# Effects of ACA Medicaid Expansions on Health Insurance Coverage and Labor Supply

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**Abstract**

We examined the effect of the expansion of Medicaid eligibility under the Affordable Care Act on health insurance coverage and labor supply of low-educated and low-income adults. We found that the Medicaid expansions were associated with large (e.g., 50 percent) increases in Medicaid coverage and corresponding decreases in the proportion uninsured. There was relatively little change in private insurance coverage, although the expansions tended to decrease such coverage slightly. In terms of labor supply, estimates indicated that the Medicaid expansions had little effect on work effort despite the substantial changes in health insurance coverage. Most estimates suggested that the expansions increased work effort, although not significantly.

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## 1. Introduction

One of the key features of the Affordable Care Act (ACA) was the expansion of Medicaid to adults with incomes below 138% of the federal poverty level. Low-income adults were largely ineligible for Medicaid prior to the ACA and this group also had a relatively low rate of health insurance coverage. Therefore, expanding Medicaid to this group was seen as an important way to reduce the number of uninsured persons, which was one of the central goals of the ACA.

While the Medicaid expansions were clearly targeted at expanding health insurance coverage, the income-based eligibility criterion of the expansion may have unintended effects on work effort. There are several reasons why the Medicaid expansions may affect work.[1] First, some people may reduce work effort to lower their income and gain Medicaid eligibility. Second, some people may reduce work effort because Medicaid coverage virtually eliminates out-of-pocket medical expenditures and health insurance premium contributions, and allows a person to work less to generate the same amount of consumption (income effect). Third, some people may increase work effort because they can work and earn more than before the Medicaid expansion and still remain eligible for Medicaid due to the higher Medicaid income eligibility threshold.[2] Finally, the Medicaid expansions may have some, albeit small, positive effect on aggregate economic activity that could increase employment.

The Congressional Budget Office (2014) estimated that the ACA would reduce total hours worked by 1.7 percent, or 2 million fewer full-time equivalent workers. Of this decline in employment, the CBO (2014) estimated that the Medicaid expansions of the ACA would be responsible for a small part of the negative effect on employment.[3] To reach their conclusion about the possible effects of Medicaid,

[1] A report by the Congressional Budget Office (2014) describes the intuition underlying the causal links between Medicaid and labor supply, and earlier studies by Blank (1989), Matsudaira and Blank (2013) and Yelowitz (1995) present simple models that generate similar hypotheses. Also, see Bitler and Karoly (2015), Moffitt (2015) and, particularly, Mulligan (2013; 2015) for a description of the ACA labor supply incentives and potential behavioral responses.

[2] Another possibility is that some people will switch jobs from one that provides employer-provided insurance and a relatively low wage to one that does not provide employer-provided insurance and a relatively higher wage, but that still allows for Medicaid coverage. The higher wage of the new job would have substitution and income effects that could change work effort.

[3] See Appendix C Labor Market Effects of the Affordable Care Act: Updated Estimates of CBO (2014) report, The Budget and Economic Outlook: 2014 to 2024. Also see Harris and Mok (2015).

the CBO (2014) relied on a synthesis of the evidence from a few, recent case studies of the effect of Medicaid expansions on labor supply. Perhaps the most important of these studies was Baicker et al. (2013), which examined the effect of expanding Medicaid to childless adults in Oregon in 2008. The findings from this study are particularly compelling because of the high degree of internal validity resulting from the experimental design that was used. Baicker et al. (2013) reported that gaining Medicaid coverage was associated with a small—1.6 percentage point (3%)—and statistically insignificant decrease in employment and earnings. Another study reviewed by CBO (2014) was Dague et al. (2014), which examined an expansion of Medicaid to childless adults in Wisconsin in 2009. A quasi-experimental research design (i.e., regression discontinuity) was used that exploited the capping of enrollment that left eligible people unable to enroll in Medicaid after a certain date. Results from the study indicated that Medicaid enrollment was associated with between a 2% to 18% percent decrease in employment. A third study included in the CBO (2014) review was by Garthwaite et al. (2014). This study examined the rollback of Medicaid eligibility in Tennessee in 2005. For this analysis, a difference-in-differences research design was used with Tennessee as the treated state and other Southern states the control states. Results of the analysis were mixed. Among low-educated, childless adults, the change in Medicaid policy was associated with a 25% increase in employment, but there was no effect for other educational groups.[4]

Besides these important pre-ACA studies, there are a couple of studies of the effect of the ACA Medicaid expansions on labor supply that were produced since the CBO (2014) report.[5] Gooptu et al. (2016) used a sample of low-income (<138% Federal Poverty Level) adults drawn from monthly Current

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http://www.cbo.gov/sites/default/files/cbofiles/attachments/45010-breakout-AppendixC.pdf. Also see Congressional Budget Office (2015). "How CBO Estimates the Effects of the Affordable Care Act on the Labor Market." Working Paper 2015-09. December 2015.

[4] Estimates in Garthwaite et al. (2014) are intention-to-treat estimates and are not directly comparable to estimates from the Oregon and Wisconsin studies. Garthwaite et al. (2014) estimated that between 63 and 90 out of every 100 childless adults that lost public health insurance coverage found employment. This is a very large implied effect of Medicaid that differs dramatically from estimates in the Oregon and Wisconsin studies. Estimates in Garthwaite et al. (2014) also suggest employment responses to changes in income (the value of Medicaid) that are 20 to 60 times the size of estimates found in most prior studies. See McClelland and Mok (2012): https://www.cbo.gov/sites/default/files/cbofiles/attachments/10-25-2012-Recent_Research_on_Labor_Supply_Elasticities.pdf

[5] There is also a larger literature on the labor supply effects of the ACA as a whole—not specific to Medicaid. Garrett and Kaestner (2014; 2015) review this literature.

Population Surveys between January 2005 and March 2015 to examine the effect of Medicaid expansions on three outcomes: transitions from employed to unemployed; transitions from full-time to part-time employment; and job switches (employed in one job to employed in different job).[6] A difference-in-differences research design was used. The authors reported that the ACA Medicaid expansions had no significant effect on these outcomes. In an unpublished paper, Leung and Mas (2016) used data from the American Community Survey from 2010 to 2014 and monthly Current Population Surveys from January 2010 to July 2015 to examine the effect of the ACA Medicaid expansions on employment, hours of work and wages.[7] The research design for the analysis in this study was difference-in-differences. Leung and Mas (2016) reported that the ACA Medicaid expansions had no significant effect on employment, hours of work or wages.

As this brief review of the literature has revealed, previous studies of the effect of Medicaid on labor supply have not produced a consensus conclusion.[8] This is an important gap in knowledge because of the relevance of this issue for both economic theory and public policy. Economic theory predicts that social programs with income-based eligibility will bring forth behavioral responses with respect to work effort. Therefore, measuring the existence and magnitude of a behavioral, labor supply response to the large and recent expansion of Medicaid will provide empirical evidence to assess a fundamental theoretical tenet. Moreover, two of the recent case studies of the effect of Medicaid on labor supply (OR and WI studies) were conducted using a sample of persons always eligible for Medicaid and, therefore, do

[6] Note that Gooptu et al. (2016) do not exhaust the possible employment transitions because they do not examine unemployed to employed or part-time to full time. In addition, the study selected the sample based on the income in the previous (baseline) year, which may be a noisy measure of potential income in the following year. Finally, a substantial part of the eligible sample (25%) could not be matched across CPS surveys.

[7] Leung and Mas (2016) also examined the effect of ACA Medicaid expansions on health insurance coverage. An important difference between our study and Leung and Mas (2016) is that we examine childless adults and parents. Leung and Mas (2016) do not include parents even though a large portion of low-income parents gained Medicaid and were affected by the expansions (see our results below). In addition, in some analyses, Leung and Mas (2016) selected the sample using income, which is endogenous. In other analyses, Leung and Mas (2016) use a sample of all persons including those with very high incomes. Therefore, a large portion of their sample is unaffected by Medicaid expansions and this reduces the statistical power of their analysis.

[8] There is also a literature that examined the effect of Medicaid expansions for pregnant women and children in late 1980s and 1990s: Yelowitz (1995); Montgomery and Navin (2000); Ham and Shore-Shepard (2005); Meyer and Rosenbaum (2001); and Dave et al. (2015). These studies also reported mixed results.

not allow for one potentially important labor supply response—"jumping on" Medicaid by lowering income to gain eligibility (Mulligan 2013). For public policy, knowing whether there are unintended consequences related to work effort associated with Medicaid is an important component of a cost-benefit analysis of the effectiveness of Medicaid. If there are large changes in work effort associated with Medicaid, for example, declines in work along the lines suggested by the Garthwaite et al. (2014), then the net, social benefit of the Medicaid expansions would be substantially lower than otherwise believed.

In sum, the absence of a consensus from the relatively small prior literature related to whether Medicaid affects labor supply and the importance of the issue for theory and policy warrants additional study. In this paper, we examine the effect of the ACA Medicaid expansions on health insurance coverage and labor supply. While the original formulation of the ACA Medicaid expansions was that it would be implemented in all states, a Supreme Court ruling allowed states to opt out of the expansion and approximately half did so.[9] Thus, we exploit the state-variation in expansions resulting from the Supreme Court ruling to assess the effect of Medicaid on insurance coverage and labor supply. We use two research designs: difference-in-differences and synthetic control. Data for the analysis are drawn from the American Community Survey (ACS) from 2010 to 2014, the March Current Population Survey (CPS) from 2010 to 2015, and monthly CPS data from January 2010 to May 2016.

We study both health insurance coverage and labor supply because insurance coverage is itself an important outcome of interest, and because changes in labor supply will be partly reflected by changes in insurance coverage. For example, if people reduce labor supply to become eligible for Medicaid, then we should observe a decrease in employment; an increase in Medicaid coverage; a reduction in uninsured; and possibly a reduction in private insurance if the person replaced their private insurance with Medicaid. Thus, the size of the increase in Medicaid has implications for the magnitude of the potential labor supply response. Similarly, low-income, working persons may gain Medicaid coverage because of the expanded income eligibility. For this group the extra income associated with Medicaid may cause them to work

[9] See http://www.supremecourt.gov/opinions/11pdf/11-393c3a2.pdf

less. Therefore, changes in insurance coverage, particularly Medicaid, provide some evidence of the extent of treatment and the size of the group that may change labor supply in response to the Medicaid expansion, although the association is not necessarily one-for-one.[10]

Results of our study indicate that, among low-educated and low-income adults, the ACA Medicaid expansions significantly increased Medicaid coverage by between 23 percent and 54 percent for parents, and by between 51 percent to 70 percent for childless adults. Notably, these increases in Medicaid coverage were associated with significant decreases in the proportion uninsured with relatively little change in private health insurance coverage, although for some groups such as unmarried parents living in states with prior Medicaid expansions, there was substantial switching from private insurance to Medicaid with less significant decreases in the proportion uninsured. These substantial changes in insurance coverage were, in general, associated with few significant changes in labor supply. Estimates of the effect of Medicaid on labor supply were, in general, small and not statistically significant, and most were positive. Overall, there was very little evidence that the Medicaid expansions decreased work effort.

**2. ACA Medicaid Expansions**

As noted, the Supreme Court decision that allowed states to opt out of the ACA Medicaid expansions resulted in approximately half of the states not expanding Medicaid in 2014 (see Table 1). Moreover, among those that did expand, several states had already expanded Medicaid to adults, for example, parents. Therefore, these states may not have experienced any real change in Medicaid eligibility for some groups. Finally, several states expanded Medicaid in 2015 or later. In short, classifying states as to whether they did or did not experience an effective change in policy is not as simple as assessing whether they expanded Medicaid in 2014 as part of the ACA.

[10] Several studies have also examined the effect of Medicaid expansions on health insurance (Wherry and Miller 2016, Courtemanche et al. (2016) and Simon et al. (2016)). We add significantly to this literature by using data from the 2015 Current Population Survey and by examining several different demographic groups and combinations of states. In addition, all these studies selected the sample using income, which is endogenous.

To classify states into those experiencing a change in Medicaid policy ("treated") and those not experiencing a change in Medicaid policy ("control"), we reviewed several sources of information.[11] Table 1 provides a list of states and how we classified them into treated and control groups as of 2014. For analyses that use data from 2015 and 2016, we made appropriate modifications that we identify below. As of 2014, states included in the control group are:

- States that did not expand Medicaid in 2014 and that had no prior Medicaid expansion between 2010 and 2014: AL, AK, FL, GA, ID, KS, LA, MS, MO, MT, NE, NC, OK, PA, SC, SD, TX, UT, VA, WY (20).
- States that did not expand Medicaid in 2014 and that had prior, but limited Medicaid expansions between 2010 and 2014: IN, ME, TN, WI (4).
- States that expanded Medicaid in 2014, but that had prior and comprehensive Medicaid expansion similar to ACA for both parents and childless adults between 2010 and 2014: DE, DC, MA, NY, VT (5).

The control group consists of 29 states. Note that we include IN, ME, TN and WI as control states even though they had some prior Medicaid expansions between 2010 and 2014. However, the prior Medicaid expansions in these states were limited (e.g., capped or closed enrollment). One state changed status between 2010 and 2013; Colorado expanded eligibility to childless adults in 2012, but capped the program at 10,000. To assess whether including states with prior expansions, either comprehensive as in MA or limited as in IN, made a difference, we re-estimated all models excluding these states from the analysis and we report the results below. We note here that dropping these states had little effect on

[11] Medicaid eligibility rules were determined using Kaiser Family Foundation's Annual 50 State Survey of Eligibility Rules, Enrollment and Renewal Procedures, and Cost-Sharing Practices in Medicaid and CHIP (2009 through 2015), Medicaid.gov demonstrations and waivers database (http://www.medicaid.gov/medicaid-chip-program-information/by-topics/waivers/waivers_faceted.html), Kaiser Family Foundation's state-specific fact sheets, healthinsurance.org Medicaid state-specific fact sheets, and individual state Medicaid websites.

estimates. As noted, four states expanded Medicaid in 2015 or 2016: PA (1/15), IN (2/15), AK (9/15), and MT (1/16). Analyses that use 2015 and 2016 data drop these states from the analysis.[12]

As of 2014, the treated states are the following:

- States that expanded Medicaid in 2014 and that had no prior Medicaid expansion: AK, KY, MI, NH, NV, NM, ND, OH, WV (9).
- States that expanded Medicaid in 2014 and that had a prior, but limited, Medicaid expansion for parents and/or childless adults: AZ, CA, CO, CT, HI, IA, IL, MD, MN, NJ, OR, RI, WA (13).

We note that Michigan expanded Medicaid in April of 2014 and New Hampshire expanded Medicaid in August of 2014. We include both in treated group because Michigan expanded for most of the year and New Hampshire is a small state and the partial year expansion is unlikely to make a difference to estimates. Re-estimating models without these two states included in treatment group had no material effect on estimates. Finally, as already mentioned, states that expanded after 2014 (IN, PA, AK, and MT) are excluded from the analysis when data post 2014 is used.

The fact that some states had prior expansions motivated us to divide the treated states into two groups depending on whether they had a previous expansion. However, if a state had expanded Medicaid fully (comprehensively) to both parents and childless adults (DE, DC, MA, NY, VT), which is the equivalent of the ACA expansion, these states were included in the control group of states. Thus, the second group of states in the treated category consists of states with a full parental expansion of Medicaid and states with limited expansions for parents and/or childless adults. On the one hand, it is reasonable to expect that the effect of the 2014 (ACA) expansion of Medicaid will be smaller in states with previous expansions of Medicaid, although many of these expansions were quite limited. Most were focused on parents. On the other hand, if take-up of Medicaid among eligible persons was relatively low, the individual mandate that required all people to have health insurance and the public outreach (i.e.

[12] We dropped these states because we wanted to use a common definition of treatment across the two research designs. The synthetic control method requires a common pre- and post-period, so these late expanders are dropped because we used 2014 as the beginning of the post-period. To be consistent, we also dropped these states from the difference-in-differences analysis.

marketplaces) that became effective in 2014 may cause those always eligible for Medicaid to obtain it and this would suggest smaller differences between the two groups of states that expanded Medicaid in 2014. Empirically, we test whether the effect of Medicaid differed in the two groups of treated states. We also explored whether to divide the second group of treated states into a finer classification based on the type of previous expansion, but tests indicated that these two categories were the only empirically relevant groupings.[13]

## 3. Empirical Approach

### 3.a. Data

The data used in the analysis come from three sources: the American Community Survey (ACS) from 2010 to 2014; the March Current Population Survey from 2010 to 2015; and monthly files of the Current Population Survey (CPS) from January 2010 to May 2016. From each of these datasets, we selected a sample of non-disabled, adults between the ages of 22 and 64 who have a high school education or less. We limit the sample to relatively low-educated adults because Medicaid is targeted at low-income persons and education is strongly related to income. We recognize that selecting a sample using income is problematic because Medicaid may affect labor supply and income and therefore, may lead to biased estimates.

We conduct analyses using all persons with a high school education or less and analyses stratified by marital status (married, not married), whether there is a child in the family and age.[14] We stratify the sample by marital status because it is associated with income; unmarried persons have lower incomes and may be more likely to be affected by the Medicaid expansions than married persons. We also conducted analyses for samples divided by whether or not there are children under the age of 18 in the household. Most prior Medicaid expansions were targeted toward low-income parents, so this group may be less affected by the ACA Medicaid expansions, and there may be differences in the effect of Medicaid by

[13] Specifically, we divided the second group of treated states into those with and without a full Medicaid expansion to parents. We could not reject the hypothesis that these two groups had similar effects on outcomes.
[14] Further stratification by marital status and education was not empirically meaningful—we could not reject the equality of estimates by education group within marital status category.

whether children are present because of differences in household income and preferences. Stratification by age is motivated by the same considerations with respect to income and also because age is correlated with health, which is an important determinant of health insurance coverage.

Data on earnings from the 2013 American Community Survey show that the low-educated sample we selected is quite disadvantaged. For example, unmarried parents in our sample have mean earnings of approximately $17,000 and unmarried, childless adults have mean earnings of approximately $18,000. However, as a sensitivity analysis, we also select a sample of persons with incomes less than 300% of the federal poverty limit. We chose 300% because we wanted to limit the selection bias associated with selecting the sample using income while simultaneously selecting a group that was likely affected by the Medicaid expansions. Because the monthly CPS files do not report income accurately, we do not use the low-income sample in analyses that use these data. Descriptive information in Table 2 reveals that the low-educated and low-income samples are quite similar with respect to the health insurance coverage and labor supply. We discuss this further below.

The ACS collects information on approximately three million people each year covering over 92% of the U.S. population in each year. The survey is conducted on a monthly basis throughout the year and combined into an annual file. The ACS collects information on health insurance coverage at the time of interview, employment at the time of interview, usual hours of work in last year (one year prior to survey), and demographic characteristics. Because the ACS is conducted on a monthly basis, we focus on the health insurance and current employment variables. Information on usual hours of work, which refers to the past year, will span the pre-expansion period, so we do not use this outcome.

The Annual Social and Economic Supplement to the Current Population Survey, i.e., the "March CPS" conducted in March of each year (supplemented with data from February and April since 2002) collects similar information to the ACS including health insurance. The survey is of the civilian, non-institutional population of the United States. We use the March CPS only for its information on health insurance because it is available for March 2015 whereas the ACS data are through 2014 and, as noted, the ACS is conducted continuously throughout the year. One disadvantage of the March CPS is that there

was a change in the health insurance question in 2014 (Turner and Boudreaux 2014; Pascale 2015). The redesigned survey was intended to address the problem related to the recall period (current v. past year) that affected past CPS surveys.

The monthly CPS files are similar to the March CPS files except they do not collect information on many social and economic indicators. However, the labor supply variables are available and refer to the survey week. Therefore, we can use the hours of work information in the monthly CPS files. In addition, the monthly CPS data are available through May 2016.

To summarize, the dependent variables and data sources for our analyses are the following:

- Health Insurance: Medicaid, private insurance, and uninsured. The information on health insurance is from the ACS and March CPS.[15] The ACS and CPS allow people to report more than one health insurance category and approximately 2% to 3% report having Medicaid and another type of insurance.
- Labor Supply: employed at time of interview, usual hours worked per week; and worked 30 or more hours per week (full time). The employed at time of interview information is from the ACS and monthly CPS. The usual hours per week and part-time status are from the monthly CPS.

The key independent variables for the analysis are the treatment group indicators listed in the previous section and Table 1. We estimate regression models using alternate definitions of Medicaid expansion states: one model defines treatment states as all those that expanded in 2014 regardless of whether they had a prior expansion, and the second model separates treatment states into two depending whether they had a prior expansion. For the second model, we test whether the coefficients on the treatment states indicators differ. Other independent variables included in the regression include dummy variables for each year of age; dummy variables for race/ethnicity (non-Hispanic white, non-Hispanic

[15] We do not divide private health insurance into employer-sponsored and non-group because of well-known problems of data quality that make the distinction between types of private insurance particularly problematic (Call et al. 2012; Claxton et al. 2013; Pascale 2016). Our focus is also on labor supply and changes in Medicaid and uninsured are most relevant outcomes related to labor supply. However, estimates for models that divide the privately insured into those with and without employer sponsored insurance are available from the authors.

black, non-Hispanic other, and Hispanic), dummy variables for marital status (married, never married, and other), dummy variables for education (high school degree and less than high school degree), dummy variables for number of children (0, 1, 2, and 3 or more), and dummy variables for family size (1, 2, 3, 4 and 5 or more).

Descriptive statistics of the variables used in the analysis are presented in Table 2.[16] These statistics are based on data from 2010, the baseline period. The left panel presents means for the samples selected using education. In general, the low-educated samples drawn from the ACS and CPS are quite similar. Approximately one-third are uninsured; 55 percent to 60 percent are covered by private insurance; 11 percent are covered by Medicaid; two-thirds are employed at the time of interview; and approximately 60 percent work full-time (>30 hours). The low-educated sample drawn from the March CPS is slightly younger, less likely to be white, and more likely to have a child under age 18 in the household than the ACS sample, although none of the differences are that marked. The right panel of Table 2 presents means for the samples selected using income. Here too the ACS and CPS samples are very similar, and notably, not too different from the low-educated samples, which confirms that selecting the sample using education is an effective way to identify a group likely affected by the Medicaid expansions. The low-income samples are slightly more likely to be uninsured (e.g., 36 percent) and slightly less likely to work (full time) than the low-educated samples. However, differences are not substantial.

**3.b. Difference-in-differences Research Design**

The ACA Medicaid expansions provide state by year variation in Medicaid eligibility that can be used to obtain estimates of the effect of Medicaid eligibility on health insurance coverage and labor supply. The expansions represent a source of plausibly exogenous variation in Medicaid eligibility, although clearly states chose whether to expand or not and, therefore, the exogeneity of the expansions needs to be assessed. Accordingly, we use a difference-in-differences (DiD) research design to obtain

[16] These are unweighted estimates.

estimates of the effect of the expansions on health insurance and labor supply. The DiD design is a straightforward approach that is intended to mimic the pre- and post-test with comparison group design of a true experiment.

We have already described the classification of states into treatment and control groups. Given this classification, DiD estimates can be obtained using the following regression model:

(1) $$HEALTHINS_{ijt} = \alpha_0 + \beta_j + \delta_t + \lambda(TREAT_j * Y2014_t) + X_{ijt}\Gamma + e_{ijt}$$

Equation (1) indicates that the health insurance coverage, for example, Medicaid, of person "i" in state "j" and year "t" depends on state fixed effects ( $\beta_j$ ), year fixed effects ( $\delta_t$ ), an indicator of whether the state is in treated group and the year is 2014 ( $TREAT_j * Y2014_t$ ), and demographic characteristics ( $X_{ijt}$ ) such as age that were previously described. In equation (1), the dependent variable is health insurance, but analogous models will be estimated using labor supply measures. In addition, for data that extend to 2015 or 2016, the interaction between the treated indicator and post-expansion period will include the additional years.

We also estimate a version of equation (1) that allows there to be two treatment groups: states that expanded Medicaid in 2014 and had no prior expansions and states that expanded Medicaid in 2014, but had some form of prior expansion. The model that allows for effects to differ by treatment group type is:

(2) $$HEALTHINS_{ijt} = \alpha_0 + \beta_j + \delta_t + \lambda_1(TREAT\_NOPRIOR_j * Y2014_t) + \lambda_2(TREAT\_PRIOR_j * Y2014_t) + X_{ijt}\Gamma + e_{ijt}$$

In equation (2), there are two treatment indicators and two coefficients measuring the effect of Medicaid expansions in the different types of treatment states. We test whether $\lambda_1 = \lambda_2$ to assess whether the prior expansion of Medicaid resulted in different effects of the 2014 expansion.

The key assumption underlying the validity of the DiD approach is the parallel trends assumption—that in the absence of the ACA Medicaid expansions changes in health insurance and labor supply would be the same in treated and control states. To assess the likely validity of this assumption, we

estimate a model, which we refer to as an event history specification, allowing for a complete set of interactions between the indicator of treatment status and years:

$$(3)\quad HEALTHINS_{ijt} = \alpha_0 + \beta_j + \delta_t + \sum_{k=2011}^{2014} \lambda_k (TREAT_j * YEAR_t) + X_{ijt}\Gamma + e_{ijt}$$

The only difference between equations (1) and (3) is that the effect of treatment is allowed to differ for every year instead of just 2014 (2015 and 2016 too when relevant). The parallel trends assumption implies that the coefficients on the interaction terms between treatment and year ( $\lambda_k$ ) would be zero in years prior to 2014. We test this hypothesis and report results below, but note here that the evidence from this analysis generally supports the validity of the research design.

**3.b. Synthetic Control**

A second approach to obtaining estimates of the effect of the Medicaid expansions on labor supply is the synthetic control approach proposed by Abadie et al. (2010). This approach uses a matching procedure to create a synthetic comparison (control) group that is a weighted average of states that did not expand Medicaid. While technically not a DiD approach, the Abadie et al. (2010) approach is similar because the estimate of the effect of Medicaid is obtained by taking the difference in means between treated states and a weighted average of non-treated states. However, only the post-expansion difference is used to calculate the estimate because the approach assumes that pre-expansion differences between treated and non-treated states are zero. Indeed, the central feature of the Abadie et al. (2010) method is to select a comparison group in such a way as to minimize—reduce toward zero—the pre-expansion differences in means between treated states and the synthetic comparison group.

The key to the Abadie et al. (2010) approach is selecting the weights that are used to construct the synthetic comparison group, or counterfactual outcome. Abadie et al. (2010) suggest choosing weights that minimize differences between the pre-treatment mean outcome and covariates of treated and untreated observations.[17] The unit of observation in this approach is the state. The argument underlying

[17] See Abadie et al. (2010) for details.

this approach is that if the pre-treatment means of the treated and control states are equal, then the post-treatment difference is likely to represent a valid estimate of the policy. An advantage of the synthetic control approach is that the closeness of the match between the treated and control states can be assessed easily, for example, graphically, and the weight for each potential comparison state is provided.

There are a variety of ways to select weights that are used to construct the synthetic comparison group, for example, by minimizing the difference between each pre-period value of the dependent variable and covariates of treated and untreated states. Alternatives include using the average of pre-period outcomes to match on instead of each pre-period outcome, or to match on the average and only the last (first) pre-period outcome. We chose to match states using each pre-period value of the dependent variable and a select number of covariates (state means of age, proportion in race/ethnic categories and proportion with less than high school degree), but we also report estimates from an alternative approach that uses only the average value of pre-2014 dependent variable, the 2013 value and each pre-2014 value of select covariates.[18] Only states with positive weights are used to construct the synthetic control group. Notably, for our preferred method of matching, almost all (e.g., 25) potential control states had positive weights. For the alternative method, the number of states with positive weights was less fluctuating between 5 and 13 depending on the outcome and data set. Despite this difference, estimates from the two approaches were very similar.[19]

Once the weights are selected and the synthetic comparison group constructed, the estimate of the effect of the Medicaid expansion is derived by taking the difference between the mean outcome in the treated states (treated as one unit) and the mean outcome in the synthetic comparison group, which is just a weighted average of outcomes in the non-expanding states. Inferences for this estimate are derived from permutation tests (randomization inference) that consist of re-doing the analysis 1000 times, but each time

[18] See Kaul et al. (2015) for an analysis of the potential consequences of different approaches. We also used a third approach—matching on pre-2014 averages of dependent variable and select covariates. Estimates from this third approach were in all but a few cases similar to those from the other two approaches. Overall, the method of matching made little difference.

[19] For analyses that dropped states with prior expansions or because of late expansion dates, the number of potential control states was considerably less as was the number of state with positive weights.

using a randomly selected group of treatment states. After generating these 1000 "random" estimates, the p-value of the estimate of the effect of Medicaid expansion on labor supply is the fraction of "random" estimates that are larger in absolute value than the actual estimate for the true treated states.

## 4. Results

### 4.a. Estimates of the Effect of ACA Medicaid Expansions on Health Insurance Using American Community Survey 2010 to 2014

We begin the discussion of results with the effect of the Medicaid expansions on health insurance coverage, which is classified into three categories: Medicaid, uninsured, and private. Table 3 presents difference-in-differences estimates, which are derived from data from the ACS. The table is organized as follows. There are two panels that present results for parents (children under 18 in family)—the top panel—and childless adults (no children under 18 in family)—the bottom panel. Within each panel, estimates from two samples are shown: the low-educated sample and the low-income (<300 percent of federal poverty) sample. For each of the three health insurance outcomes—Medicaid, uninsured and private—estimates from two model specifications are presented in separate rows (top and bottom row). In one model (top row), we combine all states that expanded Medicaid in 2014 into one treatment group. In the second model (bottom row), we allow the effect of the Medicaid expansions to differ depending on whether the state had a prior expansion of some type. In addition, for the low-educated sample, we present estimates for each outcome and each sample (parents and childless adults) for observations further stratified by marital status. [20]

Estimates in the top panel (parents) and top row of Table 3 indicate that the ACA Medicaid expansions were associated with an increase in Medicaid coverage, a decrease in the proportion uninsured, and a decrease in private insurance coverage. Estimates related to Medicaid and uninsured are always statistically significant. For the full ("All") low-educated sample of parents, the 2014 Medicaid expansions increased Medicaid coverage by 4 percentage points, or 24 percent of the 2010 mean of the

[20] All estimates presented in this study are unweighted. We have also estimated the main difference-in-differences models with survey weights. The inclusion of weights makes no quantitative or qualitative differences in our results.

proportion of uninsured. The expansion of Medicaid was associated with a 2.7 percentage point decline in uninsured and a 1.1 percentage point decline in private insurance. The decline in private insurance suggests some amount of crowd out of private for public insurance. For the sample of parents as a whole, approximately 25% of the increase in Medicaid may have come from private insurance. Estimates for the low-income sample are very similar to those for the low-educated sample, although slightly larger. The Medicaid expansion of 2014 was associated with a 4.6 percentage point (24 percent) increase in Medicaid; a 2.7 percentage point decrease in uninsured; and a 1.6 percentage point decrease in private insurance. These estimates suggest a slightly higher rate of crowd out (35 percent) of private for public insurance than in the low-educated sample.

Estimates in the bottom row of the top panel reveal that, among married parents, the effect of the 2014 Medicaid expansions did not differ significantly, or meaningfully, by whether a state had a prior Medicaid expansion. However, for not married parents, the effect of the 2014 expansion was noticeably, if not statistically, different by whether the state had a prior Medicaid expansion, which were mainly targeted at parents. Among the low-educated and unmarried group, the Medicaid expansion was associated with a larger increase in Medicaid (5.6 percentage points v. 3.5 percentage points) and larger decrease in uninsured (4.9 percentage points v. 1.5 percentage points) in states that had no prior expansion than in states with a prior expansion. The substitution of private for public coverage appears to have occurred mostly among the not married, parent sample in states that had previously expanded Medicaid; for this group of parents, the 2014 Medicaid expansion was associated with a 3.5 percentage increase in Medicaid and a 2.4 percentage point decrease in private insurance suggesting a crowd out rate of 69 percent. Estimates in the bottom row of the top panel pertaining to the low-income sample also suggest that the effect of the 2014 expansion was larger in states that had no prior expansion, and that crowd out of private insurance was slightly greater in the prior expansion states.

In the bottom panel of Table 3, estimates of the effect of the 2014 expansions on childless adults are presented. Here too estimates indicate that the 2014 expansions were associated with an increase in Medicaid coverage (53 percent) and decrease in uninsured (11 percent), but in this case, there is little

change in private insurance. However, there are substantial differences by marital status within the low-educated sample with effect sizes larger in absolute value for the not married group. Among the low-educated, married childless adults, the 2014 Medicaid expansions were associated with a 2.4 percentage point (63 percent) increase in Medicaid coverage and a 2.2 percentage point (11 percent) decrease in uninsured. For the not married group of childless adults, the 2014 expansion is associated with a 5.2 percentage point (48 percent) increase in Medicaid and a 4.4 percentage point (10 percent) decrease in uninsured. As estimates in the bottom row on the bottom panel indicate, the effect of the 2014 expansions on health insurance coverage of childless adults did not differ significantly in terms of magnitude (although the small differences are statistically different for low-income sample as indicated in Table 3) by whether the state had a prior expansion, which is consistent with the fact that most prior expansions were targeted at parents.

Estimates for the low-income sample are similar, but again, slightly larger than the corresponding estimates for the low-educated sample. Among low-income, childless adults, the 2014 Medicaid expansions were associated with a 6.3 percentage point (66 percent) increase in Medicaid; a 4.8 percentage point (12 percent) decrease in uninsured; and a 1.3 percentage point decrease in private insurance. As with the low-educated sample, there is little evidence that the effect of the expansion differed by whether a state had a prior expansion.

As previously noted, the validity of the difference-in-differences estimates in Table 3 depends on the parallel trends assumption that in the absence of the Medicaid expansions changes in health insurance coverage would be the same in treated and control states. To assess the likely validity of this assumption, we re-estimated the models that produced the estimates in Table 3, but allowed the treatment indicator to differ by every year instead of just pre- and post-2014. We refer to estimates from these analyses as event history estimates. The parallel trends assumption implies that all pre-2014 interactions between the treatment indicator and the year dummy variables are zero.

Appendix Table 1 presents the event history estimates. While estimates are not all independent, there are 72 different estimates in Appendix Table 1 that are relevant—pertaining to coefficients on the

interaction between treatment indicator and pre-2014 dummy variables. Only 7 of the 72 estimates are statistically different from zero. Even when estimates are different from zero, they are much smaller than the estimates associated with the 2014 interaction. Overall, the event history estimates support the validity of the DiD approach. Given this finding, it is reasonable to interpret the estimates in Table 3 as causal effects of the 2014 Medicaid expansions.

We also obtained estimates of the effect of the Medicaid expansions on health insurance coverage using a synthetic control approach. While not a difference-in-differences approach, the synthetic control approach is similar. In this case, the control states are chosen on the basis of a statistical, matching procedure instead of simply using all non-expansion states as controls, as in the difference-in-differences design. Figures 1 through 12 provide graphical evidence of the validity of the synthetic control approach. In all figures, the pre-2014 trend in each measure of health insurance is very similar—almost identical—between the treated states and synthetic control group of states.

In Table 4, we present estimates obtained using the synthetic control approach. For comparison, we also show the analogous difference-in-differences estimates from Table 3 in Table 4. Note that p-values for the synthetic control estimates are provided in brackets in Table 4 because the randomization inference approach produces only p-values. Overall, synthetic control estimates are quite similar to difference-in-differences estimates. The only difference of note is that estimates from the synthetic control approach suggest less crowd out of private insurance. Despite this small difference, the similarity of the synthetic control and difference-in-differences estimates bolsters the case for interpreting the estimates as causal.[21]

We also conducted analyses for samples stratified by age, which is a demographic factor related to income, and therefore likely eligibility, and other determinants of health insurance coverage such as

[21] We also estimated synthetic control models using a different approach to select weights for constructing the control group. Specifically, we used the average value of health insurance between 2010 and 2013 and the 2013 value instead of each individual value. Estimates from this alternative (not reported) were virtually identical to those reported in Table 4.

health that could cause a different behavioral response.[22] We report these results in Appendix Table 2 using the low-educated sample.[23] Estimates of the effect of the 2014 Medicaid expansions on health insurance coverage do not vary significantly or meaningfully by age. The expansions had a slightly larger effect on Medicaid coverage and the proportion uninsured among younger (ages 22 to 44), low-educated adults than older (ages 45 to 64), low-educated adults. The one notable difference by age is that there is more evidence that the Medicaid expansions resulted in a substantial amount of crowding out of private for public insurance among unmarried, parents between the ages of 45 and 64. For this group, the Medicaid expansions had virtually no effect on the proportion uninsured—the increase in Medicaid coverage was almost fully (84 percent) offset by a decrease in private coverage.

Finally, using the low-educated sample, we re-estimated all models dropping the nine control states that had prior expansions (DE, DC, MA, NY, VT, IN, ME, TN and WI) and the two treatment states that expanded late (NH and MI). We report both difference-in-differences and synthetic control estimates in Appendix Table 3 along with corresponding estimates from Tables 3 and 4 for comparison.[24] Estimates in Appendix Table 3 are quite similar quantitatively to the corresponding estimates in Tables 3 and 4, and there are virtually no qualitative differences between estimates in Appendix Table 3 and estimates in Tables 3 and 4.

**4.b. Estimates of the Effect of ACA Medicaid Expansions on Health Insurance Using March Current Population Survey 2010 to 2015**

In addition to using the ACS, we obtained estimates of the effect of the 2014 Medicaid expansions on health insurance coverage using the March CPS from 2010 to 2015. One possible advantage of the March CPS is that it reports data as of March 2015 whereas the ACS collects

[22] We have also estimated our main difference-in-differences approaches without adults aged 22-25, as their behavior may have been influenced by the dependent coverage provision. Removal of this group from the analysis has no meaningful effect on our results.

[23] Estimates by age are available upon request for the low-income sample. These are very similar to those reported for low-educated sample, which is unsurprising given the similarity of estimates between the two samples in Table 3 and 4.

[24] Appendix Figures A1 through A6 show that the synthetic control approach of Appendix Table 3 is valid as illustrated by the closeness of the pre-2014 trends in outcomes between the treated and synthetic control groups.

information throughout the year and the last year is 2014. Thus, there is a longer post-expansion period in the March CPS than the ACS. The disadvantage of the March CPS is the change in the survey design related to health insurance in 2014. We do not take a position on which is the preferred data source because it is unclear whether one if preferable to the other. To present the evidence in an easily digestible form and one that facilitates comparing estimates from the ACS and March CPS estimates, we calculated the effect of the 2014 Medicaid expansions as the percentage change in health insurance coverage from the 2010 baseline. These results are reported in Table 5 and the full set of underlying estimates obtained using the March CPS are reported in Appendix Table 4.

Overall, estimates of the effect of Medicaid expansions on health insurance coverage from the March CPS are largely consistent with corresponding estimates obtained using the ACS, as the results in Table 5 illustrate. The main difference is that the estimates from the CPS indicate larger increases in Medicaid and larger decreases in uninsured. For example, among low-educated, parents, the 2014 Medicaid expansion was associated with a 6.5 percentage point (43 percent) increase in Medicaid in the CPS. The analogous estimates from the ACS were 4.0 percentage points (24 percent). For uninsured, CPS estimates indicate a 4.0 percentage point (13 percent) decrease where ACS estimates indicated 2.7 percentage point (9 percent) decrease. Estimates from the CPS also show that results are similar whether a low-educated or low-income sample is used. As with the ACS, estimates of the effect of the Medicaid expansions on Medicaid coverage and uninsured tend to be larger for the low-income sample than from the low-educated sample.

We also conducted a similar set of analyses using the March CPS as we did for the ACS: event history analysis assessing validity of the difference-in-differences research design; an analysis that used the synthetic control approach; and an analysis that stratified by age. With respect to the event history analysis (see Appendix Table 5), only 3 of 72 estimates associated with the interaction between the treatment indicator and pre-2014 dummy variables were significant. This provides considerable evidence that the DiD design is valid and results are plausibly interpreted as causal. Appendix Table 6 and Appendix Figures 7 through 18 present synthetic control estimates of the effect of Medicaid on health

insurance using the March CPS. As was the case for the ACS, there is strong consistency between the DiD and synthetic control estimates further bolstering the case that our estimates be interpreted as causal. Appendix Figures 7 through 12 also illustrate the close match between the treated and synthetic control states and the likely validity of the synthetic control approach. Finally, Appendix Table 7 shows estimates from samples stratified by age. Given the smaller sample sizes of the March CPS than the ACS, these estimates are less precisely estimated. However, as with the ACS, estimates indicate that the expansions had a slightly larger effect on Medicaid coverage and the proportion uninsured among younger (ages 22 to 44), low-educated adults than older (ages 45 to 64), low-educated adults. Finally, we re-estimated all models dropping the nine states with prior expansions and the two late expanding states. Estimates from this analysis are presented in Appendix Table 8 and are quite similar to those from analyses that include all states.

**4.c. Summary of Estimates of the Effect of ACA Medicaid Expansions on Health Insurance**

In summary, estimates in Tables 3 through 5 and Appendix Tables 1 through 8 indicate that the 2014 Medicaid expansions significantly increased Medicaid coverage and decreased the proportion of uninsured among low-educated/low-income persons.[25] Table 5 presents a summary of results. The largest effect sizes were found childless adults. For this group, which was arguably the target group of the Medicaid expansions, the proportion of adults enrolled in Medicaid increased by approximately 51 percent to 70 percent depending on the sample and data source. Correspondingly, the proportion of low-educated/low-income, childless adults who were uninsured decreased by approximately 9 percent to 14 percent depending on the sample and data source. For low-educated/low-income parents, the increase in Medicaid resulting from the ACA expansions were approximately half the size as for childless adults, but the decrease in the proportion uninsured was approximately the same (in relative terms). There was limited, and not always consistent evidence of a modest amount of crowding out of private for public

[25] We note that in Appendix Table 8 there are some large differences between synthetic control estimates for the uninsured outcome among parents. These differences are due to the poor match of the synthetic control approach when the smaller number of states are used. Therefore, we do not put much weight on the magnitude of these estimates. We also note that DiD estimates of this same sample-outcome are stable and consistent across samples.

insurance coverage. The largest amount of crowd out was found for unmarried, parents in states that had prior Medicaid expansions. Finally, our estimates are consistent with other recent papers that have examined the effect of the Medicaid expansions on health insurance using different data sources, samples and methods (Courtemanche et al. 2016; Frean et al. 2016; Wherry and Miller 2016).

**4.d. Estimates of the Effect of ACA Medicaid Expansions on Labor Supply—American Community Survey 2010 to 2014**

As documented above, the ACA Medicaid expansions had a significant impact on health insurance coverage, which raises the possibility that people altered their labor supply to take advantage of the new Medicaid benefit. We assess this hypothesis first using data from the ACS and then using data from monthly CPS surveys.

Table 6 presents estimates of the effect of the 2014 Medicaid expansion on whether a person is employed at the time of the interview using data from the ACS. The table is organized in a similar way as previous tables, although we present both difference-in-differences (labeled DD) and synthetic control (labeled SC) estimates in the same table. The top panel of Table 6 shows estimates for parents and the bottom panel shows estimates for childless adults. Within each of these two groups, we show estimates from a sample of low-educated (HS or less) adults and from a sample of low-income (<300 percent of FPL) adults. We also present estimates from a sample stratified by marital status for the low-educated group.

Estimates in Table 6 are remarkably consistent. Almost all (28 out of 32) are small, for example, less than 0.5 percentage points (<1 percent of baseline mean). All but two estimates are statistically insignificant. Most estimates are positive. Overall, estimates in Table 6 suggest that, on average, the Medicaid expansions had virtually no effect on employment as of 2014. If anything, it appears that the Medicaid expansions are associated with an increase in employment, although, as noted, only one estimate (of 32) is statistically significant. Further, if we use standard errors derived from the difference-in-difference analyses as a reference, for example, a value of 0.003, in most cases, we can reject effect

sizes less than approximately -0.005. Thus, estimates rule out decreases in employment of 1 percent or more.

Estimates in Table 6 are somewhat larger in relative terms based on the proportion of the sample that experienced a change in Medicaid, or uninsured. Against this benchmark, which is at best suggestive of the size of the potentially treated group and do not include those affected who did not have to switch coverage to benefit[26], estimates in Table 6 can rule out decreases in employment for those who changed coverage of approximately 10 percent to 15 percent (e.g., -0.005/0.05) or greater. We reiterate, however, that most estimates are positive suggesting an increase in employment.

We also assess the validity of the difference-in-differences estimates in Table 6 using the event history approach described earlier. Estimates from this analysis are in Appendix Table 9 and provide substantial support for the validity of the difference-in-differences analysis—only 2 of the 24 interactions between treatment and pre-2014 year indicators are statistically significant. Similarly, Appendix Figures 19 through 24 show that there is a close match between the pre-2014 trends in employment between the treated and synthetic control groups of states, which provides support for the validity of this approach.[27] Moreover, there is substantial agreement between estimates obtained from the two approaches. Finally, in Appendix Table 10, we report DD and SC estimates of the effect of Medicaid expansions on labor supply omitting the nine states with prior expansions and two states with late expansions. Results from these analyses are very similar to those reported in Table 6.

**4.e. Estimates of the Effect of ACA Medicaid Expansions on Labor Supply—Monthly Current Population Survey January 2010 to May 2016**

The final set of results is for the effect of Medicaid on labor supply using monthly CPS files. These data extend through May 2016, which is nearly 2.5 years after the initial implementation, and allow for the analysis of more measures of labor supply, specifically, usual hours worked per week and whether

[26] This includes those on Medicaid prior to expansion who were potentially able to increase labor supply and still remain eligible for Medicaid.

[27] Synthetic control estimates that use the alternative approach to constructing weights that uses the 2010 to 2013 average value of the dependent variable and the 2013 value are very similar to those reported in Table 6.

a person worked full-time, defined here using a threshold indicating greater than 30 hours per week. For these data, we do not use a sample of low-income persons because income is not well measured in these data. We also omit all states that expanded in 2015/2016 (i.e., AK, MT, IN and PA).

Table 7 presents difference-in-differences estimates of the effect of Medicaid on labor supply using the monthly CPS. The table is divided into two panels depending on whether we are analyzing parents (top panel) or childless adults (bottom panel). Within each panel, we show estimates for three outcomes (employment, usual hours of work, and >30 hours per work) for the full sample, and for samples stratified by marital status.

Estimates in the top panel of Table 7, which pertain to parents, are not statistically significant. Estimates related to married parents are small, negative and not statistically significant. Among unmarried parents, estimates are positive, relatively small (e.g., 2% of mean) and not statistically significant. In addition, there is no evidence that the effect of Medicaid expansions on labor supply of low-educated parents differed by whether a state had a prior expansion.

For the childless adult sample (bottom panel of Table 7), estimates indicate that the Medicaid expansions were associated with an increase in employment and the probability of working more than 30 hours per week. While estimates are only statistically significant for the sample of married, childless adults, the magnitudes of the estimates are very similar for the unmarried sample. Similarly, estimates are very similar for states with and without a prior expansion. In terms of magnitudes, estimates indicate that the Medicaid expansions were associated with a 1.2 percentage point (1.8 percent) increase in the probability of employment and a 1.0 percentage point (1.7 percent) increase in probability of being employed full-time among childless adults.

Evidence in Appendix Table 11, however, raises a note of caution. In this table, we report estimates from the event history specification assessing the validity of the difference-in-differences approach underlying the estimates in Table 7. In this case, and particularly for the sample of unmarried parents and childless adults, we observe a substantial number of significant coefficients on the interactions between the treatment indicator and the pre-2014, year dummy variables. The significant

estimates in Appendix Table 11 are of similar magnitude to the significant estimates in Table 7. Given this evidence, we conclude that the small, significant estimates in Table 7 pertaining to the childless adult sample may not be reliable.

Synthetic control estimates, which are presented in Table 8, reinforce the last conclusion. For the childless adult sample, synthetic control estimates of the effect of Medicaid expansions on labor supply are in almost all cases quite small and not statistically significant. In addition, as Figures 13 through 18 suggest, there is a close match (identical) between the treated and synthetic comparison group in the pre-ACA period, which bolsters the credibility of the synthetic control estimates. Therefore, we believe it is reasonable to give greater weight to the synthetic control estimates than the DiD estimates, and this leads us to conclude that the Medicaid expansions had virtually no effect on labor supply of childless adults. Synthetic control estimates in Table 8 for the parent sample (top panel) are small and consistent with the DiD estimates of Table 7 suggesting that for this sample the Medicaid expansions had no significant effect on labor supply.

**4.f. Summary of Estimates of the Effect of ACA Medicaid Expansions on Labor Supply**

The large majority of estimates of the effect of Medicaid expansions on labor supply shown in Tables 6 through 8 were small (e.g., one percent in relative terms) and statistically insignificant. Most estimates were positive. Moreover, in the few cases when estimates were statistically significant, estimates remained small and corresponding estimates obtained using different methods and/or samples were at odds with these significant estimates. Given this evidence, it appears that the Medicaid expansions did not have a significant effect on labor supply in the two years subsequent to its implementation.

The small and relatively precise estimates rule out all but the smallest negative effects of the Medicaid expansions on labor supply. Consider DiD estimates in Table 6 of the effect of the ACA Medicaid expansions on employment in 2014. All estimates are positive and most are in the 0.004 range (less than one-half of a percentage point). Standard errors of DiD estimates indicate a 95% confidence interval for the typical estimate of approximately [-0.004 to 0.012]. The mean employment rate for the

different samples in Table 6 is generally between 0.6 and 0.7. Thus, a -0.004 estimate represents less than one percent of mean. Alternatively, we can compare the -0.004 figure to an estimate of the proportion of sample that was likely affected by the expansion. Such a comparison may be thought of as an estimate of treatment-on-the-treated, although it would be quite crude. However, we do not observe the fraction affected, but here we use the change in Medicaid coverage (e.g., 5 percentage points) as one possible, and very conservative, benchmark. In this case, the -0.004 figure would represent approximately 8 percent of the affected group. This admittedly crude, back-of-the-envelope estimate is consistent with the magnitudes of estimates reported in found in the Oregon Medicaid Experiment (Baicker et al. 2013) and in Dague et al. (2014). Notably, these estimates suggest much smaller income elasticities of labor supply than those found, for example, with respect to the EITC (Eissa and Hoynes 2006).

## 5. Conclusions

The Affordable Care Act (ACA) became law in 2010 when the unemployment rate in the U.S. was just under 10% and at a 30-year high, and the economy was just coming out of the Great Recession. With this backdrop, it is understandable that the potential work disincentives of the ACA garnered considerable public attention. Specifically, the expansion of Medicaid income eligibility thresholds and the formation of the health insurance marketplaces that provided income-based subsidies created incentives for people to alter their labor supply. Moreover, most of the incentives generated by the ACA were likely to reduce work effort.

In this paper, we examined whether the expansions in Medicaid affected labor supply of low-educated (a high school education or less) and low-income persons, which are groups likely to be affected by the expansions. We first measured the effect of the Medicaid expansions on health insurance coverage to assess the extent of the "treatment" engendered by the expansions. Estimates indicate that the Medicaid expansions increased the proportion of the sample covered by Medicaid and decreased the proportion uninsured by a similar, but slightly lower amount because of some switching between private insurance

and Medicaid. There was some variation in effects by demographic groups with larger changes in Medicaid coverage and the proportion uninsured observed for unmarried, childless adults.

Specifically, for samples of parents, estimates indicated that the Medicaid expansions:

- increased Medicaid coverage by between 23 percent and 54 percent depending on the data source, time period examined and whether the state had a prior Medicaid expansion;
- decreased the proportion uninsured by between 8 percent and 13 percent depending on the data source, time period examined and whether the state had a prior Medicaid expansion;
- and decreased private health insurance coverage by between 0 percent and 5 percent.

For samples of childless adults, estimates indicated that the Medicaid expansions:

- increased Medicaid coverage by between 54 percent and 70 percent depending on the data source, time period examined and whether the state had a prior Medicaid expansion;
- decreased the proportion uninsured by between 9 percent and 15 percent depending on the data source, time period examined and whether the state had a prior Medicaid expansion;
- and decreased private health insurance coverage by between 1 percent and 5 percent.

Estimates of the effect of Medicaid on labor supply were, in general, small and not statistically significant. In fact, most estimates of the effect of the Medicaid expansions on labor supply were positive. Overall, there was very little evidence that the Medicaid expansions decreased work effort. Moreover, confidence intervals associated with estimates rule out modest to large decreases in employment and hours of work in response to the Medicaid expansions. The absence of much of a labor supply response to the expansion of Medicaid is consistent with the broader literature on the income effect of labor supply, which found small elasticities of labor supply with respect to income (McClelland and Mok 2012). Overall, the Medicaid expansions have significantly expanded health insurance coverage and reduced the proportion of people uninsured without significant unintended consequences related to work effort.

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**Table 1. Classification of States into Treatment and Control Groups as of 2014**

| Control Groups | | | |
|---|---|---|---|
| No Expansion in 2014<br>No Prior Expansion | | No Expansion in 2014<br>Prior Limited Expansions for Parents and/or Childless Adults | Expansion in 2014<br>Prior Full Expansions for Parents and Childless Adults |
| Alabama | Nebraska | Indiana | Delaware |
| Alaska | North Carolina | Maine | Washington, D.C. |
| Florida | Oklahoma | Tennessee | Massachusetts |
| Georgia | Pennsylvania | Wisconsin | New York |
| Idaho | South Carolina | | Vermont |
| Kansas | South Dakota | | |
| Louisiana | Texas | | |
| Mississippi | Utah | | |
| Missouri | Virginia | | |
| Montana | Wyoming | | |

| Treatment Groups | |
|---|---|
| Expansion 2014<br>No Prior Expansion | Expansion 2014<br>Prior Expansions for Parents and/or Childless Adults |
| Arkansas | Arizona |
| Kentucky | California |
| Michigan | Connecticut |
| Nevada | Colorado |
| New Hampshire | Hawaii |
| New Mexico | Illinois |
| North Dakota | Iowa |
| Ohio | Maryland |
| West Virginia | Minnesota |
| | New Jersey |
| | Oregon |
| | Rhode Island |
| | Washington |

**Table 2. Descriptive Statistics for 2010 from American Community Survey and Current Population Survey**

| | Low-educated Sample (HS or less) | | | Low-income Sample (<300% FPL) | |
|---|---|---|---|---|---|
| | ACS | Monthly CPS | March CPS | ACS | March CPS |
| Medicaid | 0.11 | N/A | 0.11 | 0.14 | 0.13 |
| Uninsured | 0.30 | N/A | 0.32 | 0.34 | 0.36 |
| Private Insured | 0.60 | N/A | 0.56 | 0.52 | 0.49 |
| - Non-Group Private Insurance | 0.08 | N/A | 0.05 | 0.10 | 0.08 |
| - Employer-Sponsored Insurance | 0.52 | N/A | 0.51 | 0.43 | 0.42 |
| Employed at Time of Survey | 0.69 | 0.67 | 0.69 | 0.65 | 0.64 |
| Usual Hours Worked per Week | 27.3 | 26.3 | 27.3 | 24.3 | 24.3 |
| | (20.5) | (20.6) | (20.2) | (20.3) | (20.3) |
| Full-Time | 0.61 | 0.60 | 0.62 | 0.54 | 0.55 |
| Age | 43.9 | 43.2 | 41.8 | 40.7 | 39.3 |
| | (12.0) | (12.02) | (11.6) | (12.2) | (11.5) |
| Male | 0.52 | 0.51 | 0.51 | 0.46 | 0.45 |
| Non-Hispanic White | 0.62 | 0.62 | 0.52 | 0.59 | 0.51 |
| Non-Hispanic Black | 0.11 | 0.12 | 0.12 | 0.13 | 0.14 |
| Hispanic | 0.21 | 0.21 | 0.27 | 0.21 | 0.26 |
| Other Race | 0.06 | 0.06 | 0.07 | 0.08 | 0.08 |
| Married | 0.60 | 0.58 | 0.60 | 0.49 | 0.51 |
| Divorced or Separated | 0.16 | 0.15 | 0.14 | 0.19 | 0.17 |
| Never Married | 0.22 | 0.24 | 0.23 | 0.30 | 0.30 |
| Widowed | 0.02 | 0.02 | 0.02 | 0.02 | 0.21 |
| Foreign Born | 0.22 | 0.20 | 0.26 | 0.26 | 0.26 |
| U.S. Citizenship | 0.86 | 0.86 | 0.82 | 0.86 | 0.82 |
| High School Educated | 0.73 | 0.76 | 0.73 | 0.33 | 0.36 |
| Has Children under age 18 | 0.35 | 0.37 | 0.46 | 0.43 | 0.53 |
| Number of Children | 0.92 | 0.71 | 0.90 | 1.08 | 1.11 |
| | (1.22) | (1.12) | (1.20) | (1.33) | (1.31) |
| Family Size | 3.09 | 3.32 | 3.14 | 3.07 | 3.15 |
| | (1.80) | (1.75) | (1.70) | (1.92) | (1.82) |
| Observations | 529,509 | 321,171 | 39,386 | 601,629 | 42,884 |

Notes: All data are from the 2010 American Community Survey, Current Population Survey March Supplement, and Current Population Survey monthly files. The sample in columns 1-3 is limited to non-disabled adults between ages 22-64 with a high school degree or less. The sample in the columns 4-5 is limited to non-disabled adults between ages 22-64 with family income below 300% of Federal Poverty Level. Standard deviations for continuous variables are presented in parentheses.

**Table 3. Difference-in-differences Estimates of Effect of ACA Medicaid Expansions on Health Insurance**
**American Community Survey 2010-2014**

| | Low-educated Sample (HS or less) | | | | | | | | | Low-income Sample (<300% FPL) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Medicaid | | | Uninsured | | | Private | | | Medicaid | Uninsured | Private |
| Panel A: Parents | All | Married | Unmarried | All | Married | Unmarried | All | Married | Unmarried | All | All | All |
| Expand in 2014 | 0.040** | 0.039** | 0.041** | -0.027** | -0.027** | -0.024** | -0.011 | -0.009 | -0.019** | 0.046** | -0.027** | -0.016** |
| | (0.008) | (0.009) | (0.009) | (0.011) | (0.012) | (0.011) | (0.007) | (0.008) | (0.006) | (0.009) | (0.010) | (0.007) |
| Expand in 2014, no prior policy | 0.045** | 0.040** | 0.056** | -0.029** | -0.023 | -0.049** | -0.011 | -0.012 | -0.008 | 0.051** | -0.033** | -0.014 |
| | (0.013) | (0.013) | (0.018) | (0.013) | (0.012) | (0.019) | (0.009) | (0.009) | (0.011) | (0.015) | (0.015) | (0.009) |
| Expand in 2014, any prior policy | 0.039** | 0.039** | 0.035** | -0.026 | -0.029 | -0.015 | -0.011 | -0.007 | -0.024** | 0.044** | -0.024 | -0.017** |
| | (0.010) | (0.011) | (0.010) | (0.014) | (0.015) | (0.012) | (0.008) | (0.009) | (0.006) | (0.010) | (0.013) | (0.008) |
| p-value for test of difference between treatment effects | 0.712 | 0.953 | 0.283 | 0.845 | 0.733 | 0.103 | 0.972 | 0.549 | 0.153 | <0.001 | 0.032 | 0.083 |
| Observations | 857486 | 655254 | 202232 | 857486 | 655254 | 202232 | 857486 | 655254 | 202232 | 1257844 | 1257844 | 1257844 |
| Mean of Dep. Var. in 2010 | 0.168 | 0.129 | 0.303 | 0.288 | 0.269 | 0.355 | 0.560 | 0.620 | 0.355 | 0.190 | 0.281 | 0.550 |
| Panel B: Childless Adults | | | | | | | | | | | | |
| Expand in 2014 | 0.039** | 0.024** | 0.052** | -0.034** | -0.022 | -0.044** | -0.003 | -0.001 | -0.007 | 0.063** | -0.048** | -0.013 |
| | (0.007) | (0.007) | (0.007) | (0.009) | (0.011) | (0.007) | (0.006) | (0.007) | (0.006) | (0.008) | (0.008) | (0.007) |
| Expand in 2014, no prior policy | 0.035** | 0.019** | 0.052** | -0.028** | -0.012 | -0.046** | -0.006 | -0.006 | -0.005 | 0.057** | -0.044** | -0.009 |
| | (0.009) | (0.008) | (0.010) | (0.007) | (0.007) | (0.008) | (0.006) | (0.005) | (0.008) | (0.012) | (0.009) | (0.009) |
| Expand in 2014, any prior policy | 0.040** | 0.026** | 0.052** | -0.037** | -0.026 | -0.043** | -0.002 | 0.001 | -0.007 | 0.066** | -0.050** | -0.014 |
| | (0.008) | (0.008) | (0.009) | (0.012) | (0.014) | (0.009) | (0.006) | (0.008) | (0.006) | (0.009) | (0.009) | (0.008) |
| p-value for test of difference between treatment effects | 0.637 | 0.488 | 0.992 | 0.484 | 0.328 | 0.853 | 0.536 | 0.334 | 0.683 | <0.001 | <0.001 | 0.207 |
| Observations | 1718309 | 855016 | 863293 | 1718309 | 855016 | 863293 | 1718309 | 855016 | 863293 | 1766166 | 1766166 | 1766166 |
| Mean of Dep. Var. in 2010 | 0.073 | 0.038 | 0.108 | 0.305 | 0.191 | 0.421 | 0.614 | 0.763 | 0.462 | 0.095 | 0.386 | 0.506 |

Notes: Data are from years 2010-2014 of the American Community Survey. Estimates above dashed lines report coefficients on the interaction term between an indicator for whether a state expanded Medicaid and an indicator for whether the year is 2014. Estimates below dashed lines report coefficients on these interaction terms but distinguish between states that had no prior Medicaid policy and those that had any prior policy (except for those that had ACA-like Medicaid expansions prior to 2014). The p-value is for F-tests measuring whether Medicaid expansion effects are statistically different between states that had prior policies and those that did not. The sample in columns 1-9 is limited to non-disabled adults between ages 22-64 with a high school degree or less. The sample in columns 10-12 is limited to non-disabled adults between ages 22-64 with family income below 300% of Federal Poverty Level. Regressions are adjusted using indicators for state, year, age, sex, race, education levels, marital status, foreign-born status, citizenship status, number of children and family size. All standard errors (in parentheses) are clustered on state. (**) indicates significance at the 5 percent level.

**Estimates of Effect of ACA Medicaid Expansions on Health Insurance**
**American Community Survey 2010-2014**

| | Low-educated Sample (HS or less) | | | | | | | | | Low-income Sample (<300% FPL) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Medicaid | | | Uninsured | | | Private | | | Medicaid | Uninsured | Private |
| Panel A: Parents | All | Married | Unmarried | All | Married | Unmarried | All | Married | Unmarried | All | All | All |
| Indicator of Expand in 2014 | 0.046** | 0.034** | 0.067** | -0.035** | -0.032** | -0.038** | -0.006 | -0.007 | -0.013 | 0.044** | -0.035** | -0.011 |
| [p-value] | [<0.001] | [0.003] | [0.004] | [0.004] | [0.003] | [0.021] | [0.417] | [0.367] | [0.235] | [0.003] | [0.007] | [0.123] |
| Difference-in-differences | 0.040** | 0.039** | 0.041** | -0.027** | -0.027** | -0.024** | -0.011 | -0.009 | -0.019** | 0.046** | -0.027** | -0.016** |
| Estimates (From Table 3) | (0.008) | (0.009) | (0.009) | (0.011) | (0.012) | (0.011) | (0.007) | (0.008) | (0.006) | (0.009) | (0.010) | (0.007) |
| Observations | 857486 | 655254 | 202232 | 857486 | 655254 | 202232 | 857486 | 655254 | 202232 | 1257844 | 1257844 | 1257844 |
| Mean of Dep. Var. in 2010 | 0.168 | 0.129 | 0.303 | 0.288 | 0.269 | 0.355 | 0.560 | 0.620 | 0.355 | 0.190 | 0.281 | 0.550 |
| Panel B: Childless Adults | | | | | | | | | | | | |
| Indicator of Expand in 2014 | 0.044** | 0.021** | 0.062** | -0.040** | -0.028** | -0.057** | 0.002 | 0.003 | -0.002 | 0.062** | -0.054** | -0.006 |
| [p-value] | [0.001] | [0.006] | [<0.001] | [<0.001] | [0.034] | [<0.001] | [0.771] | [0.681] | [0.750] | [<0.001] | [<0.001] | [0.547] |
| Difference-in-differences | 0.039** | 0.024** | 0.052** | -0.034** | -0.022 | -0.044** | -0.003 | -0.001 | -0.007 | 0.063** | -0.048** | -0.013 |
| Estimates (From Table 3) | (0.007) | (0.007) | (0.007) | (0.009) | (0.011) | (0.007) | (0.006) | (0.007) | (0.006) | (0.008) | (0.008) | (0.007) |
| Observations | 1718309 | 855016 | 863293 | 1718309 | 855016 | 863293 | 1718309 | 855016 | 863293 | 1766166 | 1766166 | 1766166 |
| Mean of Dep. Var. in 2010 | 0.073 | 0.038 | 0.108 | 0.305 | 0.191 | 0.421 | 0.614 | 0.763 | 0.462 | 0.095 | 0.386 | 0.506 |

Notes: Data are from years 2010-2014 of the American Community Survey. Estimates report the difference in the dependent variables in 2014 between treatment states and the synthetic control group. The sample in columns 1-9 is limited to non-disabled adults between ages 22-64 with a high school degree or less. The sample in columns 10-12 is limited to non-disabled adults between ages 22-64 with family income below 300% of Federal Poverty Level. P-values of synthetic control estimates [in brackets] are obtained through randomization inference. All standard errors of differences-in-differences estimates (in parentheses) are clustered on state. (**) indicates significance at the 5 percent level.

**Table 5. Difference-in-differences Estimates of Effect of ACA Medicaid Expansions on Health Insurance Relative Effects (Percentage Change from 2010) for American Community Survey and March Current Population Survey**

| | Low-educated Sample (HS or less) | | | | | | Low-income Sample (<300% FPL) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Medicaid | | Uninsured | | Private | | Medicaid | | Uninsured | | Private | |
| Panel A: Parents | ACS | CPS | ACS | CPS | ACS | CPS | ACS | CPS | ACS | CPS | ACS | CPS |
| Indicator of Expand in 2014 | 24** | 43** | -9** | -13** | -2 | -2 | 24** | 40** | -10** | -12** | -3** | -4 |
| Mean of Dep. Var. in 2010 | 0.17 | 0.15 | 0.29 | 0.31 | 0.56 | 0.54 | 0.19 | 0.17 | 0.28 | 0.31 | 0.55 | 0.52 |
| Expand in 2014, no prior policy | 28** | 54** | -10** | -13** | -2 | -6 | 29** | 53** | -12** | -13** | -2 | -5** |
| Mean of Dep. Var. in 2010 | 0.16 | 0.14 | 0.29 | 0.30 | 0.57 | 0.56 | 0.17 | 0.15 | 0.28 | 0.31 | 0.56 | 0.54 |
| Expand in 2014, any prior policy | 23** | 39** | -9 | -13 | -2 | 0 | 23** | 35** | -8 | -11 | -3** | -3 |
| Mean of Dep. Var. in 2010 | 0.17 | 0.16 | 0.30 | 0.32 | 0.55 | 0.53 | 0.19 | 0.18 | 0.29 | 0.32 | 0.54 | 0.52 |
| Observations | 857486 | 94079 | 857486 | 94079 | 857486 | 94079 | 1257844 | 123788 | 1257844 | 123788 | 1257844 | 123788 |
| Panel B: Childless Adults | | | | | | | | | | | | |
| Indicator of Expand in 2014 | 53** | 63** | -11** | -12** | -1 | 1 | 66** | 70** | -13** | -14** | -2 | 0 |
| Mean of Dep. Var. in 2010 | 0.07 | 0.07 | 0.31 | 0.34 | 0.61 | 0.58 | 0.10 | 0.09 | 0.39 | 0.42 | 0.51 | 0.46 |
| Expand in 2014, no prior policy | 51** | 56** | -9** | -11** | -1 | 1 | 62** | 76** | -12** | -15** | -2 | 1 |
| Mean of Dep. Var. in 2010 | 0.07 | 0.07 | 0.30 | 0.33 | 0.62 | 0.58 | 0.09 | 0.09 | 0.38 | 0.41 | 0.52 | 0.47 |
| Expand in 2014, any prior policy | 54** | 64** | -12** | -13** | 0 | 1 | 67** | 65** | -13** | -14** | -3 | 0 |
| Mean of Dep. Var. in 2010 | 0.07 | 0.07 | 0.31 | 0.34 | 0.61 | 0.57 | 0.10 | 0.10 | 0.39 | 0.42 | 0.50 | 0.46 |
| Observations | 1718309 | 114117 | 1718309 | 114117 | 1718309 | 114117 | 1766166 | 114727 | 1766166 | 114727 | 1766166 | 114727 |

Notes: Data are from years 2010-2014 of the American Community Survey and years 2010-2015 of the March CPS. Each value is the effect of the 2014 Medicaid expansion on the outcome expressed in percentage terms (estimate divided by 2010 mean). The sample in columns 1-6 is limited to non-disabled adults between ages 22-64 with a high school degree or less. The sample in columns 7-12 is limited to non-disabled adults between ages 22-64 with family income below 300% of Federal Poverty Level. Estimates used to construct relative effects for ACS are in Table 3 and estimates for March CPS are in Appendix Table 4. (**) indicates significance at the 5 percent level.

**Table 6. Difference-in-differences and Synthetic Control Estimates of Effect of ACA Medicaid Expansions on Labor Supply American Community Survey 2010-2014**

| | Low-educated Sample (HS or less) | | | | | | Low-income Sample (<300% FPL) | |
|---|---|---|---|---|---|---|---|---|
| | Employed at Time of Survey | | | | | | Employed at Time of Survey | |
| Panel A: Parents | All | | Married | | Unmarried | | All | All |
| | DD | SC | DD | SC | DD | SC | DD | SC |
| Indicator of Expand in 2014 | 0.005 | -0.003 | 0.003 | 0.013** | 0.011 | -0.005 | 0.004 | -0.007 |
| | (0.004) | [0.679] | (0.003) | [0.015] | (0.007) | [0.713] | (0.003) | [0.066] |
| Expand in 2014, no prior policy | 0.002 | | 0.001 | | 0.003 | | 0.002 | |
| | (0.005) | | (0.005) | | (0.009) | | (0.005) | |
| Expand in 2014, any prior policy | 0.006 | | 0.003 | | 0.014 | | 0.005** | |
| | (0.004) | | (0.004) | | (0.007) | | (0.002) | |
| p-value for test of difference between treatment effects | 0.507 | | 0.731 | | 0.288 | | 0.128 | |
| Observations | 857486 | 857486 | 655254 | 655254 | 202232 | 202232 | 1257844 | 1257844 |
| Mean of Dep. Var. in 2010 | 0.715 | 0.715 | 0.726 | 0.726 | 0.676 | 0.676 | 0.693 | 0.693 |
| Panel B: Childless Adults | | | | | | | | |
| Indicator of Expand in 2014 | 0.003 | -0.002 | 0.003 | -0.008 | 0.002 | 0.003 | 0.003 | -0.0004 |
| | (0.003) | [0.580] | (0.003) | [0.067] | (0.004) | [0.605] | (0.003) | [0.915] |
| Expand in 2014, no prior policy | 0.002 | | 0.0005 | | 0.004 | | 0.004 | |
| | (0.006) | | (0.006) | | (0.006) | | (0.004) | |
| Expand in 2014, any prior policy | 0.003 | | 0.004 | | 0.002 | | 0.003 | |
| | (0.003) | | (0.003) | | (0.004) | | (0.003) | |
| p-value for test of difference between treatment effects | 0.910 | | 0.525 | | 0.685 | | 0.462 | |
| Observations | 1718309 | 1718309 | 855016 | 855016 | 863293 | 863293 | 1766166 | 1766166 |
| Mean of Dep. Var. in 2010 | 0.677 | 0.677 | 0.688 | 0.688 | 0.667 | 0.667 | 0.610 | 0.610 |

Notes: Data are from years 2010-2014 of the American Community Survey.. Estimates above dashed lines report the coefficient on the interaction term between an indicator for whether a state expands Medicaid and an indicator for whether the year is 2014. Estimates below dashed lines report coefficients on these interaction terms but distinguish between states that had no prior Medicaid policy and those that had any prior policy (except for those that had ACA-level Medicaid expansions prior to 2014). The p-value is for F-tests measuring whether Medicaid expansion effects are statistically different between states that had prior policies and those that did not. The sample used in columns 1-6 is limited to non-disabled adults between ages 22-64 with a high school degree or less. The sample used in columns 7-8 is limited to non-disabled adults between ages 22-64 with family income below 300% of Federal Poverty Level. Regressions are adjusted using indicators for state, year, age, sex, race, education levels, marital status, foreign-born status, citizenship status, number of children and family size. P-values of synthetic control estimates [in brackets] are obtained through randomization inference. All standard errors of differences-in-differences estimates (in parentheses) are clustered on state. (**) indicates significance at the 5 percent level.

**Table 7. Difference-in-differences Estimates of Effect of ACA Medicaid Expansions on Labor Supply**
**Monthly Current Population Survey 2010-(May) 2016**

| | High School or Less | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Employed at Time of Survey | | | Usual Hours Worked per Week | | | Full-Time | | |
| Panel A: Parents | All | Married | Unmarried | All | Married | Unmarried | All | Married | Unmarried |
| Indicator of Expand in 2014 | 0.001 | -0.004 | 0.015 | -0.039 | -0.202 | 0.388 | 0.001 | -0.003 | 0.012 |
| | (0.005) | (0.005) | (0.008) | (0.222) | (0.234) | (0.356) | (0.005) | (0.006) | (0.009) |
| Expand in 2014, no prior policy | 0.002 | -0.004 | 0.016 | -0.029 | -0.227 | 0.388 | -0.002 | -0.007 | 0.008 |
| | (0.009) | (0.010) | (0.011) | (0.431) | (0.502) | (0.514) | (0.010) | (0.011) | (0.014) |
| Expand in 2014, any prior policy | 0.0002 | -0.004 | 0.014 | -0.043 | -0.190 | 0.388 | 0.003 | -0.001 | 0.013 |
| | (0.004) | (0.005) | (0.008) | (0.200) | (0.208) | (0.370) | (0.005) | (0.006) | (0.009) |
| p-value for test of difference between treatment effects | 0.817 | 0.980 | 0.873 | 0.974 | 0.941 | >0.999 | 0.648 | 0.600 | 0.697 |
| Observations | 640572 | 459425 | 181147 | 640572 | 459425 | 181147 | 640572 | 459425 | 181147 |
| Mean of Dep. Var. in 2010 | 0.685 | 0.706 | 0.627 | 27.1 | 28.3 | 23.9 | 0.615 | 0.639 | 0.548 |
| Panel B: Childless Adults | | | | | | | | | |
| Indicator of Expand in 2014 | 0.012** | 0.014** | 0.012 | 0.426 | 0.446 | 0.459 | 0.010 | 0.012** | 0.009 |
| | (0.005) | (0.006) | (0.007) | (0.239) | (0.267) | (0.302) | (0.005) | (0.006) | (0.007) |
| Expand in 2014, no prior policy | 0.012 | 0.017 | 0.007 | 0.378 | 0.585 | 0.215 | 0.007 | 0.012 | 0.003 |
| | (0.009) | (0.008) | (0.011) | (0.377) | (0.352) | (0.478) | (0.008) | (0.007) | (0.011) |
| Expand in 2014, any prior policy | 0.013** | 0.012 | 0.014 | 0.455 | 0.358 | 0.596 | 0.012** | 0.012 | 0.013 |
| | (0.006) | (0.007) | (0.007) | (0.237) | (0.292) | (0.318) | (0.006) | (0.006) | (0.008) |
| p-value for test of difference between treatment effects | 0.901 | 0.557 | 0.560 | 0.835 | 0.514 | 0.453 | 0.576 | 0.955 | 0.439 |
| Observations | 1141994 | 549419 | 592575 | 1141994 | 549419 | 592575 | 1141994 | 549419 | 592575 |
| Mean of Dep. Var. in 2010 | 0.652 | 0.669 | 0.636 | 25.8 | 26.7 | 24.9 | 0.587 | 0.605 | 0.569 |

Notes: Data are from years 2010-2016 (May) of the Current Population Survey monthly files. Analysis excludes Alaska, Indiana, Montana and Pennsylvania due to expansions after 2014. Sample is limited to non-disabled adults between ages 22-64 with a high school degree or less. Regressions are adjusted using indicators for state, year, age, sex, race, education levels, marital status, foreign-born status, citizenship status, number of children and family size. The p-value is for F-tests measuring whether Medicaid expansion effects are statistically different between states that had prior policies and those that did not. All standard errors (parentheses) are clustered on state. (**) indicates significance at the 5 percent level.

**Table 8. Synthetic Control Estimates of Effect of ACA Medicaid Expansions on Labor Supply**
**Monthly Current Population Survey 2014-(May) 2016**

| | Low-educated Sample (HS or less) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Employed at Time of Survey | | | Usual Hours Worked per Week | | | Full-Time | | |
| Panel A: Parents | All | Married | Unmarried | All | Married | Unmarried | All | Married | Unmarried |
| Indicator of Expand in 2014 | -0.009 | -0.011 | 0.002 | -0.121 | -0.359 | -0.301 | -0.002 | -0.004 | -0.011 |
| [p-value] | [0.285] | [0.206] | [0.885] | [0.728] | [0.335] | [0.621] | [0.853] | [0.618] | [0.489] |
| Difference-in-differences | 0.001 | -0.004 | 0.015 | -0.039 | -0.202 | 0.388 | 0.001 | -0.003 | 0.012 |
| Estimates (From Table 7) | (0.005) | (0.005) | (0.008) | (0.222) | (0.234) | (0.356) | (0.005) | (0.006) | (0.009) |
| Observations | 640572 | 459425 | 181147 | 640572 | 459425 | 181147 | 640572 | 459425 | 181147 |
| Mean of Dep. Var. in 2010 | 0.686 | 0.713 | 0.650 | 27.1 | 28.3 | 23.9 | 0.616 | 0.640 | 0.549 |
| Panel B: Childless Adults | | | | | | | | | |
| Indicator of Expand in 2014 | 0.0005 | 0.001 | -0.007 | 0.282 | -0.412 | 0.081 | 0.002 | -0.002 | 0.001 |
| [p-value] | [0.963] | [0.924] | [0.562] | [0.547] | [0.404] | [0.886] | [0.859] | [0.856] | [0.940] |
| Difference-in-differences | 0.012** | 0.014** | 0.012 | 0.426 | 0.446 | 0.459 | 0.010 | 0.012** | 0.009 |
| Estimates (From Table 7) | (0.005) | (0.006) | (0.007) | (0.239) | (0.267) | (0.302) | (0.005) | (0.006) | (0.007) |
| Observations | 1141994 | 549419 | 592575 | 1141994 | 549419 | 592575 | 1141994 | 549419 | 592575 |
| Mean of Dep. Var. in 2010 | 0.652 | 0.675 | 0.648 | 25.8 | 26.7 | 24.9 | 0.587 | 0.605 | 0.569 |

Notes: Data are from years 2010-2016 (May) of the Current Population Survey monthly files. Analysis excludes Alaska, Indiana, Montana and Pennsylvania due to expansions after 2014. The sample is limited to non-disabled adults between ages 22-64 with a high school degree or less. Regressions are adjusted using indicators for state, year, age, sex, race, education levels, marital status, foreign-born status, citizenship status, number of children and family size. P-values of synthetic control estimates [in brackets] are obtained through randomization inference. All standard errors of differences-in-differences estimates (in parentheses) are clustered on state. (**) indicates significance at the 5 percent level.

**Appendix Table 1. Event History Estimates of Effect of ACA Medicaid Expansions on Health Insurance**
**American Community Survey 2010-2014**

| | Low-educated Sample (HS or less) | | | | | | | | | Low-income Sample (<300% FPL) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Medicaid | | | Uninsured | | | Private | | | Medicaid | Uninsured | Private |
| Panel A: Parents | All | Married | Unmarried | All | Married | Unmarried | All | Married | Unmarried | All | All | All |
| Expand x Year 2014 | 0.040** | 0.041** | 0.035** | -0.026** | -0.030** | -0.013 | -0.011 | -0.007 | -0.024** | 0.048** | -0.027** | -0.017 |
| | (0.010) | (0.011) | (0.010) | (0.012) | (0.014) | (0.012) | (0.009) | (0.009) | (0.008) | (0.010) | (0.012) | (0.009) |
| Expand x Year 2013 | -0.0001 | 0.003 | -0.013 | 0.004 | -0.0002 | 0.020** | -0.002 | -0.001 | -0.005 | 0.004 | 0.001 | -0.003 |
| | (0.006) | (0.006) | (0.007) | (0.005) | (0.005) | (0.009) | (0.004) | (0.004) | (0.007) | (0.006) | (0.005) | (0.004) |
| Expand x Year 2012 | 0.001 | 0.002 | -0.002 | -0.002 | -0.005 | 0.010 | 0.001 | 0.005 | -0.010 | 0.001 | -0.001 | 0.001 |
| | (0.005) | (0.005) | (0.009) | (0.004) | (0.005) | (0.008) | (0.003) | (0.003) | (0.006) | (0.005) | (0.004) | (0.003) |
| Expand x Year 2011 | -0.001 | 0.002 | -0.012 | -0.0001 | -0.004 | 0.014 | 0.0001 | 0.002 | -0.005 | 0.001 | -0.001 | -0.001 |
| | (0.004) | (0.004) | (0.007) | (0.004) | (0.005) | (0.008) | (0.003) | (0.004) | (0.005) | (0.004) | (0.003) | (0.003) |
| p-value test of joint significance of pre-trend | 0.870 | 0.948 | 0.037 | 0.374 | 0.391 | 0.136 | 0.765 | 0.275 | 0.493 | 0.779 | 0.868 | 0.634 |
| Observations | 857486 | 655254 | 202232 | 857486 | 655254 | 202232 | 857486 | 655254 | 202232 | 1257844 | 1257844 | 1257844 |
| Mean of Dep. Var. in 2010 | 0.168 | 0.129 | 0.303 | 0.288 | 0.269 | 0.355 | 0.560 | 0.620 | 0.355 | 0.190 | 0.281 | 0.550 |
| Panel B: Childless Adults | | | | | | | | | | | | |
| Expand x Year 2014 | 0.039** | 0.024** | 0.052** | -0.037** | -0.022 | -0.050** | -0.001 | -0.001 | -0.001 | 0.064** | -0.054** | -0.008 |
| | (0.008) | (0.007) | (0.009) | (0.010) | (0.012) | (0.008) | (0.006) | (0.008) | (0.006) | (0.009) | (0.009) | (0.008) |
| Expand x Year 2013 | 0.002 | 0.001 | 0.001 | -0.004 | 0.002 | -0.008 | 0.001 | -0.004 | 0.006 | 0.004 | -0.006 | 0.002 |
| | (0.003) | (0.002) | (0.005) | (0.004) | (0.004) | (0.006) | (0.003) | (0.004) | (0.004) | (0.004) | (0.005) | (0.003) |
| Expand x Year 2012 | -0.001 | -0.001 | -0.002 | -0.004 | -0.002 | -0.004 | 0.004 | 0.002 | 0.006 | -0.001 | -0.006 | 0.008** |
| | (0.003) | (0.002) | (0.004) | (0.003) | (0.003) | (0.005) | (0.002) | (0.003) | (0.003) | (0.003) | (0.003) | (0.003) |
| Expand x Year 2011 | 0.001 | 0.0005 | 0.001 | -0.006** | -0.0001 | -0.011** | 0.005** | -0.0001 | 0.011** | 0.002 | -0.009** | 0.008** |
| | (0.001) | (0.002) | (0.002) | (0.003) | (0.003) | (0.004) | (0.002) | (0.003) | (0.003) | (0.002) | (0.002) | (0.002) |
| p-value test of joint significance of pre-trend | 0.303 | 0.420 | 0.566 | 0.156 | 0.505 | 0.035 | 0.060 | 0.212 | 0.010 | 0.092 | 0.007 | 0.001 |
| Observations | 1718309 | 855016 | 863293 | 1718309 | 855016 | 863293 | 1718309 | 855016 | 863293 | 1766166 | 1766166 | 1766166 |
| Mean of Dep. Var. in 2010 | 0.073 | 0.038 | 0.108 | 0.305 | 0.191 | 0.421 | 0.614 | 0.763 | 0.462 | 0.095 | 0.386 | 0.506 |

Notes: Data are from years 2010-2014 of the American Community Survey.. Estimates report the coefficient on the interaction term between an indicator for whether a state expands Medicaid and year indicators. A p-value reports results from F-tests of joint significance from pre-2014 Medicaid expansion interaction terms. Sample used in columns 1-9 is limited to non-disabled adults between ages 22-64 with a high school degree or less. Sample used in columns 10-12 is limited to non-disabled adults between ages 22-64 with family income below 300% of Federal Poverty Level. Regressions are adjusted using indicators for state, year, age, sex, race, education levels, marital status, foreign-born status, citizenship status, number of children and family size. All standard errors (in parentheses) are clustered on state. (**) indicates significance at the 5 percent level.

**Appendix Table 2. Difference-in-differences Estimates of Effect of ACA Medicaid Expansions on Health Insurance By Age**
**American Community Survey 2010-2014**

| | Low-educated Sample (HS or less) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Medicaid | | | Uninsured | | | Private | | |
| Panel A: Parents | All | Married | Unmarried | All | Married | Unmarried | All | Married | Unmarried |
| Age 22 to 44 | | | | | | | | | |
| Expand in 2014 | 0.044** | 0.044** | 0.041** | -0.030** | -0.031** | -0.028** | -0.011 | -0.009 | -0.016** |
| | (0.008) | (0.008) | (0.010) | (0.010) | (0.012) | (0.011) | (0.007) | (0.009) | (0.006) |
| Observations | 625684 | 461899 | 163785 | 625684 | 461899 | 163785 | 625684 | 461899 | 163785 |
| Mean of Dep. Var. in 2010 | 0.186 | 0.141 | 0.324 | 0.315 | 0.297 | 0.367 | 0.518 | 0.582 | 0.325 |
| Age 45 to 64 | | | | | | | | | |
| Expand in 2014 | 0.030** | 0.029** | 0.037** | -0.018 | -0.020 | -0.008 | -0.012 | -0.008 | -0.031** |
| | (0.010) | (0.011) | (0.010) | (0.014) | (0.015) | (0.013) | (0.008) | (0.009) | (0.012) |
| Observations | 231802 | 193355 | 38447 | 231802 | 193355 | 38447 | 231802 | 193355 | 38447 |
| Mean of Dep. Var. in 2010 | 0.118 | 0.099 | 0.215 | 0.214 | 0.197 | 0.306 | 0.680 | 0.717 | 0.487 |
| Panel B: Childless Adults | | | | | | | | | |
| Age 22 to 44 | | | | | | | | | |
| Expand in 2014 | 0.047** | 0.036** | 0.050** | -0.042** | -0.026** | -0.045** | -0.004 | -0.009 | -0.004 |
| | (0.007) | (0.006) | (0.007) | (0.007) | (0.010) | (0.007) | (0.005) | (0.007) | (0.006) |
| Observations | 594085 | 133989 | 460096 | 594085 | 133989 | 460096 | 594085 | 133989 | 460096 |
| Mean of Dep. Var. in 2010 | 0.092 | 0.052 | 0.104 | 0.472 | 0.346 | 0.511 | 0.438 | 0.603 | 0.386 |
| Age 45 to 64 | | | | | | | | | |
| Expand in 2014 | 0.034** | 0.022** | 0.054** | -0.028** | -0.021 | -0.041** | -0.004 | 0.001 | -0.012 |
| | (0.007) | (0.007) | (0.008) | (0.010) | (0.011) | (0.008) | (0.006) | (0.007) | (0.006) |
| Observations | 1124224 | 721027 | 403197 | 1124224 | 721027 | 403197 | 1124224 | 721027 | 403197 |
| Mean of Dep. Var. in 2010 | 0.062 | 0.035 | 0.113 | 0.214 | 0.159 | 0.315 | 0.710 | 0.795 | 0.552 |

Notes: Data are from years 2010-2014 of the American Community Survey. Estimates above dashed lines report the coefficient the interaction term between an indicator for whether a state expands Medicaid and an indicator for whether the year is 2014. Sample is limited to non-disabled adults between ages 22-64 with a high school degree or less. Regressions are adjusted using indicators for state, year, age, sex, race, education levels, marital status, foreign-born status, citizenship status, number of children and family size. All standard errors (in parentheses) are clustered on state. (**) indicates significance at the 5 percent level.

**Appendix Table 3. Comparison of Health Insurance Estimates With and Without Eleven States**
**(Nine Prior Full Expansion or Limited Expansion Control States: DE, DC, MA, NY, VT, IN, ME, TN and WI, and Two Late Expansion Treatment States: MI and NH)**
**American Community Survey**

| | Low-educated Sample (HS or less) | | | | | | | | | Low-income Sample (<300% FPL) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Medicaid | | | Uninsured | | | Private | | | Medicaid | Uninsured | Private |
| Panel A: Parents | All | Married | Unmarried | All | Married | Unmarried | All | Married | Unmarried | All | All | All |
| Difference-in-differences | 0.043** | 0.043** | 0.039** | -0.020 | -0.020 | -0.019 | -0.021** | -0.019** | -0.025** | 0.049** | -0.020 | -0.026** |
| Estimates | (0.008) | (0.008) | (0.009) | (0.011) | (0.013) | (0.011) | (0.006) | (0.007) | (0.006) | (0.009) | (0.011) | (0.006) |
| Difference-in-differences | 0.040** | 0.039** | 0.041** | -0.027** | -0.027** | -0.024** | -0.011 | -0.009 | -0.019** | 0.046** | -0.027** | -0.016** |
| Estimates (From Table 3) | (0.008) | (0.009) | (0.009) | (0.011) | (0.012) | (0.011) | (0.007) | (0.008) | (0.006) | (0.009) | (0.010) | (0.007) |
| Synthetic Control | 0.029 | 0.025 | 0.044 | -0.040** | -0.031** | -0.020 | -0.014 | -0.007 | -0.021 | 0.027 | -0.062** | -0.021** |
| [p-value] | [0.073] | [0.085] | [0.079] | [0.002] | [0.023] | [0.247] | [0.068] | [0.407] | [0.085] | [0.097] | [<0.001] | [0.009] |
| Synthetic Control | 0.046** | 0.034** | 0.067** | -0.035** | -0.032** | -0.038** | -0.006 | -0.007 | -0.013 | 0.044** | -0.035** | -0.011 |
| [p-value] (From Table 4) | [<0.001] | [0.003] | [0.004] | [0.004] | [0.003] | [0.021] | [0.417] | [0.367] | [0.235] | [0.003] | [0.007] | [0.123] |
| Observations | 703283 | 537870 | 165413 | 703283 | 537870 | 165413 | 703283 | 537870 | 165413 | 1035622 | 1035622 | 1035622 |
| Mean of DV. In 2010 | 0.153 | 0.116 | 0.279 | 0.312 | 0.292 | 0.380 | 0.550 | 0.608 | 0.352 | 0.172 | 0.302 | 0.545 |
| Panel B: Childless Adults | | | | | | | | | | | | |
| Difference-in-differences | 0.046** | 0.030** | 0.060** | -0.034** | -0.019 | -0.045** | -0.011** | -0.009 | -0.014** | 0.075** | -0.049** | -0.023** |
| Estimates | (0.006) | (0.006) | (0.006) | (0.010) | (0.012) | (0.008) | (0.005) | (0.007) | (0.004) | (0.006) | (0.008) | (0.006) |
| Difference-in-differences | 0.039** | 0.024** | 0.052** | -0.034** | -0.022 | -0.044** | -0.003 | -0.001 | -0.007 | 0.063** | -0.048** | -0.013 |
| Estimates (From Table 3) | (0.007) | (0.007) | (0.007) | (0.009) | (0.011) | (0.007) | (0.006) | (0.007) | (0.006) | (0.008) | (0.008) | (0.007) |
| Synthetic Control | 0.042** | 0.034** | 0.065** | -0.041** | -0.028** | -0.060** | -0.006 | -0.0002 | -0.007 | 0.076** | -0.055** | -0.013 |
| [p-value] | [0.002] | [0.003] | [0.001] | [<0.001] | [0.057] | [<0.001] | [0.325] | [0.966] | [0.316] | [<0.001] | [<0.001] | [0.127] |
| Synthetic Control | 0.044** | 0.021** | 0.062** | -0.040** | -0.028** | -0.057** | 0.002 | 0.003 | -0.002 | 0.062** | -0.054** | -0.006 |
| [p-value] (From Table 4) | [0.001] | [0.006] | [<0.001] | [<0.001] | [0.034] | [<0.001] | [0.771] | [0.681] | [0.750] | [<0.001] | [<0.001] | [0.547] |
| Observations | 1375638 | 679664 | 695974 | 1375638 | 679664 | 695974 | 1375638 | 679664 | 695974 | 1435514 | 1435514 | 1435514 |
| Mean of DV. In 2010 | 0.064 | 0.033 | 0.096 | 0.323 | 0.205 | 0.441 | 0.603 | 0.752 | 0.453 | 0.082 | 0.403 | 0.500 |

Notes: Data are from years 2010-2014 of the American Community Survey. Estimates report the difference in dependent variables in 2014 between treatment states and the synthetic control group. Sample used in columns 1-9 is limited to non-disabled adults between ages 22-64 with a high school degree or less. Sample used in columns 10-12 is limited to non-disabled adults between ages 22-64 with family income below 300% of Federal Poverty Level. P-values of synthetic control estimates [in brackets] are obtained through randomization inference. (**) indicates significance at the 5 percent level.

**Appendix Table 4. Difference-in-differences Estimates of Effect of ACA Medicaid Expansions on Health Insurance**
**March Current Population Survey 2010-2015**

| | Low-educated Sample (HS or less) | | | | | | | | | Low-income Sample (<300% FPL) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Medicaid | | | Uninsured | | | Private | | | Medicaid | Uninsured | Private |
| Panel A: Parents | All | Married | Unmarried | All | Married | Unmarried | All | Married | Unmarried | All | All | All |
| Expand in 2014 | 0.065** | 0.075** | 0.043** | -0.040** | -0.038** | -0.050** | -0.011 | -0.021 | 0.013 | 0.068** | -0.037** | -0.019 |
| | (0.015) | (0.017) | (0.020) | (0.017) | (0.018) | (0.024) | (0.013) | (0.015) | (0.019) | (0.014) | (0.017) | (0.012) |
| Expand in 2014, no prior policy | 0.074** | 0.074** | 0.074 | -0.039** | -0.034** | -0.053 | -0.031 | -0.040** | -0.011 | 0.82** | -0.040** | -0.028** |
| | (0.021) | (0.021) | (0.037) | (0.017) | (0.014) | (0.044) | (0.017) | (0.018) | (0.029) | (0.020) | (0.017) | (0.010) |
| Expand in 2014, any prior policy | 0.061** | 0.075** | 0.028 | -0.041 | -0.039 | -0.049** | -0.002 | -0.013 | 0.025 | 0.62** | -0.036** | -0.015 |
| | (0.018) | (0.021) | (0.019) | (0.022) | (0.023) | (0.023) | (0.014) | (0.016) | (0.018) | (0.018) | (0.021) | (0.014) |
| p-value for test of difference between treatment effects | 0.603 | 0.962 | 0.219 | 0.945 | 0.794 | 0.913 | 0.148 | 0.178 | 0.250 | 0.385 | 0.866 | 0.389 |
| Observations | 94079 | 68065 | 26014 | 94079 | 68065 | 26014 | 94079 | 68065 | 26014 | 123788 | 123788 | 123788 |
| Mean of Dep. Var. in 2010 | 0.150 | 0.118 | 0.239 | 0.310 | 0.272 | 0.416 | 0.545 | 0.617 | 0.343 | 0.170 | 0.311 | 0.524 |
| Panel B: Childless Adults | | | | | | | | | | | | |
| Expand in 2014 | 0.045** | 0.040** | 0.049** | -0.041** | -0.033 | -0.048** | 0.006 | 0.007 | 0.004 | 0.065** | -0.060** | 0.002 |
| | (0.008) | (0.013) | (0.009) | (0.015) | (0.021) | (0.014) | (0.012) | (0.017) | (0.012) | (0.009) | (0.015) | (0.011) |
| Expand in 2014, no prior policy | 0.039** | 0.026 | 0.051** | -0.035** | -0.019 | -0.053** | 0.005 | 0.007 | 0.004 | 0.069** | -0.061** | 0.004 |
| | (0.011) | (0.013) | (0.015) | (0.015) | (0.019) | (0.018) | (0.018) | (0.023) | (0.011) | (0.013) | (0.019) | (0.011) |
| Expand in 2014, any prior policy | 0.048** | 0.046** | 0.048** | -0.044** | -0.041 | -0.045** | 0.006 | 0.007 | 0.004 | 0.063** | -0.059** | 0.001 |
| | (0.009) | (0.014) | (0.009) | (0.020) | (0.026) | (0.018) | (0.016) | (0.020) | (0.015) | (0.012) | (0.020) | (0.014) |
| p-value for test of difference between treatment effects | 0.516 | 0.163 | 0.851 | 0.713 | 0.459 | 0.738 | 0.957 | 0.990 | 0.972 | 0.716 | 0.965 | 0.824 |
| Observations | 114117 | 55253 | 58864 | 114117 | 55253 | 58864 | 114117 | 55253 | 58864 | 114727 | 114727 | 114727 |
| Mean of Dep. Var. in 2010 | 0.071 | 0.058 | 0.084 | 0.337 | 0.217 | 0.451 | 0.575 | 0.712 | 0.445 | 0.094 | 0.422 | 0.460 |

Notes: Data are from years 2010-2015 of the March Current Population Survey. Estimates above dashed lines report the coefficient on the interaction term between an indicator for whether a state expands Medicaid and an indicator for whether the year is 2014. Estimates below dashed lines also report coefficients on these interaction terms but distinguish between states that had no prior Medicaid policy and those that had any prior policy (except for those that had ACA-level Medicaid expansions prior to 2014). A p-value reports results from F-tests measuring whether Medicaid expansion effects are statistically different between states that had prior policies and those that did not. Sample used in columns 1-9 is limited to non-disabled adults between ages 22-64 with a high school degree or less. Sample used in columns 10-12 is limited to non-disabled adults between ages 22-64 with family income below 300% of Federal Poverty Level. Regressions are adjusted using indicators for state, year, age, sex, race, education levels, marital status, foreign-born status, citizenship status, number of children and family size. All standard errors (in parentheses) are clustered on state. (**) indicates significance at the 5 percent level.

**Appendix Table 5. Event History Estimates of Effect of ACA Medicaid Expansions on Health Insurance**
**March Current Population Survey 2010-2015**

| | Low-educated Sample (HS or less) | | | | | | | | | Low-income Sample (<300% FPL) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Medicaid | | | Uninsured | | | Private | | | Medicaid | Uninsured | Private |
| Panel A: Parents | All | Married | Unmarried | All | Married | Unmarried | All | Married | Unmarried | All | All | All |
| Expand x Survey Year 2015 | 0.073** | 0.088** | 0.038 | -0.043** | -0.037 | -0.066** | -0.015 | -0.030 | 0.029 | 0.078** | -0.044** | -0.018 |
| | (0.018) | (0.019) | (0.023) | (0.021) | (0.023) | (0.025) | (0.016) | (0.019) | (0.022) | (0.018) | (0.019) | (0.014) |
| Expand x Survey Year 2014 | 0.030** | 0.029 | 0.026 | -0.007 | -.003 | -0.020 | -0.013 | -0.014 | 0.001 | 0.038** | -0.015 | -0.003 |
| | (0.014) | (0.017) | (0.017) | (0.018) | (0.023) | (0.022) | (0.013) | (0.016) | (0.024) | (0.014) | (0.015) | (0.013) |
| Expand x Survey Year 2013 | 0.010 | 0.020 | -0.016 | -0.019 | -0.014 | -0.037 | 0.007 | -0.003 | 0.040** | 0.010 | -0.018 | 0.009 |
| | (0.011) | (0.011) | (0.021) | (0.015) | (0.014) | (0.025) | (0.011) | (0.013) | (0.019) | (0.012) | (0.011) | (0.011) |
| Expand x Survey Year 2012 | 0.012 | 0.020 | -0.011 | 0.007 | 0.009 | 0.0004 | -0.018 | -0.022 | 0.0002 | 0.011 | -0.003 | -0.007 |
| | (0.009) | (0.010) | (0.019) | (0.010) | (0.011) | (0.019) | (0.010) | (0.012) | (0.020) | (0.010) | (0.008) | (0.010) |
| Expand x Survey Year 2011 | -0.0003 | 0.004 | -0.016 | 0.002 | 0.011 | -0.025 | 0.002 | -0.008 | 0.035 | 0.003 | -0.003 | 0.003 |
| | (0.008) | (0.009) | (0.015) | (0.009) | (0.012) | (0.017) | (0.010) | (0.013) | (0.021) | (0.009) | (0.010) | (0.011) |
| p-value test of joint significance of pre-2014 interactions | 0.284 | 0.267 | 0.086 | 0.266 | 0.068 | 0.339 | 0.132 | 0.394 | 0.115 | 0.059 | 0.519 | 0.539 |
| Observations | 94079 | 68065 | 26014 | 94079 | 68065 | 26014 | 94079 | 68065 | 26014 | 123788 | 123788 | 123788 |
| Mean of Dep. Var. in 2010 | 0.150 | 0.118 | 0.239 | 0.310 | 0.272 | 0.416 | 0.545 | 0.617 | 0.343 | 0.170 | 0.311 | 0.524 |
| Panel B: Childless Adults | | | | | | | | | | | | |
| Expand x Survey Year 2015 | 0.045** | 0.035** | 0.054** | -0.043** | -0.025 | -0.060** | 0.007 | 0.002 | 0.012 | 0.067** | -0.070** | 0.008 |
| | (0.011) | (0.014) | (0.012) | (0.015) | (.021) | (0.014) | (0.013) | (0.019) | (0.013) | (0.011) | (0.018) | (0.014) |
| Expand x Survey Year 2014 | 0.004 | -0.003 | 0.011 | -0.009 | 0.003 | -0.023 | 0.006 | -0.007 | 0.022 | 0.007 | -0.019 | 0.012 |
| | (0.011) | (0.011) | (0.014) | (0.010) | (0.015) | (0.013) | (0.011) | (0.017) | (0.016) | (0.010) | (0.015) | (0.014) |
| Expand x Survey Year 2013 | 0.002 | -0.007 | 0.009 | 0.008 | 0.015 | 0.00003 | -0.005 | -0.005 | -0.004 | 0.001 | -0.001 | 0.001 |
| | (0.008) | (0.009) | (0.011) | (0.011) | (0.014) | (0.014) | (0.010) | (0.013) | (0.014) | (0.008) | (0.014) | (0.012) |
| Expand x Survey Year 2012 | -0.006 | -0.010 | -0.004 | 0.009 | 0.025 | -0.007 | -0.012 | -0.023 | -0.0002 | -0.002 | -0.008 | 0.002 |
| | (0.006) | (0.009) | (0.008) | (0.012) | (0.013) | (0.016) | (0.011) | (0.012) | (0.016) | (0.007) | (0.013) | (0.001) |
| Expand x Survey Year 2011 | 0.004 | -0.001 | 0.008 | -0.019 | -0.004 | -0.034** | 0.018 | 0.009 | 0.029 | 0.005 | -0.024** | 0.017 |
| | (0.005) | (0.007) | (0.008) | (0.010) | (0.010) | (0.014) | (0.010) | (0.014) | (0.015) | (0.006) | (0.011) | (0.011) |
| p-value test of joint significance of pre-2014 interactions | 0.190 | 0.838 | 0.111 | 0.098 | 0.298 | 0.026 | 0.050 | 0.139 | 0.038 | 0.754 | 0.082 | 0.335 |
| Observations | 114117 | 55253 | 58864 | 114117 | 55253 | 58864 | 114117 | 55253 | 58864 | 114727 | 114727 | 114727 |
| Mean of Dep. Var. in 2010 | 0.071 | 0.058 | 0.084 | 0.337 | 0.217 | 0.451 | 0.575 | 0.712 | 0.445 | 0.094 | 0.422 | 0.460 |

Notes: Data are from years 2010-2015 of the March Current Population Survey. A p-value reports results from F-tests measuring whether Medicaid expansion effects are statistically different from 0 in pre-expansion periods. Sample used in columns 1-9 is limited to non-disabled adults between ages 22-64 with a high school degree or less. Sample used in columns 10-12 is limited to non-disabled adults between ages 22-64 with family income below 300% of Federal Poverty Level. Regressions are adjusted using indicators for state, year, age, sex, race, education levels, marital status, foreign-born status, citizenship status, number of children and family size. All standard errors (in parentheses) are clustered on state. (**) indicates significance at the 5 percent level.

**Appendix Table 6. Synthetic Control Estimates of Effect of ACA Medicaid Expansions on Health Insurance**
**March Current Population Survey 2010-2015**

| | Low-educated Sample (HS or less) | | | | | | | | | Low-income Sample (<300% FPL) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Medicaid | | | Uninsured | | | Private | | | Medicaid | Uninsured | Private |
| Panel A: Parents | All | Married | Unmarried | All | Married | Unmarried | All | Married | Unmarried | All | All | All |
| Indicator of Expand in 2014 | 0.061** | 0.068** | 0.049 | -0.052** | -0.049 | -0.045 | 0.003 | -0.017 | 0.030 | 0.043 | -0.041** | -0.011 |
| [p-value] | [0.010] | [0.009] | [0.082] | [0.031] | [0.072] | [0.145] | [0.891] | [0.442] | [0.209] | [0.065] | [0.032] | [0.525] |
| Difference-in-differences | 0.065** | 0.075** | 0.043** | -0.040** | -0.038** | -0.050** | -0.011 | -0.021 | 0.013 | 0.068** | -0.037** | -0.019 |
| Estimates (From A. Table 4) | (0.015) | (0.017) | (0.020) | (0.017) | (0.018) | (0.024) | (0.013) | (0.015) | (0.019) | (0.014) | (0.017) | (0.012) |
| Observations | 94079 | 68065 | 26014 | 94079 | 68065 | 26014 | 94079 | 68065 | 26014 | 123788 | 123788 | 123788 |
| Mean of Dep. Var. in 2010 | 0.150 | 0.118 | 0.239 | 0.310 | 0.272 | 0.416 | 0.545 | 0.617 | 0.343 | 0.170 | 0.311 | 0.524 |
| Panel B: Childless Adults | | | | | | | | | | | | |
| Indicator of Expand in 2014 | 0.043** | 0.046** | 0.042** | -0.032** | -0.031 | -0.051** | 0.020 | 0.002 | 0.016 | 0.067** | -0.047** | 0.008 |
| [p-value] | [0.003] | [0.035] | [0.010] | [0.043] | [0.074] | [0.007] | [0.202] | [0.915] | [0.290] | [<0.001] | [0.012] | [0.595] |
| Difference-in-differences | 0.045** | 0.040** | 0.049** | -0.041** | -0.033 | -0.048** | 0.006 | 0.007 | 0.004 | 0.065** | -0.060** | 0.002 |
| Estimates (From A. Table 4) | (0.008) | (0.013) | (0.009) | (0.015) | (0.021) | (0.014) | (0.012) | (0.017) | (0.012) | (0.009) | (0.015) | (0.011) |
| Observations | 114117 | 55253 | 58864 | 114117 | 55253 | 58864 | 114117 | 55253 | 58864 | 114117 | 114117 | 114117 |
| Mean of Dep. Var. in 2010 | 0.071 | 0.058 | 0.084 | 0.337 | 0.217 | 0.451 | 0.575 | 0.712 | 0.445 | 0.094 | 0.422 | 0.460 |

Notes: Data are from years 2010-2015 of the March Current Population Survey. Estimates report the difference in dependent variables in survey year 2015 between treatment states and the synthetic control group. Sample used in columns 1-9 is limited to non-disabled adults between ages 22-64 with a high school degree or less. Sample used in columns 10-12 is limited to non-disabled adults between ages 22-64 with family income below 300% of Federal Poverty Level. P-values of synthetic control estimates [in brackets] are obtained through randomization inference. All standard errors of differences-in-differences estimates (in parentheses) are clustered on state. (**) indicates significance at the 5 percent level.

**Appendix Table 7. Difference-in-differences Estimates of Effect of ACA Medicaid Expansions on Health Insurance By Age**
**March Current Population Survey 2010-2015**

| | Low-educated Sample (HS or less) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Medicaid | | | Uninsured | | | Private | | |
| Panel A: Parents | All | Married | Unmarried | All | Married | Unmarried | All | Married | Unmarried |
| Age 22 to 44 | | | | | | | | | |
| Expand in 2014 | 0.069** | 0.081** | 0.046** | -0.045** | -0.041** | -0.057** | -0.011 | -0.024 | 0.018 |
| | (0.016) | (0.017) | (0.021) | (0.017) | (0.017) | (0.025) | (0.013) | (0.014) | (0.018) |
| Observations | 70818 | 49563 | 21255 | 70818 | 49563 | 21255 | 70818 | 49563 | 21255 |
| Mean of Dep. Var. in 2010 | 0.166 | 0.130 | 0.258 | 0.334 | 0.260 | 0.429 | 0.506 | 0.582 | 0.316 |
| Age 45 to 64 | | | | | | | | | |
| Expand in 2014 | 0.056** | 0.060** | 0.036 | -0.030 | -0.032 | -0.023 | -0.011 | -0.012 | -0.007 |
| | (0.016) | (0.019) | (0.032) | (0.023) | (0.026) | (0.031) | (0.025) | (0.025) | (0.043) |
| Observations | 23261 | 18502 | 4759 | 23261 | 18502 | 4759 | 23261 | 18502 | 4759 |
| Mean of Dep. Var. in 2010 | 0.101 | 0.087 | 0.156 | 0.236 | 0.206 | 0.357 | 0.664 | 0.716 | 0.461 |
| Panel B: Childless Adults | | | | | | | | | |
| Age 22 to 44 | | | | | | | | | |
| Expand in 2014 | 0.048** | 0.054** | 0.045** | -0.046** | -0.040 | -0.046** | -0.002 | -0.015 | -0.0004 |
| | (0.011) | (0.017) | (0.012) | (0.015) | (0.024) | (0.017) | (0.013) | (0.022) | (0.015) |
| Observations | 45489 | 11214 | 34275 | 45489 | 11214 | 34275 | 45489 | 11214 | 34275 |
| Mean of Dep. Var. in 2010 | 0.080 | 0.072 | 0.082 | 0.480 | 0.349 | 0.525 | 0.431 | 0.577 | 0.380 |
| Age 45 to 64 | | | | | | | | | |
| Expand in 2014 | 0.042** | 0.035** | 0.055** | -0.036** | -0.030 | -0.049** | 0.011 | 0.012 | 0.008 |
| | (0.011) | (0.014) | (0.012) | (0.018) | (0.023) | (0.017) | (0.017) | (0.019) | (0.020) |
| Observations | 68628 | 44039 | 24589 | 68628 | 44039 | 24589 | 68628 | 44039 | 24589 |
| Mean of Dep. Var. in 2010 | 0.065 | 0.054 | 0.086 | 0.239 | 0.181 | 0.345 | 0.675 | 0.749 | 0.539 |

Notes: Data are from years 2010-2015 of the March Current Population Survey. Estimates above dashed lines report the coefficient on the interaction term between an indicator for whether state expands Medicaid and an indicator for whether the survey year is 2015. Sample is limited to non-disabled adults between ages 22-64 with a high school degree or less. Regressions are adjusted using indicators for state, year, age, sex, race, education levels, marital status, foreign-born status, citizenship status, number of children and family size. All standard errors (in parentheses) are clustered on state. (**) indicates significance at the 5 percent level.

**Appendix Table 8. Comparison of Health Insurance Estimates With and Without Eleven States (Nine Prior Full Expansion or Limited Expansion Control States: DE, DC, MA, NY, VT, IN, ME, TN and WI, and Two Late Expansion Treatment States: MI and NH) March Current Population Survey**

| | Low-educated Sample (HS or less) | | | | | | | | | Low-income Sample (<300% FPL) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Medicaid | | | Uninsured | | | Private | | | Medicaid | Uninsured | Private |
| Panel A: Parents | All | Married | Unmarried | All | Married | Unmarried | All | Married | Unmarried | All | All | All |
| Difference-in-differences | 0.054** | 0.067** | 0.027 | -0.032 | -0.027 | -0.048 | -0.010 | -0.027 | 0.027 | 0.064** | -0.027 | -0.024 |
| Estimates | (0.016) | (0.018) | (0.023) | (0.020) | (0.020) | (0.029) | (0.015) | (0.016) | (0.020) | (0.015) | (0.018) | (0.013) |
| Difference-in-differences | 0.065** | 0.075** | 0.043** | -0.040** | -0.038** | -0.050** | -0.011 | -0.021 | 0.013 | 0.068** | -0.037** | -0.019 |
| Estimates (From A. Table 4) | (0.015) | (0.017) | (0.020) | (0.017) | (0.018) | (0.024) | (0.013) | (0.015) | (0.019) | (0.014) | (0.017) | (0.012) |
| Synthetic Control | 0.083** | 0.117** | 0.057 | -0.040 | -0.073** | -0.149** | -0.016 | -0.003 | 0.062 | 0.104** | -0.028 | -0.042 |
| [p-value] | [0.005] | [0.001] | [0.099] | [0.247] | [0.039] | [<0.001] | [0.539] | [0.899] | [0.073] | [<0.001] | [0.238] | [0.069] |
| Synthetic Control | 0.061** | 0.068** | 0.049 | -0.052** | -0.049 | -0.045 | 0.003 | -0.017 | 0.030 | 0.043 | -0.041** | -0.011 |
| [p-value] (From A. Table 6) | [0.010] | [0.009] | [0.082] | [0.031] | [0.072] | [0.145] | [0.891] | [0.442] | [0.209] | [0.065] | [0.032] | [0.525] |
| Observations | 73739 | 53599 | 20140 | 73739 | 53599 | 20140 | 73739 | 53599 | 20140 | 97741 | 97741 | 97741 |
| Mean of DV. In 2010 | 0.130 | 0.103 | 0.206 | 0.340 | 0.300 | 0.453 | 0.532 | 0.601 | 0.338 | 0.145 | 0.338 | 0.520 |
| Panel B: Childless Adults | | | | | | | | | | | | |
| Difference-in-differences | 0.052** | 0.049** | 0.054** | -0.037** | -0.030 | -0.042** | -0.001 | -0.001 | -0.002 | 0.069** | -0.059** | 0.001 |
| Estimates | (0.007) | (0.012) | (0.008) | (0.017) | (0.024) | (0.015) | (0.014) | (0.019) | (0.014) | (0.009) | (0.016) | (0.012) |
| Difference-in-differences | 0.045** | 0.040** | 0.049** | -0.041** | -0.033 | -0.048** | 0.006 | 0.007 | 0.004 | 0.065** | -0.060** | 0.002 |
| Estimates (From A. Table 4) | (0.008) | (0.013) | (0.009) | (0.015) | (0.021) | (0.014) | (0.012) | (0.017) | (0.012) | (0.009) | (0.015) | (0.011) |
| Synthetic Control | 0.061** | 0.075** | 0.072** | -0.056** | -0.057** | -0.053** | -0.006 | 0.002 | 0.005 | 0.078** | -0.051 | -0.004 |
| [p-value] | [<0.001] | [0.005] | [<0.001] | [0.002] | [0.008] | [0.045] | [0.701] | [0.898] | [0.808] | [0.001] | [0.059] | [0.805] |
| Synthetic Control | 0.043** | 0.046** | 0.042** | -0.032** | -0.031 | -0.051** | 0.020 | 0.002 | 0.016 | 0.067** | -0.047** | 0.008 |
| [p-value] (From A. Table 6) | [0.003] | [0.035] | [0.010] | [0.043] | [0.074] | [0.007] | [0.202] | [0.915] | [0.290] | [<0.001] | [0.012] | [0.595] |
| Observations | 86576 | 42179 | 44397 | 86576 | 42179 | 44397 | 86576 | 42179 | 44397 | 88459 | 88459 | 88459 |
| Mean of DV. In 2010 | 0.062 | 0.054 | 0.068 | 0.359 | 0.234 | 0.479 | 0.562 | 0.698 | 0.431 | 0.079 | 0.443 | 0.453 |

Notes: Data are from years 2010-2015 of the March Current Population Survey. Estimates report the difference in the dependent variables in survey year 2015 between treatment states and the synthetic control group. Sample used in columns 1-9 is limited to non-disabled adults between ages 22-64 with a high school degree or less. Sample used in columns 10-12 is limited to non-disabled adults between ages 22-64 with family income below 300% of Federal Poverty Level. P-values of synthetic control estimates [in brackets] are obtained through randomization inference. (**) indicates significance at the 5 percent level.

**Appendix Table 9. Event History Estimates of Effect of ACA Medicaid Expansions on Labor Supply**
**American Community Survey 2010-2014**

| | Low-educated Sample (HS or less) | | | Low-income Sample (<300% FPL) |
|---|---|---|---|---|
| | Employed at Time of Survey | | | Employed at Time of Survey |
| Panel A: Parents | All | Married | Unmarried | All |
| Expand x Year 2014 | 0.007 | 0.005 | 0.016 | 0.007 |
| | (0.005) | (0.004) | (0.010) | (0.004) |
| Expand x Year 2013 | 0.006 | 0.006 | 0.008 | 0.006 |
| | (0.003) | (0.003) | (0.008) | (0.003) |
| Expand x Year 2012 | 0.004 | 0.004 | 0.009 | 0.005 |
| | (0.003) | (0.003) | (0.007) | (0.003) |
| Expand x Year 2011 | -0.001 | -0.002 | 0.005 | 0.001 |
| | (0.003) | (0.003) | (0.007) | (0.003) |
| p-value test of joint significance of pre-trend | 0.157 | 0.153 | 0.664 | 0.086 |
| Observations | 857486 | 655254 | 202232 | 1257844 |
| Mean of Dep. Var. in 2010 | 0.715 | 0.726 | 0.676 | 0.693 |
| | | | | |
| Panel B: Childless Adults | | | | |
| Expand x Year 2014 | 0.006 | 0.007 | 0.005 | 0.007 |
| | (0.004) | (0.004) | (0.006) | (0.004) |
| Expand x Year 2013 | 0.007** | 0.008** | 0.007 | 0.006 |
| | (0.004) | (0.004) | (0.005) | (0.003) |
| Expand x Year 2012 | 0.004 | 0.008** | 0.001 | 0.005 |
| | (0.003) | (0.003) | (0.005) | (0.003) |
| Expand x Year 2011 | 0.002 | 0.001 | 0.004 | 0.002 |
| | (0.002) | (0.003) | (0.003) | (0.002) |
| p-value test of joint significance of pre-trend | 0.214 | 0.002 | 0.245 | 0.251 |
| Observations | 1718309 | 855016 | 863293 | 1766166 |
| Mean of Dep. Var. in 2010 | 0.677 | 0.688 | 0.667 | 0.610 |

Notes: Data are from years 2010-2014 of the American Community Survey. Estimates report the coefficient on the interaction term between an indicator for whether state expands Medicaid and year indicators. A p-value reports results from F-tests of joint significance from pre-2014 Medicaid expansion interaction terms. Sample used in columns 1-3 is limited to non-disabled adults between ages 22-64 with a high school degree or less. Sample used in column 4 is limited to non-disabled adults between ages 22-64 with family income below 300% of Federal Poverty Level. Regressions are adjusted using indicators for state, year, age, sex, race, education levels, marital status, foreign-born status, citizenship status, number of children and family size. All standard errors (in parentheses) are clustered on state. (**) indicates significance at the 5 percent level.

**Appendix Table 10. Comparison of Labor Supply Estimates With and Without Eleven States (Nine Prior Full Expansion or Limited Expansion Control States: DE, DC, MA, NY, VT, IN, ME, TN and WI, and Two Late Expansion Treatment States: MI and NH) American Community Survey**

| | Low-educated Sample (HS or less) | | | Low-income Sample (<300% FPL) |
|---|---|---|---|---|
| | | Employed at Time of Survey | | Employed at Time of Survey |
| Panel A: Parents | All | Married | Unmarried | All |
| Difference-in-differences Estimates | 0.005 | 0.002 | 0.014 | 0.005 |
| | (0.004) | (0.004) | (0.008) | (0.003) |
| Difference-in-differences Estimates (From Table 6) | 0.005 | 0.003 | 0.011 | 0.004 |
| | (0.004) | (0.003) | (0.007) | (0.003) |
| Synthetic Control: Expand in 2014 | 0.003 | -0.001 | 0.001 | 0.008** |
| [p-value] | [0.532] | [0.786] | [0.957] | [0.049] |
| Synthetic Control: Expand in 2014 | -0.003 | 0.013** | -0.005 | -0.007 |
| [p-value] (From Table 6) | [0.679] | [0.015] | [0.713] | [0.066] |
| Observations | 703283 | 537870 | 165413 | 1035622 |
| Mean of Dep. Var. in 2010 | 0.713 | 0.723 | 0.677 | 0.692 |
| Panel B: Childless Adults | | | | |
| Difference-in-differences Estimates | 0.001 | 0.002 | -0.001 | 0.002 |
| | (0.003) | (0.003) | (0.004) | (0.003) |
| Difference-in-differences Estimates (From Table 6) | 0.003 | 0.003 | 0.002 | 0.003 |
| | (0.003) | (0.003) | (0.004) | (0.003) |
| Synthetic Control: Expand in 2014 | -0.003 | -0.007 | -0.004 | -0.008 |
| [p-value] | [0.470] | [0.165] | [0.384] | [0.082] |
| Synthetic Control: Expand in 2014 | -0.002 | -0.008 | 0.003 | -0.0004 |
| [p-value] (From Table 6) | [0.580] | [0.067] | [0.605] | [0.915] |
| Observations | 1375638 | 679664 | 695974 | 1435514 |
| Mean of Dep. Var. in 2010 | 0.676 | 0.686 | 0.667 | 0.612 |

Notes: Data are from years 2010-2014 of the American Community Survey. Estimates report the difference in dependent variables in 2014 between treatment states and the synthetic control group. Sample used in columns 1-3 is limited to non-disabled adults between ages 22-64 with a high school degree or less. Sample used in column 4 is limited to non-disabled adults between ages 22-64 with family income below 300% of Federal Poverty Level. P-values of synthetic control estimates [in brackets] are obtained through randomization inference. All standard errors of differences-in-differences estimates (in parentheses) are clustered on state. (**) indicates significance at the 5 percent level.

**Appendix Table 11. Event History Estimates of Effect of ACA Medicaid Expansions on Labor Supply**
**Monthly Current Population Survey 2010-(May) 2016**

| | Low-educated Sample (HS or less) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Employed at Time of Survey | | | Usual Hours Worked per Week | | | Full-Time | | |
| Panel A: Parents | All | Married | Unmarried | All | Married | Unmarried | All | Married | Unmarried |
| Expand x Year 2016 | -0.010 | -0.013 | -0.002 | -0.270 | -0.446 | 0.174 | -0.006 | -0.012 | 0.008 |
| | (0.009) | (0.009) | (0.016) | (0.418) | (0.441) | (0.656) | (0.009) | (0.009) | (0.017) |
| Expand x Year 2015 | 0.004 | -0.005 | 0.029** | 0.103 | -0.338 | 1.267** | 0.008 | -0.002 | 0.034** |
| | (0.007) | (0.008) | (0.013) | (0.342) | (0.368) | (0.580) | (0.007) | (0.008) | (0.014) |
| Expand x Year 2014 | 0.006 | -0.006 | 0.042** | 0.189 | -0.260 | 1.414** | 0.006 | -0.007 | 0.042** |
| | (0.006) | (0.008) | (0.012) | (0.288) | (0.322) | (0.489) | (0.006) | (0.007) | (0.011) |
| Expand x Year 2013 | 0.006 | 0.001 | 0.021 | 0.256 | -0.013 | 1.013 | 0.009 | 0.002 | 0.028** |
| | (0.007) | (0.009) | (0.011) | (0.320) | (0.371) | (0.510) | (0.007) | (0.008) | (0.013) |
| Expand x Year 2012 | 0.007 | 0.001 | 0.023 | 0.469 | 0.101 | 1.389** | 0.012 | 0.001 | 0.040** |
| | (0.008) | (0.009) | (0.013) | (0.381) | (0.412) | (0.566) | (0.008) | (0.009) | (0.014) |
| Expand x Year 2011 | -0.001 | -0.008 | 0.018 | 0.051 | -0.325 | 0.982** | 0.001 | -0.010 | 0.027** |
| | (0.006) | (0.007) | (0.011) | (0.292) | (0.317) | (0.431) | (0.007) | (0.007) | (0.011) |
| p-value test of joint significance of pre-2014 interactions | 0.425 | 0.300 | 0.247 | 0.239 | 0.232 | 0.091 | 0.130 | 0.144 | 0.052 |
| Observations | 640572 | 459425 | 181147 | 640572 | 459425 | 181147 | 640572 | 459425 | 181147 |
| Mean of Dep. Var. in 2010 | 0.685 | 0.706 | 0.627 | 27.1 | 28.3 | 23.9 | 0.615 | 0.639 | 0.548 |
| | | | | | | | | | |
| Panel B: Childless Adults | | | | | | | | | |
| Expand x Year 2016 | 0.010 | 0.006 | 0.016 | 0.311 | 0.169 | 0.529 | 0.010 | 0.006 | 0.015 |
| | (0.008) | (0.010) | (0.011) | (0.396) | (0.484) | (0.503) | (0.009) | (0.010) | (0.012) |
| Expand x Year 2015 | 0.011 | 0.012 | 0.014 | 0.295 | 0.239 | 0.504 | 0.009 | 0.008 | 0.014 |
| | (0.008) | (0.008) | (0.011) | (0.350) | (0.381) | (0.454) | (0.008) | (0.008) | (0.011) |
| Expand x Year 2014 | 0.002 | -0.010 | 0.016 | -0.025 | -0.401 | 0.469 | 0.001 | -0.007 | 0.012 |
| | (0.007) | (0.008) | (0.010) | (0.309) | (0.358) | (0.427) | (0.007) | (0.008) | (0.010) |
| Expand x Year 2013 | -0.007 | -0.017** | 0.007 | -0.360 | -0.707** | 0.134 | -0.004 | -0.014 | 0.008 |
| | (0.006) | (0.008) | (0.009) | (0.254) | (0.337) | (0.370) | (0.006) | (0.007) | (0.009) |
| Expand x Year 2012 | -0.012** | -0.024** | 0.002 | -0.509** | -0.892** | -0.042 | -0.008 | -0.019** | 0.005 |
| | (0.005) | (0.006) | (0.008) | (0.252) | (0.323) | (0.364) | (0.005) | (0.007) | (0.009) |
| Expand x Year 2011 | -0.007 | -0.018** | 0.005 | -0.363 | -0.734** | 0.033 | -0.007 | -0.017** | 0.004 |
| | (0.004) | (0.005) | (0.007) | (0.191) | (0.254) | (0.301) | (0.005) | (0.006) | (0.007) |
| p-value test of joint significance of pre-2014 interactions | 0.182 | 0.001 | 0.766 | 0.204 | 0.028 | 0.939 | 0.422 | 0.017 | 0.828 |
| Observations | 1141994 | 549419 | 592575 | 1141994 | 549419 | 592575 | 1141994 | 549419 | 592575 |
| Mean of Dep. Var. in 2010 | 0.652 | 0.669 | 0.636 | 25.8 | 26.7 | 24.9 | 0.587 | 0.605 | 0.569 |

Notes: Data are from years 2010-2016 (May) of the Current Population Survey monthly files. A p-value reports results from F-tests measuring whether Medicaid expansion effects are statistically different from 0 in pre-expansion periods. Analysis excludes Alaska, Indiana, Montana and Pennsylvania due to expansions after 2014. Sample limited to non-disabled adults between ages 22-64 with a high school degree or less. Regressions are adjusted using indicators for state, year, age, sex, race, education levels, marital status, foreign-born status, citizenship status, number of children and family size. All standard errors (in parentheses) are clustered on state. (**) indicates significance at the 5 percent level.

**Appendix Table 12. Comparison of Health Insurance Estimates With and Without Eleven States (Nine Prior Full Expansion or Limited Expansion Control States: DE, DC, MA, NY, VT, IN, ME, TN and WI, and Two Late Expansion Treatment States: MI and NH) Monthly Current Population Survey**

| | Low-educated Sample (HS or less) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Medicaid | | | Uninsured | | | Private | | |
| Panel A: Parents | All | Married | Unmarried | All | Married | Unmarried | All | Married | Unmarried |
| Difference-in-differences | 0.001 | -0.005 | 0.020** | -0.018 | -0.227 | 0.562 | 0.002 | -0.002 | 0.014 |
| Estimates | (0.004) | (0.005) | (0.008) | (0.213) | (0.225) | (0.359) | (0.005) | (0.006) | (0.009) |
| Difference-in-differences | 0.001 | -0.004 | 0.015 | -0.039 | -0.202 | 0.388 | 0.001 | -0.003 | 0.012 |
| Estimates (From Table 7) | (0.005) | (0.005) | (0.008) | (0.222) | (0.234) | (0.356) | (0.005) | (0.006) | (0.009) |
| Synthetic Control | -0.0003 | -0.013 | 0.011 | 0.245 | -0.626** | -0.238 | -0.004 | -0.009 | -0.014 |
| [p-value] | [0.958] | [0.078] | [0.505] | [0.459] | [0.048] | [0.763] | [0.694] | [0.299] | [0.436] |
| Synthetic Control | -0.009 | -0.011 | 0.002 | -0.121 | -0.359 | -0.301 | -0.002 | -0.004 | -0.011 |
| [p-value] (From Table 8) | [0.285] | [0.206] | [0.885] | [0.728] | [0.335] | [0.621] | [0.853] | [0.618] | [0.489] |
| Observations | 527338 | 381446 | 145892 | 527338 | 381446 | 145892 | 527338 | 381446 | 145892 |
| Mean of DV. In 2010 | 0.693 | 0.709 | 0.653 | 27.7 | 28.8 | 25.0 | 0.628 | 0.649 | 0.573 |
| Panel B: Childless Adults | | | | | | | | | |
| Difference-in-differences | 0.013** | 0.012 | 0.014 | 0.413 | 0.379 | 0.486 | 0.011 | 0.012 | 0.011 |
| Estimates | (0.006) | (0.007) | (0.007) | (0.259) | (0.279) | (0.330) | (0.006) | (0.006) | (0.008) |
| Difference-in-differences | 0.012** | 0.014** | 0.012 | 0.426 | 0.446 | 0.459 | 0.010 | 0.012** | 0.009 |
| Estimates (From Table 7) | (0.005) | (0.006) | (0.007) | (0.239) | (0.267) | (0.302) | (0.005) | (0.006) | (0.007) |
| Synthetic Control | 0.002 | -0.001 | -0.013 | 0.072 | -1.01** | 0.023 | 0.001 | 0.010 | -0.002 |
| [p-value] | [0.861] | [0.942] | [0.280] | [0.882] | [0.030] | [0.957] | [0.932] | [0.298] | [0.814] |
| Synthetic Control | 0.0005 | 0.001 | -0.007 | 0.282 | -0.412 | 0.081 | 0.002 | -0.002 | 0.001 |
| [p-value] (From Table 8) | [0.963] | [0.924] | [0.562] | [0.547] | [0.404] | [0.886] | [0.859] | [0.856] | [0.940] |
| Observations | 901679 | 435294 | 466385 | 901679 | 435294 | 466385 | 901679 | 435294 | 466385 |
| Mean of DV. In 2010 | 0.661 | 0.673 | 0.650 | 26.3 | 27.2 | 25.6 | 0.597 | 0.613 | 0.583 |

Notes: Data are from years 2010-2016 of the (May) Current Population Survey monthly files. Analysis excludes Alaska, Indiana, Montana and Pennsylvania due to expansions after 2014. Sample limited to non-disabled adults between ages 22-64 with a high school degree or less. Regressions are adjusted using indicators for state, year, age, sex, race, education levels, marital status, foreign-born status, citizenship status, number of children and family size. P-values of synthetic control estimates [in brackets] are obtained through randomization inference. All standard errors of differences-in-differences estimates (in parentheses) are clustered on state. (**) indicates significance at the 5 percent level.

**Figure 1. Medicaid, Low-educated Parents (ACS)**

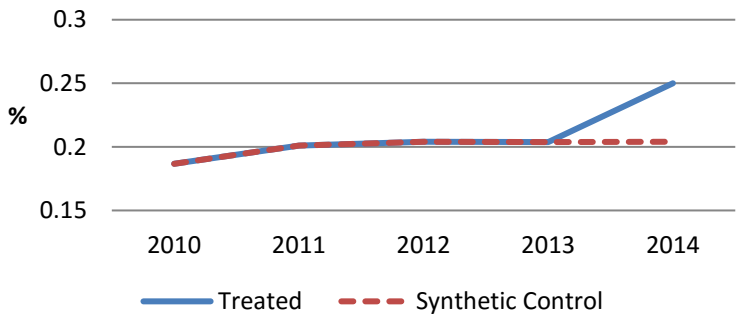


**Figure 2. Uninsured, Low-educated Parents (ACS)**

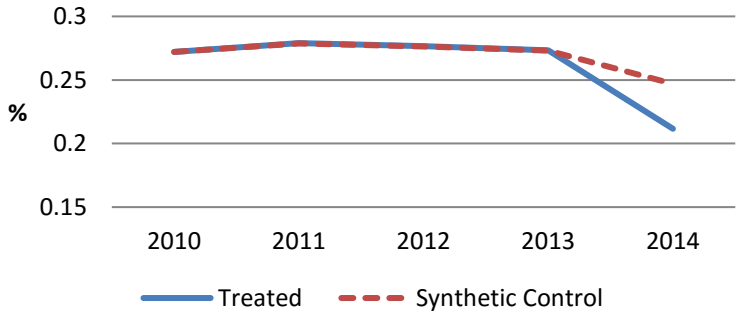


**Figure 3. Private Insured, Low-educated Parents (ACS)**

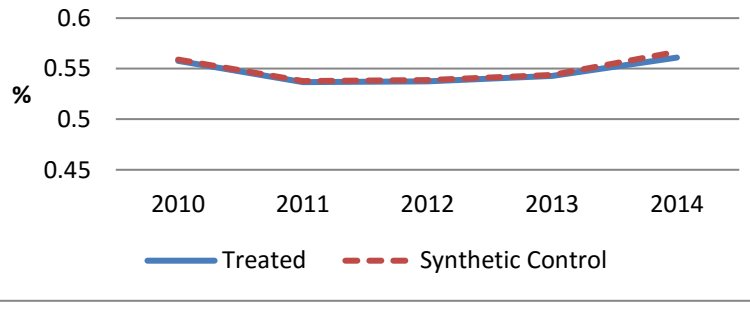


**Figure 4. Medicaid, Low-educated Childless Adults (ACS)**

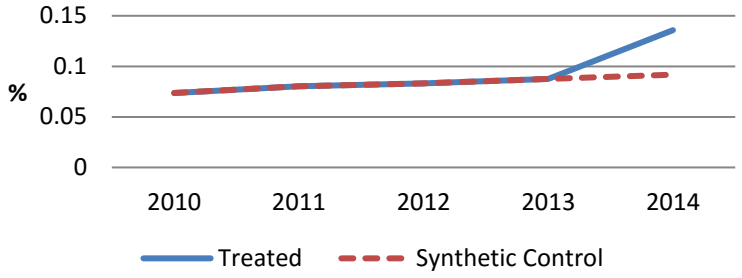


**Figure 5. Uninsured, Low-educated Childless Adults (ACS)**

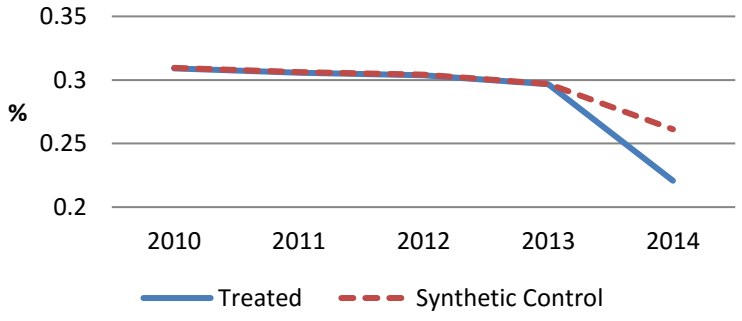


**Figure 6. Private Insured, Low-educated Childless Adults (ACS)**

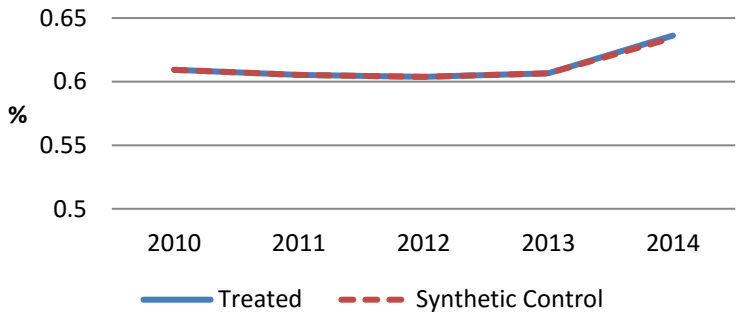

**Figure 7. Medicaid, Low-income Parents (ACS)**

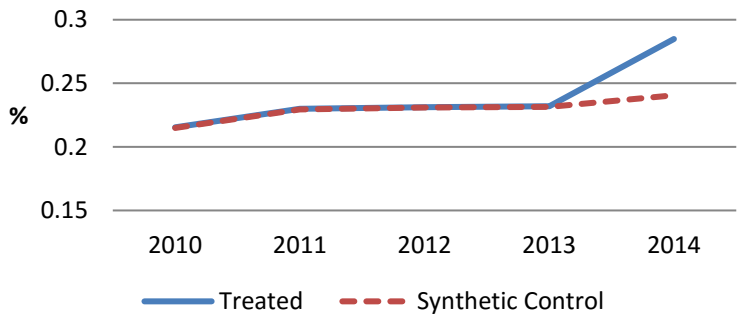


**Figure 8. Uninsured, Low-income Parents (ACS)**

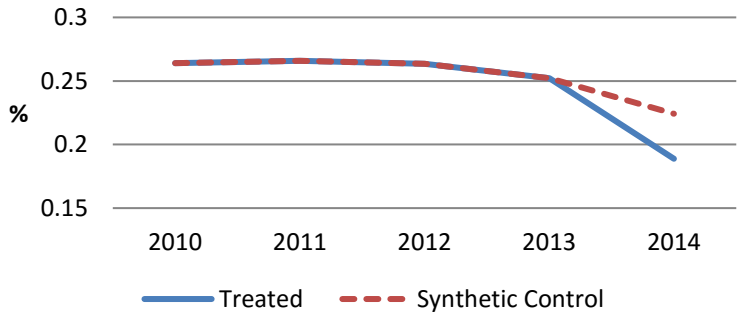


**Figure 9. Private Insured, Low-income Parents (ACS)**

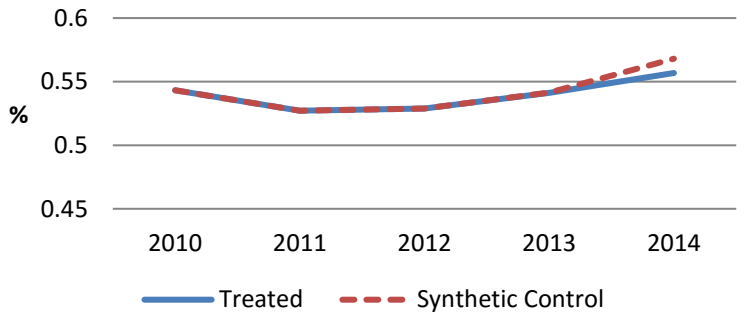


**Figure 10. Medicaid, Low-income Childless Adults (ACS)**

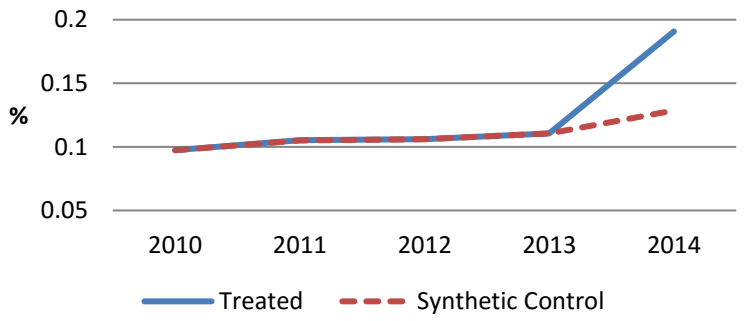


**Figure 11. Uninsured, Low-income Childless Adults (ACS)**

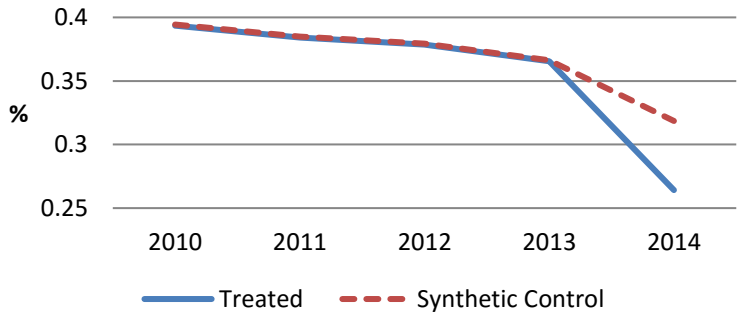


**Figure 12. Private Insured, Low-income Childless Adults (ACS)**

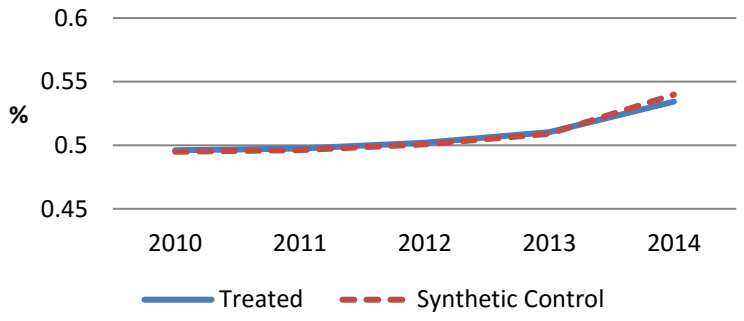

**Figure 13. Employed, Low-educated Parents (Monthly CPS)**

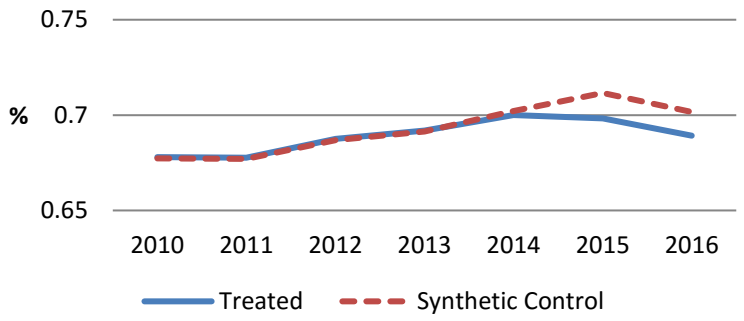


**Figure 14. Usual Hours Worked per Week, Low-educated Parents (Monthly CPS)**

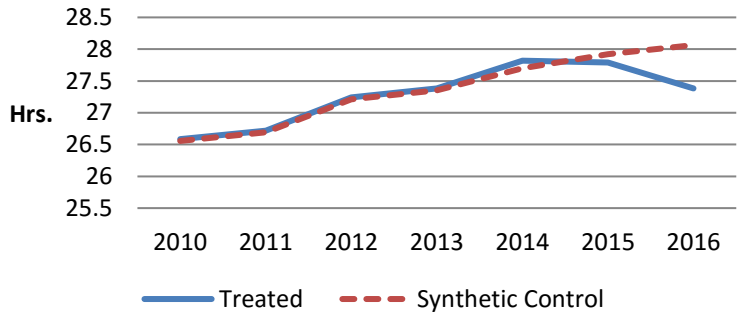


**Figure 15. Full-Time, Low-educated Parents (Monthly CPS)**

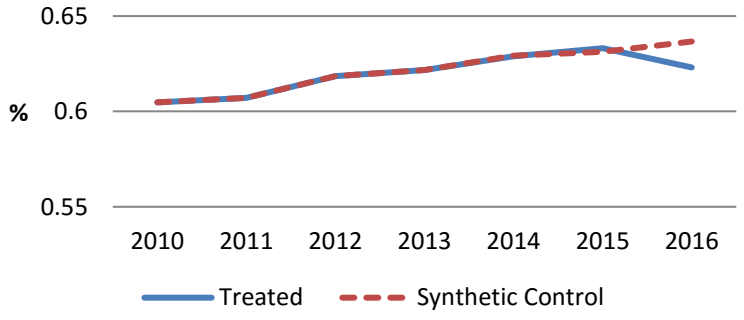


**Figure 16. Employed, Low-educated Childless Adults (Monthly CPS)**

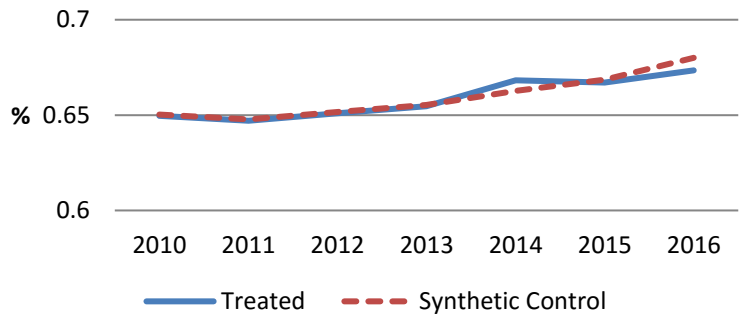


**Figure 17. Usual Hours Worked per Week, Low-educated Childless Adults (Monthly CPS)**

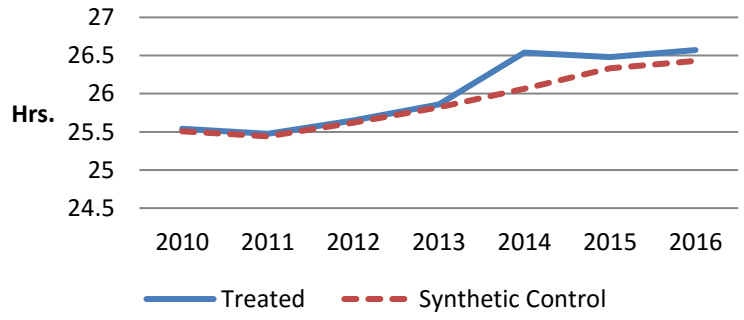


**Figure 18. Full-Time, Low-educated Childless Adults (Monthly CPS)**

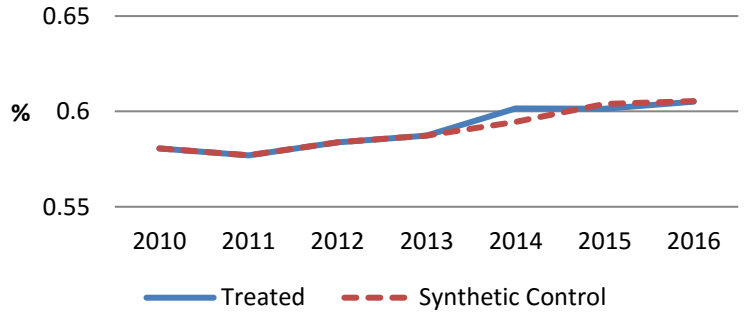

**Figure A1. Medicaid, Low-educated Parents (ACS, Excluding 11 States)**

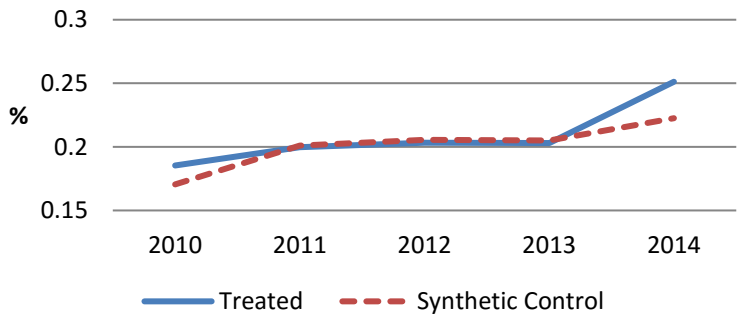


**Figure A2. Uninsured, Low-educated Parents (ACS, Excluding 11 States)**

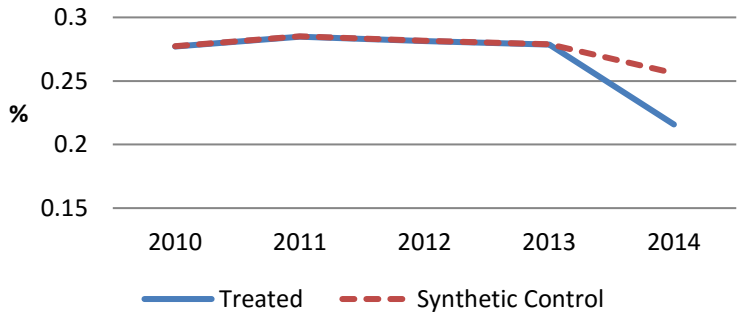


**Figure A3. Private Insured, Low-educated Parents (ACS, Excluding 11 States)**

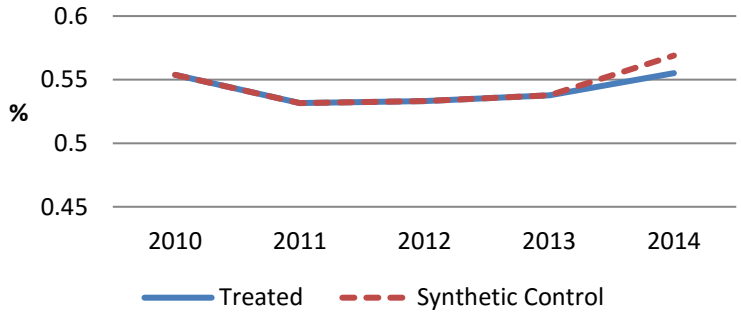


**Figure A4. Medicaid, Low-educated Childless Adults (ACS, Excluding 11 States)**

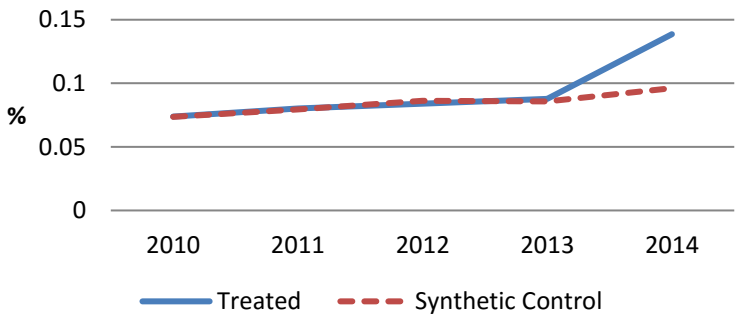


**Figure A5. Uninsured, Low-educated Childless Adults (ACS, Excluding 11 States)**

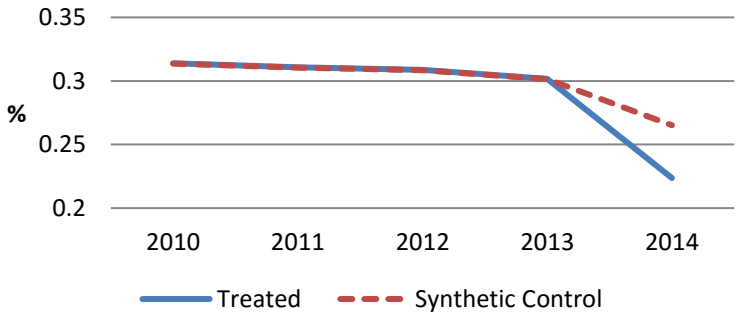


**Figure A6. Private Insured, Low-educated Childless Adults (ACS, Excluding 11 States)**

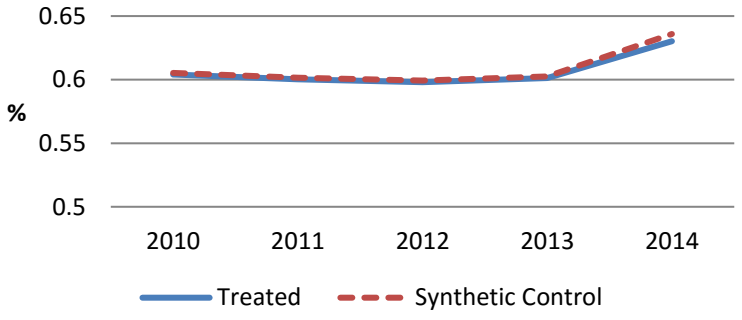

**Figure A7. Medicaid, Low-educated Parents (March CPS)**

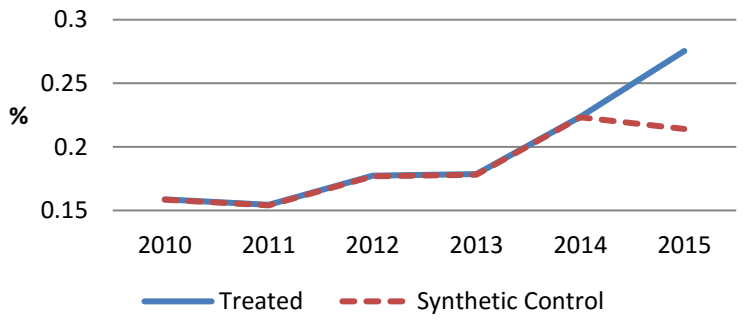


**Figure A8. Uninsured, Low-educated Parents (March CPS)**

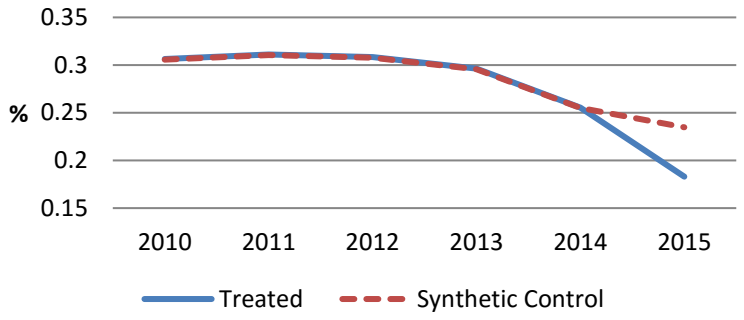


**Figure A9. Private Insured, Low-educated Parents (March CPS)**

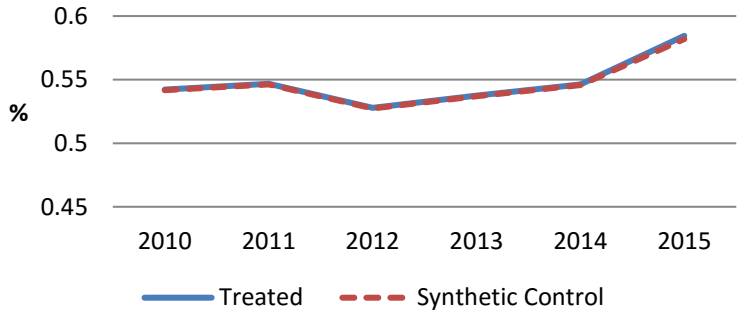


**Figure A10. Medicaid, Low-educated Childless Adults (March CPS)**

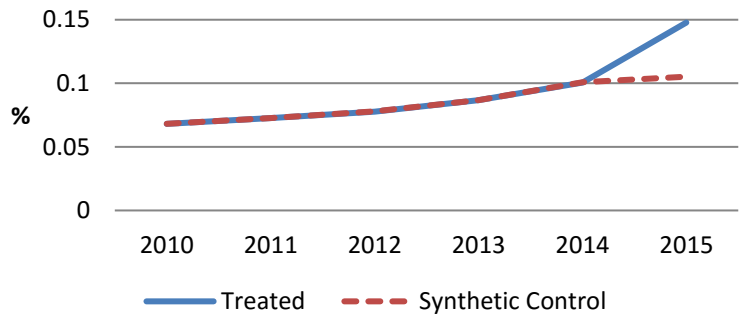


**Figure A11. Uninsured, Low-educated Childless Adults (March CPS)**

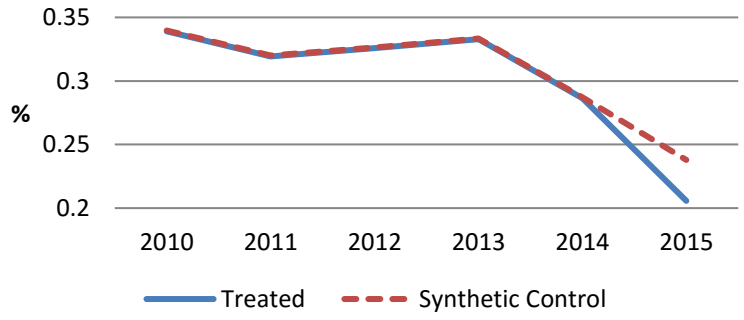


**Figure A12. Private Insured, Low-educated Childless Adults (March CPS)**

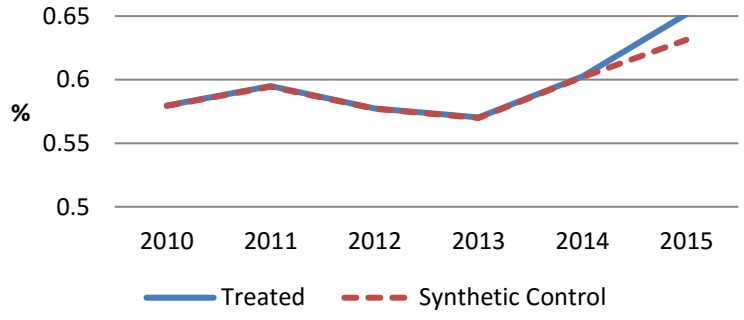

**Figure A13. Medicaid, Low-income Parents (March CPS)**

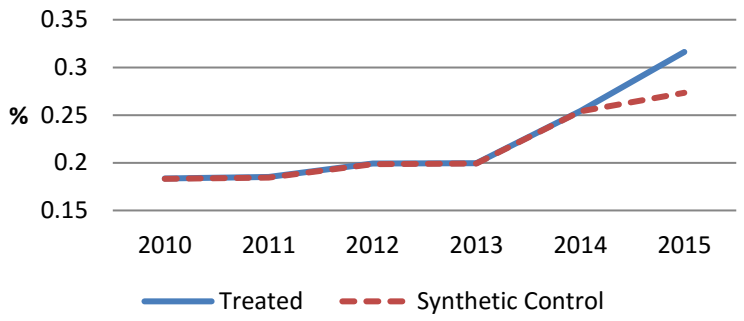


**Figure A14. Uninsured, Low-income Parents (March CPS)**

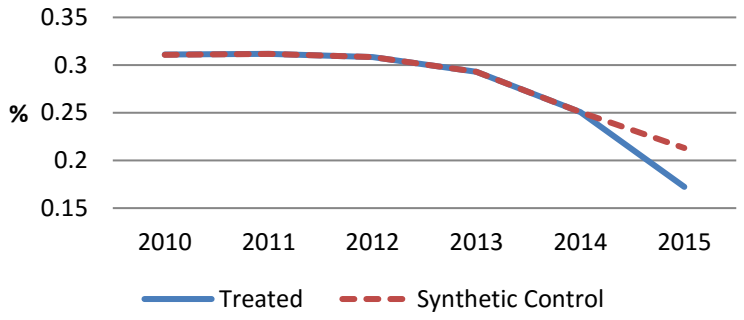


**Figure A15. Private Insured, Low-income Parents (March CPS)**

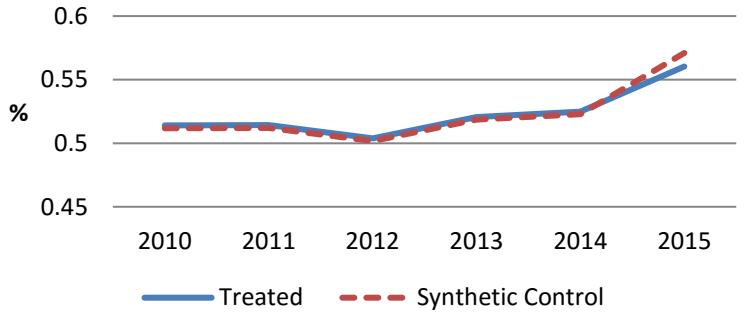


**Figure A16. Medicaid, Low-income Childless Adults (March CPS)**

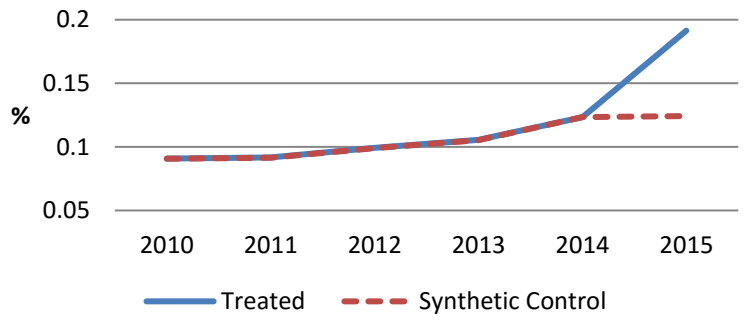


**Figure A17. Uninsured, Low-income Childless Adults (March CPS)**

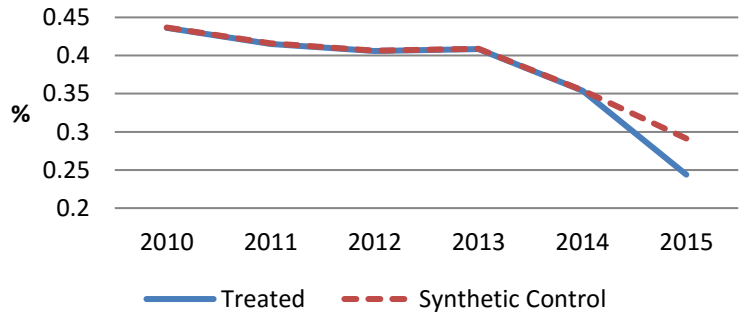


**Figure A18. Private Insured, Low-income Childless Adults (March CPS)**

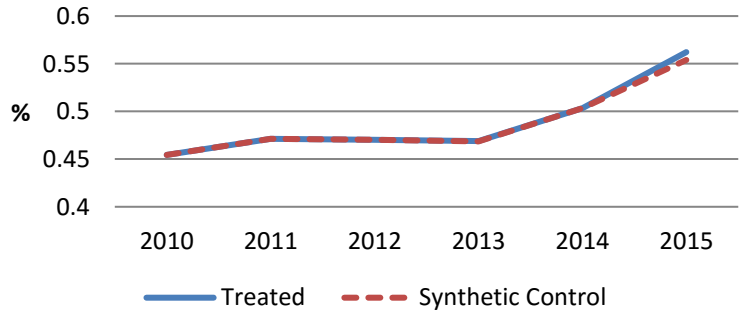

**Figure A19. Employed, Low-educated Parents (ACS)**

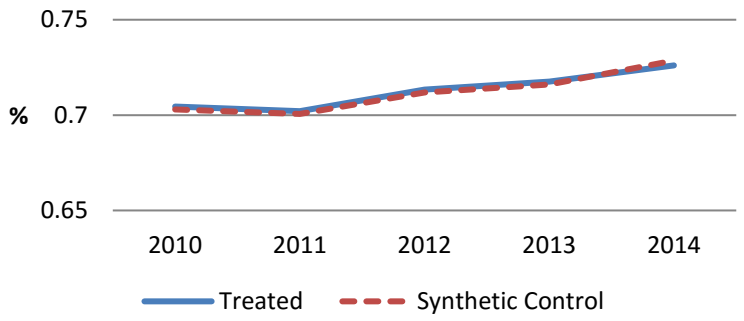


**Figure A20. Employed, Low-educated Childless Adults (ACS)**

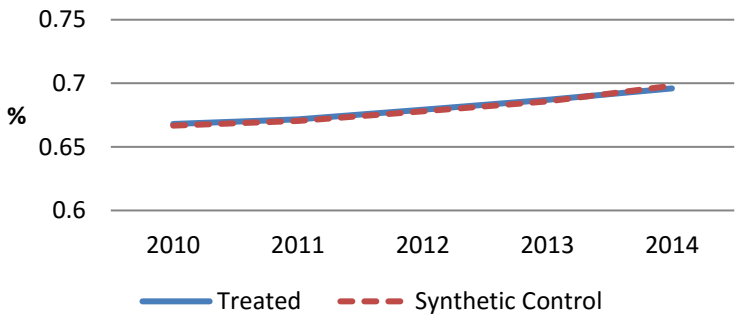


**Figure A21. Employed, Low-income Parents (ACS)**

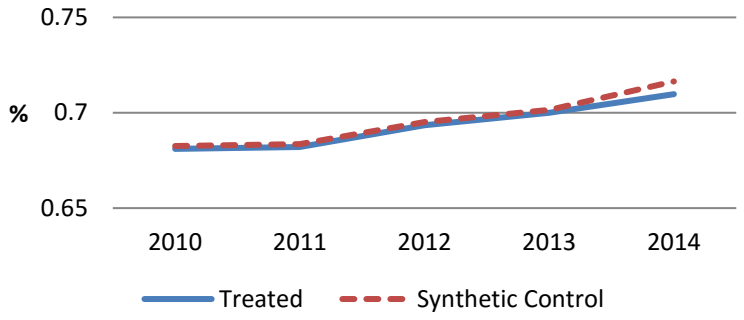


**Figure A22. Employed, Low-income Childless Adults (ACS)**

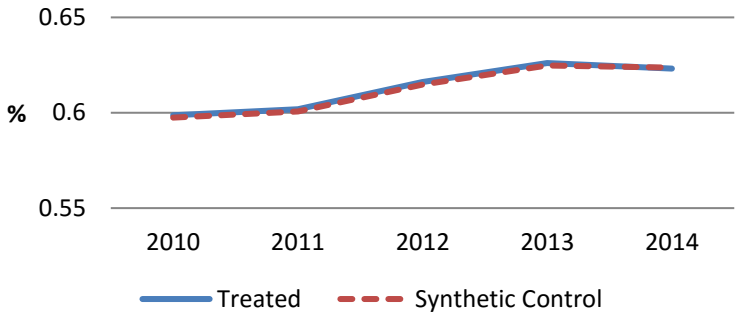


**Figure A23. Employed, Low-educated Parents (ACS, Excluding 11 States)**

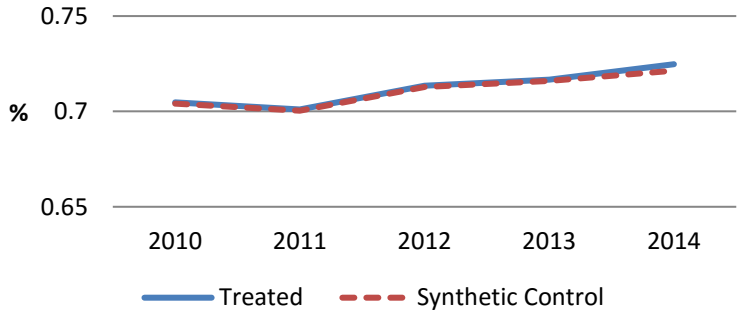


**Figure A24. Employed, Low-educated Childless Adults (ACS, Excluding 11 States)**