What is the impact of the Affordable Care Act Medicaid expansion in 2014 on marriage and divorce in United States?

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Abstract

The Affordable Care Act (ACA) Medicaid expansion of 2014 allowed thousands of individuals to benefit from health insurance coverage. Risk aversion for healthcare can often play a role in the decision to marry or to divorce. In this article, I study the impact of this policy implemented in late 2014 on the stock of marriage and divorce in the United States. This policy was not adopted by all the fifty states, which allowed me to use a difference-in-difference method in order to see if the ACA had an impact on the stock of marriage and divorce in the states where the policy took place. My result suggests that the implementation of the Medicaid expansion has a significant effect on the stock of marriage, but not on the divorce stock in the states where the policy was implemented.

Keywords:Difference-in-difference, Medicaid expansion, Marriage, divorce.
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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 covers more than 45 million persons over the whole country. I will not focus on Medicare in this article, only on the expansion of Medicaid. 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 covers more than 45 million 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. 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

Risk aversion for health insurance can be a factor in the decision to get married or divorced. Individuals who prioritize financial security and access to healthcare may be more likely to stay in marriage or seek out a marriage as a means of obtaining health insurance coverage. Conversely, the risk of losing health insurance coverage may make individuals more hesitant to pursue a divorce, even if they would be better off ending the relationship.

The motivation behind studying the relationship between health insurance and marriage and divorce is to understand how access to healthcare can impact individuals' decision to marry or to divorce, as it affects access to healthcare for both individuals. Studying this relationship allows to better understand the various social and economic factors that influence marriage and divorce decisions behaviors, as well as how healthcare policies may impact individuals' choices in this regard. Understanding the link between healthcare and marital decisions is important for policy makers, healthcare providers and individuals.

The main objective of this study is to understand the impact of the expansion of Medicaid on marriage and divorce behavior in the United States after 2014. To fully apprehend the economical background of the outcome of the policy, I have used a Difference-in-Difference method. The use of this method allowed me to see if the policy adopted in only a restrictive number of states had had a statistical impact on the stock of marriage and divorce.

In this article, the second part is dedicated to the link to literature. Part 3 describes the data I have used in order to properly estimate the impact of the 2014 Medicaid expansion on the stock of marriage and divorce in the United States. Part 4 provides the methodology and the empirical analysis used for the Difference-in-Difference method. In part 5, I mainly present my results and provide some robustness tests. In part 6, I discuss the limitation of my subject and the problems I have encountered during this project. Finally, part 7 concludes on the impact of the expansion of Medicaid on marriage and divorce stocks.

2 Link to literature

3 Data

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

3.1 Data sources and sample

I gathered data from Census, surveys of individual and economic characteristics on a state-based level in United States from 2010 to 2017. These surveys contain information on both men, women, households' median earnings, poverty rate, ethnicity, marital status, level of education, level of employment. For my project, I choose to work with the following variables: ethnicity, marital status, level of education, poverty rate, median household income, level of employment/unemployment, household level of income. These variables are expressed as percentages. To conduct the empirical work, I merged all these datasets. The wide range of variables I selected enables me to account for differences in race, education level, income level, poverty, and employment levels.

In addition of all the variables that I have, I 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. I 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 marriage and divorce stock in United States. I also created a second dummy variable which represents before and after the introduction of the Medicaid expansion. This variable named "post" 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 I 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

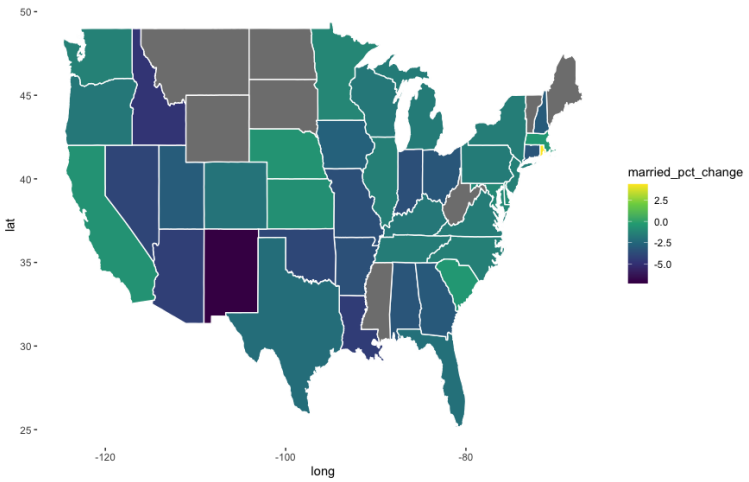
Washington. These states correspond to the states that implemented the Medicaid expansion. So, I have in my control group 34 states, which are the remaining states.

To summarize, I have 400 observations and a total of 33 variables in my final merged dataset, and I am looking at 50 states between 2010 and 2017.

3.2 Summary statistics

The following map (figure 1) displays the percentage change in stock of married people in United States between 2010 and 2017. The map shows that some states experienced a positive percentage change, indicating an increase in the number of marriages, as observed in Rhode Island with an increase approximately above 2.5% Conversely, other states have experienced a relatively small change, such as California (around 0% change). In contrast, some states have experienced a significant decrease in the stock of married people, as seen in New Mexico (approximately a 5%decrease).

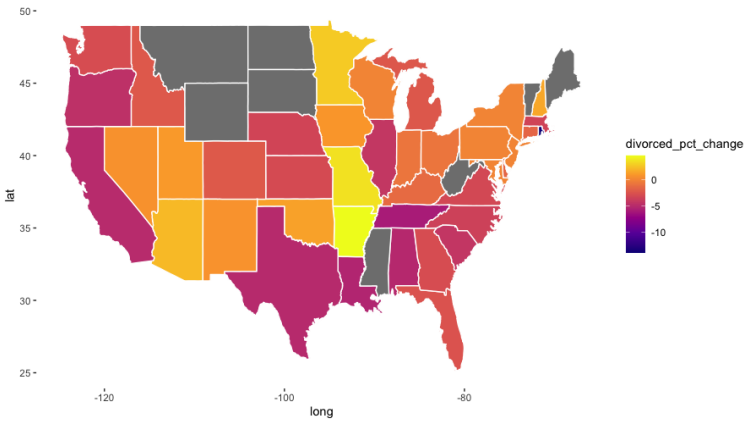
Figure 1: Percentage Change in Stock of Married People in United States between 2010 and 2017



Notes: Data from Census. Some states do not appear as I have missing values. This is the case for the following states: Hawaii, Alaska, Montana, Wyoming, North Dakota, South Dakota, Mississippi, Maine, Vermont, West Virginia.

From Figure 2 below, we can see the percentage change in the stock of divorced people in United States between 2010 and 2017. It appears that some states such as Arkansas and Minnesota have seen a rise in the stock of divorces, while other state like California, Oregon, and Texas have observed a decrease of around 5% in the stock of divorces.

Figure 2: Percentage Change in Stock of Divorced People in United States between 2010 and 2017



Notes: Data from Census. Some states do not appear as I have missing values. This is the case for the following states: Hawaii, Alaska, Montana, Wyoming, North Dakota, South Dakota, Mississippi, Maine, Vermont, West Virginia.

The table below displays the summary statistics of my data. In average, people in the treatment group reached a higher level of education; 10.16% for the control group against 13.64% for the treatment group. Individuals in the treatment group are in average more employed. However, individuals in the control group face in average higher stock of marriage and divorce than individual in the treatment group.

Summary statistics of the treatment and control group

Variable	**N**	**Controlled**, N = 280[1]	**Treated**, N = 120[1]
Marital status: never married	332	31.35 (2.53)	33.99 (2.35)
Marital status: married	332	48.95 (2.92)	47.99 (2.27)
Marital status: divorced or separated	332	13.70 (1.37)	12.28 (1.51)
Ethnicity: white	332	77.63 (9.50)	69.51 (16.21)
Ehnicity: black or african american	332	12.61 (9.37)	9.60 (8.07)
Ethnicity: asian	332	2.98 (2.44)	8.53 (9.60)
Ethnicity: hispanic of latino	332	11.68 (10.01)	15.96 (10.85)
Level of education: Graduate or professional degree	332	10.16 (1.99)	13.64 (2.63)
Employment	400	58.81 (4.23)	59.45 (4.05)
Poverty rate for married couple family	332	5.33 (1.46)	4.51 (1.81)
Unemployment	400	4.57 (1.54)	4.78 (1.37)
Median income household (dollars)	332	51,442.62 (7,390.31)	62,575.78 (9,711.94)

[1] Mean (SD)

Notes: Data from Census. All the variables are expressed in percentage.

4 Methodology

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

4.1 Estimation

To estimate whether the introduction of the Medicaid expansion had an impact on the stock of marriage and divorce, I use a difference-in-difference approach as my main identification strategy. The treatment group corresponds to the states that have implemented the Medicaid expansion while the 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 year corresponding to the implementation of the treatment is September 2014, but I chose 2015 as a reference. In the difference-in-difference approach I make a comparison of both groups of treated and untreated condition before and after the treatment period. My main equations are the following:

$$Married_{s,t} = \beta_0 + \beta_1 Post_t + \beta_2 Treatment_s + \beta_3 Treatment_s * Post_t + epsilon_{s,t} \quad (1)$$

$$Divorced_{s,t} = \beta_0 + \beta_1 Post_t + \beta_2 Treatment_s + \beta_3 Treatment_s * Post_t + \epsilon_{s,t} \quad (2)$$

Where married is the stock of marriage and divorced the stock of divorce in percentage 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 the treatment is 0, these are the states in the control group.

In order to evaluate the impact of the expansion of Medicaid, I need to consider that there maybe other state-specific factors that could be affecting the stock of marriage and divorce. To deal with this issue, I include time and state fixed effects in my difference-in-difference regression model. Fixed effects allow to control for unobserved heterogeneity between treatment and control groups, such as difference in pre-existing characteristics. By including fixed effects, I can isolate the effect of the treatment from other sources of variation in the data. Thus, I take into account that the states do not necessarily have the same laws, the same public expenditures. It is the same for time fixed effects, I introduce this effect to consider the differences through years and the hazards that characterize them. The equations are the following:

$$Married_{s,t} = \alpha + \gamma_1 Year_t + \gamma_2 State_s + \beta_3 Treatment_s * Post_t + \epsilon_{s,t} \quad (3)$$

$$Divorced_{s,t} = \alpha + \gamma_1 Year_t + \gamma_2 State_s + \beta_3 Treatment_s * Post_t + \epsilon_{s,t} \quad (4)$$

Where married is the stock of marriage and divorced the stock of divorce in percentage 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 the treatment is 0, these are the states in 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 my model, in a second step I decide to focus mainly on low-income individuals as the Medicaid expansion mainly affected this group. I use education as a proxy for income and decide to use high school attainment. The equations are the following:

$$Married{-}ind{-}educ{-}h_{s,t} = \beta + \gamma_1 Year_t + \gamma_2 State_s + \beta_3 Treatment_s * Post_t + \epsilon_{s,t} \quad (5)$$

$$Divorced{-}ind{-}educ{-}h_{s,t} = \beta + \gamma_1 Year_t + \gamma_2 State_s + \beta_3 Treatment_s * Post_t + \epsilon_{s,t} \quad (6)$$

Where Married-ind-educ-h is the stock of marriage for people and Divorced-ind-educ-h the stock of divorce for individuals who only attained high school in percentage 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 the treatment is 0, these are the states in the control group.

In a third step, I perform a difference-in-difference regression including control variables for each state and for each period. This time I choose to not focus anymore on low-income individuals. I control for race and level of employment. The equations are the following:

$$Married_{s,t} = \beta + \gamma_1 Year_t + \gamma_2 State_s + \beta_3 Treatment_s * Post_t + \beta_4 * X_{s,t} + \epsilon_{s,t} \quad (7)$$

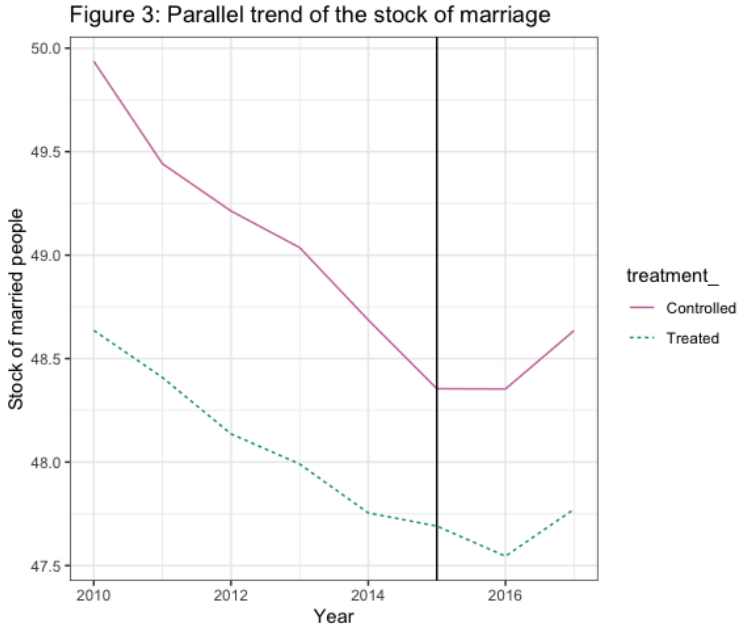
$$Divorced_{s,t} = \beta + \gamma_1 Year_t + \gamma_2 State_s + \beta_3 Treatment_s * Post_t + \beta_4 * X_{s,t} + \epsilon_{s,t} \quad (8)$$

Where married is the stock of marriage and divorced the stock of divorce in percentage 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 the treatment is 0, these are the states in the control group. Year is the fixed effect for time t, and state is the fixed effect for all 50 states s. I have the control variables, which are the X's for each stat s at each year t.

4.2 Parallel Trend

It is a critical step to verify the parallel trend assumption when conducting rigorous and valid difference-in-difference analysis because it is a key assumption

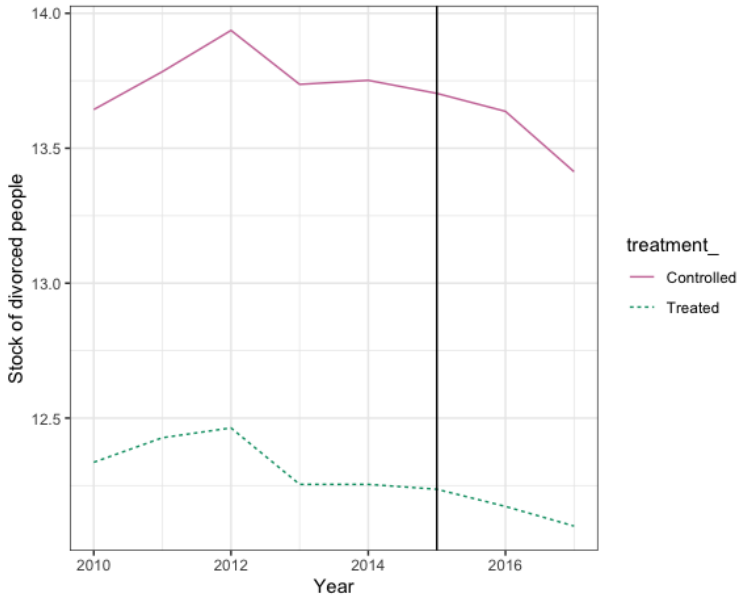
that must hold in order to obtain unbiased estimates of the treatment effect. The parallel trend assumption means that, in the absence of the treatment (Medicaid expansion), the outcome variable (marriage or divorce) for the treatment group would have followed the same trend as the outcome variable for the control group over time. If this assumption holds, any difference in the outcome variable between the treatment and control groups after the implementation of the treatment can be attributed to the treatment itself.



Notes: Data from Census. Marriage stock expressed in percentage.

In figure 3 we have both groups, treatment, and control. The treatment and control groups before 2015 do have approximately the same trend. Figure 2 shows the trend of marriage stocks in the United States. I have very similar pre-treatment trends in the outcome variable of interest for both the treatment and control groups, both before and after the implementation of the policy, then it can be concluded that the parallel trend assumption holds. This means that any difference in outcome variable between the treatment and control groups after the implementation of the policy is more likely to be due to the treatment itself rather than preexisting differences in the outcome between the two groups.

Figure 4: Parallel trend of the stock of divorced



Notes: Data from Census. Divorce stock expressed in percentage.

Figure 4 displays the parallel trend for the stock of divorce. Given that there are comparable pre-treatment trends for both groups, prior and following the implementation of the expansion of Medicaid I can conclude that the parallel trend assumption is valid. However, I notice a steeper decrease in the number of divorces for the control group after the implementation of the policy.

In general, I can note that the parallel trend assumption is holding for both the marriage and divorce stocks.

5 Results

5.1 Main results

My main results are presented in table 1. The implementation of the expansion in some states does not have a significant impact on the divorce and marriage stocks. A state that has implemented Medicaid expansion should have an increase of 0.296%-point in the stock of marriage and an increase of 0.009%-point in the stock of divorce. Since these results are not significant, I cannot take these results for granted and the coefficients cannot be reliably interpreted.

Table 1: Difference in difference estimates

	Dependent variable:	
	Stock of marriage	Stock of divorce
	(1)	(2)
treatment	-1.075**	-1.423***
	(0.432)	(0.222)
I(treatment ∗post)	0.296	0.009
	(0.705)	(0.362)
post	-0.812**	-0.187
	(0.363)	(0.186)
Constant	49.261***	13.770***
	(0.223)	(0.114)
Observations	332	332
R^2	0.040	0.169
Adjusted R^2	0.031	0.162
Residual Std. Error (df = 328)	2.745	1.411
F Statistic (df = 3; 328)	4.562***	22.269***
Note:		*p<0.1; **p<0.05; ***p<0.01

If we examine the results in table 2, it becomes evident that incorporating time and state fixed effects leads to the stock of marriage outcome becoming significant. This indicates that there may have been other factors influencing the change in the outcome apart from the treatment that are specific to state differences. Notably, there is a significant increase of 0.258%-points in the stock of marriage in states that have implemented Medicaid expansion. By controlling for fixed effects, I can better estimate the causal impact of the treatment for the marriage stock. However, it is not the case for the divorce stock as the result is still not significant. A state who received the treatment should see an increase of 0.019%-point in the stock of divorce, therefore the observed effect is not strong enough to conclude whether this small increase in divorce is because of the implementation of Medicaid.

Table 2: Difference in difference estimates including fixed effects

	Dependent variable:	
	Stock of marriage	Stock of divorce
	(1)	(2)
I(treatment ∗post)	0.258**	0.019
	(0.106)	(0.062)
Constant	48.408***	15.038***
	(0.159)	(0.093)
Observations	332	332
R^2	0.981	0.979
Adjusted R^2	0.978	0.975
Residual Std. Error (df = 282)	0.414	0.242
F Statistic (df = 49; 282)	301.273***	268.752***
Note:	*p<0.1; **p<0.05; ***p<0.01	

5.2 Robustness

In the second estimation step I consider limiting the focus on low-income individuals as Medicaid only affected this group. I decide to use education level as a proxy for income and include only individuals with a lower level of education (e.g., high school diploma) in the study. I focus on the variable "high school attainment". The result I got are presented in table 3. My results are not significant either for the stock of marriage or divorce. A state that implemented Medicaid sees an increase of 0.028%-point in the stock of marriage, and an increase of 0.001%-point increase in the stock of divorce, everything else remaining constant. Because the results are not statistically significant, it means that the data fails to provide enough evidence to reject the null hypothesis. It might be in part due that I have the presence of confounding factors. Other factors that play a role in the stock of divorce and marriage. It is therefore necessary to include control variables in my difference-in-difference regression model.

Table 3: Difference-in-difference estimates focusing on low-income individuals

	Dependent variable:	
	Stock of marriage	Stock of divorce
	(1)	(2)
I(treatment ∗post)	0.028	0.001
	(0.068)	(0.022)
Constant	15.395***	4.769***
	(0.102)	(0.033)
Observations	332	332
R^2	0.984	0.989
Adjusted R^2	0.981	0.987
Residual Std. Error (df = 282)	0.266	0.087
F Statistic (df = 49; 282)	350.127***	532.219***
Note:	*p<0.1; **p<0.05; ***p<0.01	

In a third attempt to capture the true causal effect of the expansion of Medicaid, I conduct a difference-in-difference regression that includes fixed effects and control variables. This time I choose to not focus anymore on low-income individuals. I control for race and level of employment. We can see in table 4 the results that I obtained. The result is still significant for the marriage stock at the 5% level. The effect of Medicaid expansion in a state that received the treatment is having an increase of 0.225%-point when controlling for race (black and Asian) and employment level. Despite the inclusion of control variables, the estimate for the impact of the policy on divorce is not statistically significant. The estimated effect suggests a 0.022%-point increase in the number of divorces in states that adopted the policy.

Table 4: Difference-in-difference estimates including fixed effects and controlls

	Dependent variable:	
	Stock of marriage	Stock of divorce
	(1)	(2)
Treatment*Post	0.225**	0.022
	(0.105)	(0.063)
Ehnicity: black or african american	0.057	-0.024
	(0.130)	(0.079)
Ethnicity: asian	0.128	0.003
	(0.138)	(0.084)
Level of employment	0.188***	-0.029
	(0.043)	(0.026)
Constant	37.117***	17.166***
	(4.304)	(2.612)
Observations	332	332
R^2	0.983	0.979
Adjusted R^2	0.980	0.975
Residual Std. Error (df = 279)	0.399	0.242
F Statistic (df = 52; 279)	305.175***	251.791***
Note:		*p<0.1; **p<0.05; ***p<0.01

Overall, my analysis using fixed effects and control variables indicates significant results for the impact of Medicaid expansion on the stock of marriage. However, despite conducting robust checks, I did not find significant results for the impact of the policy on the stock of divorce. Therefore, while I can confidently conclude that Medicaid expansion has a causal effect on the stock of marriage, I cannot draw a definitive conclusion regarding its impact on the stock of divorce, given the lack of significant evidence and potential confounding factors. Nonetheless, the parallel trend assumption is satisfied, and my estimates for the stock of marriage are robust and statistically significant.

6 Discussion

Since the Medicaid expansion only affected households with low income, it may seem reasonable to limit the focus of an empirical study to low-income individuals. However, establishing this low-income group presents challenges. One potential approach is to use education level as a proxy for income and include only individuals with a lower level of education (e.g., high school diploma) in the study. However, this approach has limitations as education level alone may not fully capture an individual's income level and may introduce bias into the study.

I considered using a staggered difference-in-difference model. The aim of a staggered difference-in-difference design is to estimate the causal effect of a treatment or policy that is implemented at different points in time for different groups. This allows for the comparison of changes in the outcome variable over time between the treated and control groups, both before and after the treatment is implemented. The problem I encountered is that most of the remaining states implemented Medicaid in 2018 and 2019, and my data only goes till 2017.

Secondly, I face the problem of my data, by having data by states, I cannot have a large variance between states, which may participate in the explanation of the non-significance of the results for the stock of divorce. Moreover, not having individual data led me to an undeniable lack of information. As I didn't have access to the data, I couldn't' make a case-by-case analysis and actually consider the individual characteristics of people which essentially impact the choice to marry or to divorce.

7 Conclusion

The degree of risk aversion for health insurance can potentially influence the decision to get married or divorced through various mechanisms related to financial stability, health, and well-being. Without access to health insurance, individuals may face important medical bills, which can lead to financial stress and strain the relationship. My results support that Medicaid expansion can alleviate this financial burden and increase financial stability, making it easier for individual to commit to a marriage or remain in a marriage. However, I found no statistical evidence of the 2014 Medicaid expansion on the divorce stock.

References