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ABSTRACT

State Medicaid Expansion and the Self-Employed*

This paper examines effects of state Medicaid Expansion via the Affordable Care Act on the self-employed. We first examine impacts on the probability of self-employment and find no significant effect. We then examine the probability of having health insurance and the type of coverage for self-employed persons. Medicaid expansion increased overall health insurance coverage rates, with especially large impacts for the unincorporated self-employed. Medicaid expansion also increased the probability of Medicaid coverage as expected, but there is evidence of crowd out of other types of coverage. Impacts on health insurance rates of the self-employed also strengthened over time.

JEL Classification: H51, I13, L26

Keywords: health insurance, self-employed, Affordable Care Act, state Medicaid expansion

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1. Introduction

Entrepreneurship is critical for economic growth and societal well-being (Schumpeter 1934).¹ However, self-employed persons face a number of challenges in starting and running their businesses. In the United States, access to quality affordable health insurance has been viewed historically as an important challenge and potential impediment for many current and prospective small business owners (Holtz-Eakin et al. 1996; Fairlie et al. 2011; Blumberg et al. 2014; Obama 2016). Since passage of the Affordable Care Act (ACA) in 2010, the U.S. healthcare system has undergone major changes in access to health care and health insurance. The ACA included numerous provisions, but one of the most important and widely studied aspects was federally-funded expansion of state Medicaid programs beginning in 2014. 24 states and the District of Columbia² implemented state Medicaid expansion (SME) on January 1, 2014; several other states implemented SME subsequently or have plans to do so.³ Expansion states extended Medicaid health insurance eligibility to citizens and permanent residents with income below 138 percent of the federal poverty level; for 2019 the federal poverty level for a family of four was \$25,750. Individuals in non-SME states were still affected by other aspects of the ACA including the individual mandate, the employer mandate, and access to federal-government subsidized private health insurance through the Health Insurance Marketplace.

The current study examines the effects of state Medicaid expansion on the self-employed. Specifically, we use individual-level data from the American Community Survey (ACS) and a difference-in-differences (DID) research design to estimate effects of SME on the probability of

¹ See also Acs and Storey (2004), Wennekers et al. (2005), Acs (2006), Baumol and Strom (2007), Van Praag and Versloot (2007), Stephens and Partridge (2011), Stephens et al. (2013), and Glaeser et al. (2015).

² We hereafter refer to the District of Columbia as a state.

³ Additional details can be found online at <https://www.kff.org/medicaid/issue-brief/status-of-state-medicaid-expansion-decisions-interactive-map/>

self-employment and the probability of health insurance coverage for the self-employed. We study individuals ages 26-64. We separate self-employed workers into unincorporated and incorporated, motivated by previous research that the latter is more closely connected with opportunity self-employment and the former is closer to self-employment out of necessity (Levine and Rubinstein 2017). The unincorporated self-employed have lower incomes and lower baseline health insurance rates, so we expect them to be more responsive to Medicaid expansion. We look at overall health insurance coverage and breakdowns by type of coverage. We also examine effects of SME on paid-employees and non-workers for comparison. We estimate both simple DID models for illustration and regression DID models that include controls for individual characteristics, state fixed effects, and region-year effects. We also estimate heterogeneous effects over time.

We have a number of important results. First, our preferred models suggest no significant effect of state Medicaid expansion on the probability of being self-employed, either unincorporated or incorporated. Second, we find that SME did increase overall health insurance coverage rates for the self-employed, with especially strong impacts on the unincorporated self-employed. Third, we find that SME impacts on having Medicaid are much larger than impacts on overall health insurance coverage indicating that SME crowded out other insurance. However, close inspection of regression coefficients and sample means indicates that the SME crowd out effects were driven by increased private health insurance purchases in non-expansion states that were likely due to other aspects of the ACA, including the individual mandate and subsidies in the Health Insurance Marketplace. Thus, SME increased overall health insurance rates of the self-employed and affected the type of insurance they had. We also find that the impacts of SME on the health coverage of the self-employed strengthened over time.

Our paper relates to an important and growing literature on the impacts of the Affordable Care Act. Overall, the literature has found that the ACA and SME in particular have increased health insurance coverage rates among both workers and non-workers (Courtemanche et al. 2017; Frean et al. 2017; Kaestner et al. 2017; Decker et al. 2018; Hu et al. 2018; Antonisse et al. 2019; Courtemanche et al. 2019a,b; Gallagher et al. 2019; Gruber and Sommers 2019).⁴ However, Decker et al. (2018) is the only previous study to specifically examine ACA effects on health insurance coverage of the self-employed. Decker et al. (2018) examine the National Health Interview Survey (NHIS) to document national-level increases in health insurance coverage for the self-employed and others without employer-offered health insurance. However, the publicly available NHIS microdata do not include state-level identifiers, so Decker et al. (2018) do not examine treatment effects from state Medicaid expansions. Our study focuses on effects of state Medicaid expansion and offers important insights beyond the findings in Decker et al. (2018). Guided by the self-employment literature, we also split the self-employed into unincorporated and incorporated and find important differences that are not explored in Decker et al. (2018). We conclude that SME had especially strong positive effects on the health insurance coverage of the unincorporated self-employed, a group that typically faces important challenges.

Our paper also relates to the literature on health insurance access and the decision to be self-employed (Holtz-Eakin et al. 1996; Wellington 2001; Boyle and Lahey 2010; Heim and Lurie 2010; Fairlie et al. 2011; Velamuri 2012; Heim and Lurie 2014a,b; Niu 2014; Fossen and

⁴ Earlier studies have also examined impacts of previous health insurance expansions on coverage rates and public-private crowd out (Cutler and Gruber 1996; Shore-Sheppard et al. 2000; Monheit and Schone 2004; Busch and Duchovny 2005; Gruber and Simon 2008; Hamersma and Kim 2013; Wagner 2015; Dillender 2017).

König 2017).⁵ While results are somewhat mixed, several prominent studies do suggest an important role of health insurance access in self-employment decisions. This literature includes only a few recent studies on effects of the Affordable Care Act (Bailey 2017; Heim and Yang 2017; Heim et al. 2018; Bailey and Dave 2019). Heim and Yang (2017) explore early effects (during the first two years) of the ACA on the probability of self-employment and find generally small impacts that are not statistically significant. Bailey (2017) examines effects of the dependent coverage provision in the ACA on self-employment rates, finding no average effect on young adult self-employment rates but a significant increase in self-employment for young adults with disabilities. Heim et al. (2018) also focus on the young adult dependent coverage provision and find no average impact on having any self-employment income in tax return data. Bailey and Dave (2019) study the effects of the ACA on self-employment of older adults using Medicare-eligible persons as a control group; they find a significant increase in senior self-employment. To our knowledge, no previous study has examined the effects of state Medicaid expansion on self-employment. The income eligibility requirements for SME limit the potential impact on self-employment for individuals with income well above the threshold, but many self-employed and potential self-employed workers do have relatively low incomes and qualify for Medicaid, so the impacts of SME on self-employment are not clearly zero *a priori*. Our documenting effectively zero impact of SME on the probability of self-employment is a new and important result for this group. Furthermore, our sample means also indicate no large increase in self-employment rates over time in either the SME or non-SME states, indicating that the other

⁵ Other studies have also looked at effects of health insurance access on employment, job lock, and job mobility (Hamersma and Kim 2009; Garthwaite et al. 2014; Heim and Lurie 2015; Gooptu et al. 2016; Kaestner et al. 2017; Leung and Mas 2018; Kofoed and Frasier 2019).

provisions of the ACA are unlikely to have substantially impacted the average probability of self-employment for adults ages 26-64.

2. Policy Background

The Affordable Care Act (ACA), popularly known as ObamaCare, transformed health care in the United States by greatly lowering the cost of health insurance for millions of previously uninsured Americans (Obama 2016). President Barack Obama signed the Patient Protection and Affordable Care Act on March 23, 2010 and signed the companion Health Care and Education Reconciliation Act of 2010 a week later. The dependent coverage provision of the ACA took effect in 2010 and allowed young adults to remain on their parents' health insurance until age 26 including those who were not in school, not living with their parents, or not dependents on their parents income tax returns. For this reason, we exclude persons under age 26 from our subsequent analysis. The U.S. Supreme Court ruled in June 2012 that states could choose whether or not to expand their Medicaid programs, and many states declined or delayed doing so.

Several major provisions took effect beginning in 2014 including Medicaid expansion in 25 states and an overhaul of the private insurance market that included an individual mandate, guaranteed issue, and the Health Insurance Marketplace. The individual mandate required nearly all individuals to have health insurance or a pay a tax penalty. President Trump signed legislation in 2017 reducing the penalty to \$0 beginning in 2019, but it was still in effect through the end of our study period. The guaranteed issue component of the ACA required health insurance providers to offer insurance to all individuals regardless of pre-existing conditions.

The ACA established health insurance exchanges and subsidies for low and moderate income households via the Health Insurance Marketplace.

The employer mandate was phased in over 2015-2016. The employer mandate required all employers with at least 50 employees to offer health insurance to full-time employees or pay a tax penalty. The start date for the employer mandate was pushed back to January 1, 2015 for employers with 100 or more employees and January 1, 2016 for employers with 50-99 employees.

In addition to the 25 states implementing Medicaid expansion on January 1, 2014, nine states expanded Medicaid between January 1, 2014 and the end of 2018. Figure 1 illustrates the early expansion, late expansion, and non-expansion states through 2018. State Medicaid expansion extended eligibility to all U.S. citizens and permanent residents with income less than 138% of the federal poverty level. The ACA required the federal government to cover 100% of Medicaid expansion costs in 2014-2016. The federal portion decreased over time to 95% in 2017, 94% in 2018, 93% in 2019, and 90% in 2020 and beyond. State Medicaid expansion and other provisions of the ACA were widely covered by news media, facilitating awareness among affected individuals. The individual mandate and broader impact of the ACA may have also increased Medicaid enrollment among persons who were previously eligible for Medicaid but not enrolled; this could occur in both expansion and non-expansion states.

Interestingly, increased enrollment in Medicaid appears to have not just been restricted to those with reported household income below 138% of the poverty level in the American Community Survey (Courtemanche et al. 2019a). This may reflect inconsistencies in how income and/or household composition are defined and reported between the ACS and Medicaid applications. Our main analysis of state Medicaid expansions imposes no household income

restrictions, but we also examine how results vary by limiting the sample to low and moderate income households.

3. Data and Empirical Approach

3.1 Data

This study uses data from the pooled 2009-2018 American Community Survey (ACS) accessed from IPUMS-USA (Ruggles et al. 2019). Each year of the ACS includes a one percent random sample of the U.S. population. The data are a repeated cross-section of individuals; we cannot track the same individuals over time. The ACS collects information on health insurance coverage and type along with individual characteristics related to employment, self-employment, demographics, and geographic location. We limit the main sample to U.S. citizens who are ages 26-64. We exclude non-citizens because the ACA state Medicaid expansion only applied to citizens and permanent residents and we cannot differentiate between permanent residents and other non-citizens in the ACS data. We exclude individuals younger than age 26 because the ACA allowed young people to remain on their parents' health insurance until age 26. We exclude citizens over age 64 because they are eligible for Medicare.

We classify individuals into four mutually exclusive employment categories: unincorporated self-employed, incorporated self-employed, paid-employed, and non-employed. We define indicator variables for each category that we explore as outcomes and also examine health insurance outcomes by employment sub-sample. We focus on the self-employed, but we also briefly examine the paid-employed and non-employed for comparison.

We define five health insurance coverage indicator variables. The first is a dummy variable for having any type of health insurance. The other four are indicators for having a

specific type of health insurance coverage including Medicaid coverage, employer coverage, purchased coverage, and other health insurance coverage. Individuals can report having more than one type of health insurance coverage in the ACS and we allow this in our analysis; i.e., the types are not mutually exclusive. Less than five percent of the sample has more than one type of health insurance.

Our main explanatory variable of interest is a state Medicaid expansion (SME) treatment variable. This variable equals zero for individuals in states that never expanded Medicaid as part of the ACA. For individuals in early and late expansion states, the variable equals zero in years prior to expansion and one in years after Medicaid expansion in their state. For expansions occurring after January 1 of a year, we assign a fractional value for that year equal to the percentage of the year that was affected by the expansion. The SME treatment variable is assigned based on individuals' state of current residence. If Medicaid expansion induced cross-state migration, it could bias results. However, Schwartz and Sommers (2014) and Goodman (2017) both confirm that SME did not meaningfully affect migration, so we can confidently assign treatment via state of current residence.

3.2 Simple Difference-in-Differences

We first conduct simple difference-in-differences (DID) analyses by comparing dependent variable means over time between the 25 states that expanded Medicaid on January 1, 2014 and the 18 states that never expanded Medicaid through 2018. We exclude later expansion states from the simple DID analysis because they do not fit neatly into either group, but they are included in the regression analysis discussed below. 2009-2013 is the pre-SME period and 2014-2018 is the SME treatment period. We compute outcome means for each group of states in

each period. We next separately compute the pre- and post-SME time differences for the early expansion states and the non-expansion states. We then compute the difference in these differences to illustrate how changes in the early expansion states compared to changes in non-expansion states.

3.3 Regression Analysis

We estimate difference-in-differences (DID) linear probability models (LPM) of the form:

$$Y_{ist} = \theta StateMedicaidExpansion_{st} + \beta X_{ist} + \gamma_s + \delta_{r(s)t} + \varepsilon_{ist} \quad (1)$$

, where Y_{ist} is a binary dependent variable for individual i in state s and year t ,

$StateMedicaidExpansion_{st}$ is the explanatory variable of interest and explained in the last paragraph of sub-section 3.1, X_{ist} is a vector of individual characteristic dummy variable controls for age, sex, race, ethnicity, and education, γ_s is a set of state fixed effects, $\delta_{r(s)t}$ is a set of region-year effects, and ε_{ist} is a mean zero error term. Our main regressions do not include controls for marital status, number of children, or income because these characteristics are outcomes potentially influenced by state Medicaid expansion which could make them bad controls (Angrist and Pischke 2009). However, we discuss robustness checks below that include additional controls for these characteristics. We cluster standard errors by state.⁶ We estimate equation (1) for different outcome variables and different sub-samples.

The DID regression model differs from the simple DID analysis by including delayed expansion states in the analysis and controlling for individual characteristics, state fixed effects,

⁶ In results not shown, we also estimated wild cluster bootstrap p-values using the `boottest` Stata program described in Roodman et al. (2019) based on the approach suggested by Cameron et al. (2008). The wild cluster bootstrap significance levels obtained were very similar to those using traditional clustered standard errors by state.

and region-year effects. Individual characteristic controls account for overall differences related to observable characteristics. Including state fixed effects means that identifying variation comes from changes over time within states. Including region-year effects means that control groups are region-specific, i.e., the regression compares changes over time in SME states to change in non-SME states in the same region. This is useful because states in the same region are more similar and are expected to provide a more accurate counterfactual of what would have occurred in the absence of SME.

4. Empirical Results

4.1 Simple DID

Table 1 presents pre- and post-SME employment outcome means for early expansion and non-expansion states. Since the outcomes are binary, the means can be interpreted as rates. The third column presents the time differences for early expansion states and the sixth column presents time differences for non-expansion states. The seventh column presents the simple DID estimates along with asterisks to indicate statistical significance levels based on standard errors clustered by state. There was little change over time in both unincorporated self-employment and incorporated self-employment. The DID estimates for the self-employment outcomes are also small; the DID estimate of -0.0011 for unincorporated self-employed is significant at the five percent level, but the estimate is negative, inconsistent with increased health insurance access increasing self-employment. There were overall increases in paid-employment rates and corresponding reductions in non-employment in both groups of states consistent with the stronger overall economy post-2014. The simple DID yields a positive but statistically insignificant effect on paid-employment and a negative but insignificant effect on non-

employment. Thus, state Medicaid expansion appears to have had minimal effects on overall employment and self-employment outcomes.

Table 2 reports health insurance coverage rates overall and by type of coverage pre- and post-SME for early expansion and non-expansion states. These are reported separately for each of the four employment categories. The unincorporated self-employed sample is in Panel A and the incorporated self-employed sample is in Panel B. Panels C and D include the paid-employed and non-employed samples, respectively. Time differences are again included in the third and sixth columns. Overall health insurance rates increased over time for all groups, but there are quantitative differences between early expansion and non-expansion states and across employment categories. Simple DID estimates are in the seventh column.

For the unincorporated self-employed, overall health insurance rates increased considerably over time. The percentage with any coverage in Panel A increased over time from 74.6 percent to 86.1 percent in early expansion states and from 65.1 percent to 73.8 percent in non-expansion states; the simple DID estimate is significant at the ten percent level and implies that state Medicaid expansion increased overall health insurance rates by 2.8 percentage points. The Medicaid coverage rate in Panel A increased over time from 8.0 percent to 18.2 percent in early expansion states; non-expansion states experienced an increase from 4.6 percent to 6.7 percent. The simple DID estimate in Panel A is much larger for Medicaid coverage than for having any coverage. State Medicaid expansion clearly impacted the unincorporated self-employed, but it increased Medicaid coverage rates much more than overall health insurance rates.

Employer coverage in Panel A was unchanged for early expansion states but actually increased in non-expansion states. Employer coverage for the self-employed can be through a

spouse or one's own business. The increased employer coverage for the unincorporated self-employed in non-expansion states likely reflects some combination of the individual mandate and the employer mandate provisions in the ACA. Purchased coverage rates in Panel A moderately increased in early expansion states but increased by much more in non-expansion states, likely due to some combination of the individual mandate and subsidies in the Health Insurance Marketplace. Consequently, the simple DID estimates imply that state Medicaid expansion reduced employer coverage and purchased coverage, which helps explain why SME increased Medicaid coverage by much more than it increased overall health insurance rates. In a sense, SME appears to have crowded out employer coverage and purchased coverage among the unincorporated self-employed. However, the negative DID estimates for employer coverage and purchased coverage are driven by increases in the non-expansion states, which were almost certainly driven by other features of the Affordable Care Act. Because of federal subsidies to private insurance markets in non-expansion states, negative DID coefficients for purchased coverage do not represent a pure public-private crowd out.

Panel B of Table 2 shows that overall health insurance rates and Medicaid coverage rates also increased over time for the incorporated self-employed in both early expansion and non-expansion states. Employer coverage actually decreased over time in Panel B for both groups of states, and purchased coverage rates increased for both groups of states. However, the simple DID estimates for the incorporated self-employed are only significant for Medicaid coverage (positive) and purchased coverage (negative). The negative SME effect on purchased coverage is again driven by increased purchased coverage in non-expansion states.

Panel C of Table 2 also shows increases over time in overall health insurance rates, Medicaid coverage, and purchased coverage for paid employees. Employer coverage declined in

early SME states. The simple DID estimates indicate that SME increased Medicaid coverage and reduced employer coverage and purchased coverage among paid employees. Non-workers in Panel D also experienced large gains over time in overall health insurance, Medicaid coverage, and purchased coverage rates. Non-workers also had reduced employer coverage rates. The simple DID estimates for non-workers suggest that SME increased overall health insurance and Medicaid coverage but reduced employer coverage, purchased coverage, and other health insurance coverage.

While the results in Tables 1 and 2 are informative, the simple DID estimates do not account for changes in individual characteristics. They also do not restrict treatment and control groups to be from the same region. The next section presents regression results that include controls for individual characteristics, state fixed effects, and region-year effects.

4.2 DID Regression Results

Table 3 presents DID regression results for the employment and self-employment outcomes. The state Medicaid expansion indicator is the explanatory variable of interest, and the analysis includes all 50 states and DC. The four columns are for the four dependent variables. Column (1) examines the effect of SME on the probability of being unincorporated self-employed and Column (2) examines the effect of SME on the probability of being incorporated self-employed. Columns (3) and (4) examine SME effects on paid-employment and non-employment. The preferred results for the main sample are in Panel A. The coefficients in Panel A are all small and not statistically significant. Thus, the preferred results suggest that state Medicaid expansion had no overall effect on self-employment or employment probabilities.

Panels B-D of Table 3 present additional analysis for alternative samples. Panel B considers a sample of low and moderate household income individuals by restricting the sample to individuals whose household income is less than 250% of the poverty line for their household size. The coefficient estimates in Panel B are all small and not statistically significant. Panel C restricts the sample further to low-income individuals with household income less than 138% of the poverty line. There is now a small but statistically significant positive coefficient of 0.0012 for the effect of SME on the probability of being incorporated self-employed. Panel C coefficients for the other outcomes are all small and not significant. The small effect on incorporated self-employment is plausible, but the lack of a significant effect for broader samples hinders confidence in the Panel C coefficient. Furthermore, we would expect lower income individuals to be more likely to enter unincorporated self-employment, which is unaffected in Panel C. Additionally, the incorporated self-employed coefficient in Panel C is small and the significance level is a potential aberration from multiple hypothesis testing. Finally, even if there is a small effect on the low-income sample, the effectively zero impact on the main sample in Panel A would imply that increased low-income self-employment displaced higher income self-employment, which could reflect income changes among some self-employed workers in response to SME and eligibility rules. Panel D restricts the main sample to the 21 states identified in Courtemanche et al. (2019a) with no history of Medicaid expansion prior to the ACA. The 21 states include nine newly expanding states following the ACA and 12 states that never expanded Medicaid by December 31, 2018.⁷ Panel D coefficient estimates are all small and not statistically significant.

⁷ The nine new expansion states are Arkansas, Kentucky, Michigan, Nevada, New Hampshire, New Mexico, North Dakota, Ohio, and West Virginia. The 12 never expanders are Alabama, Florida, Georgia, Kansas, Mississippi, Missouri, North Carolina, Oklahoma, South Carolina, South Dakota, Texas, and Wyoming.

Panel E of Table 3 includes additional individual characteristic controls for marital status and the number of children in the household. Specifically, we define married persons with a spouse present as the omitted group and include five marital status dummies for being either married with absent spouse, separated, divorced, widowed, or never married. We define having no children as the omitted group and include five dummies for having one, two, three, four, or five or more children in the household. Adding these additional controls gives nearly identical results in Panel E as the preferred specification for the main sample in Panel A. We do not include any income controls because income directly depends on employment and self-employment outcomes. Overall, we interpret the evidence in Table 3 to indicate that state Medicaid expansion had little or no impact on self-employment rates.⁸

Table 4 presents DID regression results for the effects of state Medicaid expansion on health insurance coverage and type. Results for the unincorporated and incorporated self-employed are in Panels A and B, respectively. Results for paid employees and non-workers are in Panels C and D, respectively. Columns (1) to (5) examine dependent variables for any health insurance, Medicaid insurance, employer insurance, purchased insurance, and other insurance.

The results in Column (1) of Table 4 indicate that SME significantly increased the probability of having any health insurance for persons in all four employment categories. The coefficient of 0.0396 for the unincorporated self-employed is larger than corresponding estimates for the incorporated self-employed (0.0151) and paid employees (0.0163), though non-workers had an even larger effect (0.0568). Column (2) indicates that positive SME effects on having

⁸ We also estimated some additional employment outcome models not shown that yielded similar results. Specifically, we explored limiting the sample to states in the Midwest and South regions and again obtained small coefficient estimates that were not statistically significant at conventional levels. We also examined simultaneously limiting the sample to the 21 new and never expansion states in Courtemanche et al. (2019a) and limiting the sample based on income as in Panels B and C; this yielded small coefficient estimates that were not statistically significant. These additional results are available from the corresponding author by email request.

Medicaid insurance were even larger than the effects on having any insurance. Column (3) indicates a significant negative effect of SME on employer insurance coverage in three of the four panels, with incorporated self-employed having a positive but insignificant coefficient. Panel D reports significantly negative effects on purchased coverage in all four panels. We reiterate the discussion above that the crowd out effects on purchased coverage are likely driven by reduced purchases of federally-subsidized private insurance in the Health Insurance Marketplace. The coefficient estimates for other insurance in Column (5) are relatively small and not statistically significant.

Table 5 provides additional analysis of health insurance outcomes for the unincorporated self-employed via sub-sample analysis. Panel A replicates the results for the main sample. Panel B examines a sample of low and moderate income individuals with incomes below 250% of the poverty line. Panel C examines a low income sample with income below 138% of the poverty line. Panels B and C indicate that the magnitude of impacts grow as we focus the sample on lower income persons. This is as expected since state Medicaid expansion from the Affordable Care Act targeted persons with incomes less than 138% of the poverty level. However, we do not focus solely on persons with income below 138% of the poverty level in particular because Courtemanche et al. (2019a) document that SME significantly impacted health insurance coverage for individuals with income above 138% of the poverty level (which we confirm in results not shown). It is important to understand that there is both a meaningful significant average effect for the main sample and a larger effect among low-income persons. The estimated effects of SME on any health insurance in Column (1) are 0.0919 in Panel B and 0.1254 in Panel C, which are large effects. Column (2) confirms that the Panels B and C sub-samples also have much larger positive effects on having Medicaid insurance. Columns (3) and

(4) indicate larger magnitude negative effects on employer insurance and purchased insurance in Panel B and C.

Panel D of Table 5 restricts the main sample to the 21 states identified as new and never expanders in Courtemanche et al. (2019a). This is largely intended as a sensitivity check, but it also provides a more focused estimate for the sub-sample of states that never expanded Medicaid prior to the ACA backed expansion. The estimated effect on any health insurance of 0.0699 is even larger than the estimate for the full sample. The same is true for the effect on having Medicaid insurance in Column (2). Coefficient estimates in Columns (3) to (5) are mostly comparable to the main sample estimates. There are potential limitations of focusing on only the 21 states, but it is notable that the 21 state analysis in Panel D gives similar conclusions as the main sample with even more positive overall effects.

Panel E of Table 5 adds the previously mentioned additional individual characteristic controls for marital status and number of children and also includes 50 dummy control variables for household income as a percentage of the poverty threshold for the household's size and composition; households with income less than 500 percent of the poverty threshold are divided by 10 point increments and households with income at or above 500 percent of the poverty threshold are a single category. The results in Panel E are generally very similar to those in Panel A except the estimated effect of SME on having employer insurance decreases somewhat and is no longer significant at the ten percent level.

Table 6 reports sub-sample analysis for incorporated self-employed. A similar pattern across panels emerges as in Table 5. In particular, limiting the analysis to the low and moderate income sample in Panel B and the low income sample in Panel C considerably increases the magnitude of the positive effects on having any health insurance (Column 1) and Medicaid

insurance (Column 2). The effects on purchased insurance (Column 4) again become more negative for reduced income samples. Panel D again restricts the sample to the 21 new and never expanding states and gives similar overall conclusions as Panel A but larger overall impacts on having any health insurance and Medicaid insurance. Panel E again adds additional individual characteristic control variables and yields very similar results to Panel A.

4.3 Event Analysis Effects on Health Insurance of the Self-Employed

We next explore heterogeneous effects over time on the health insurance of the self-employed by conducting event-style analyses. We begin by defining event period t as the year that SME began in each Medicaid expansion state. We then construct separate post-event dummies for state Medicaid expansion in years $t, t + 1, t + 2, t + 3,$ and $t + 4$. We also construct pre-event dummies for Medicaid expansion states for years $t - 2, t - 3, t - 4, t - 5,$ and all pre $t - 5$ periods. This event-style analysis excludes year $t - 1$ as the reference period. Non-expansion states have values of zero for all the event dummies. We then re-estimate equation (1) replacing the single SME dummy with the post-event and pre-event dummies. The post-event dummy coefficients measure how the treatment effect evolves over time. Based on previous literature (Frean et al. 2017; Courtemanche et al. 2019a,b), we expect SME impacts on health insurance coverage to increase over time due to inertia in enrollment and non-enrollment in Medicaid among eligible persons. Specifically, some newly eligible individuals likely do not immediately respond to Medicaid expansion and instead enroll one or more years after expansion. Once enrolled in Medicaid, they are likely to remain enrolled. The pre-event dummies help assess the extent to which actual treatment effects may have occurred before the actual expansion. We expect minimal effect of SME prior to implementation, but there is some

potential for “woodwork” effects to increase Medicaid enrollment among previously eligible individuals in years immediately preceding expansion.

Table 7 presents event-style analysis results for the impacts on the health insurance coverage and type for the unincorporated self-employed.⁹ The coefficient estimates for effects on any health insurance in Column (1) are largely as expected. In particular, the effect of SME increases significantly over time from 0.0199 in the year of implementation (year t) to 0.0593 in year $t + 4$. We also observe relatively small pre-event coefficients in Column (1) with a positive coefficient of 0.0087 in $t - 2$ and negative coefficients in all previous years. The coefficients in $t-2$ and $t-4$ are significant at the ten percent level, though of opposite signs. Since $t - 1$ is the omitted period, negative coefficients for the pre-event dummies may suggest woodwork effects inducing increased enrollment in $t - 1$ relative to earlier years. However, the positive coefficient in $t - 2$ is not expected; it is only significant at the ten percent and the coefficient is small.

Column (2) of Table 7 examines event analysis effects on the probability of having Medicaid insurance. The post-event coefficients again increase over time from 0.0428 in year t to 0.0996 in year $t + 4$. The pre-event coefficient estimates are mostly negative with two individually significantly different from $t - 1$ at the ten percent level. However, the pre-event coefficients are jointly significant at the one percent level, providing more evidence that woodwork effects increased Medicaid enrollment prior to the expansion date. Columns (3) to (5) report event analysis estimates for having employer insurance, purchased insurance, and other insurance, respectively. Coefficient estimates in Column (3) are all relatively small and not

⁹ In results not shown, we also estimated event-style regression models with the employment outcomes as dependent variables. Coefficient estimates were consistently small and not statistically significant, again suggesting that SME had little to no effect on employment and self-employment outcomes. These results are available from the corresponding author by email request.

significant except for an anomalous and unexpected significant positive coefficient for $t - 2$; however, the pre-event coefficients are not jointly significant at the ten percent level. The post-event coefficients in Column (4) are all significantly negative, but none of the pre-event coefficients are statistically significant. The Column (5) coefficients are generally small and not significant except for significant negative coefficients for $t - 2$ and $t + 4$.

Table 8 reports event analysis results for the health insurance coverage and type for the incorporated self-employed. In Column (1), the impact on having any health insurance is small and not significant in period t (0.0065) but increases over time to 0.0325 by $t + 4$. Pre-event coefficient estimates in Column (1) are all not statistically significant. In Column (2), the impact of SME on having Medicaid insurance is significantly positive in all post-treatment years and the coefficient increases from 0.0174 in period t to 0.0411 in $t + 4$. The pre-event coefficient estimates in Column (2) are significantly negative for three periods and are jointly significantly different from $t - 1$, again suggesting that woodwork effects increased Medicaid enrollment in the year before actual Medicaid expansion. For employer insurance in Column (3), three of the post-event coefficients are individually significantly positive, and none of the pre-event coefficients are significant. For purchased insurance in Column (4) four of the post-event coefficients are significantly negative, and none of the pre-event coefficients are significant. For other insurance in Column (5) one pre-event and one post-event coefficient are statistically significant.

5. Conclusion

Health insurance access has historically been a challenge for self-employed persons in the U.S. The Affordable Care Act of 2010 overhauled the nation's health insurance system via

Medicaid expansion, mandates for individuals and employers, and subsidies for purchasing private insurance. While a majority of states have chosen to participate in Medicaid expansion, some delayed expansion and many have not expanded at all. The current study uses data from the American Community Survey (ACS) to estimate difference-in-differences models of the effects of state Medicaid expansion (SME) on the self-employed. We differentiate between unincorporated and incorporated self-employment. We first look at effects on the probability of either type of self-employment. We then look at effects of SME on health insurance coverage and type of insurance for the self-employed. We also examine effects for the paid-employed and non-employed for comparison.

Our main results indicate that there was no meaningful effect of state Medicaid expansion on the probability of self-employment. We also find no statistically significant effect of expansion on the probability of paid employment or non-employment. Thus, state Medicaid expansion does not appear to have meaningfully affected employment or self-employment outcomes. More generally, we observe minimal change in self-employment rates over time in both expansion and non-expansion states, suggesting that the combined influence of the ACA did not significantly alter incentives for self-employment.

We do find significant effects of state Medicaid expansion on the probability of having health insurance and the type of coverage. Notably, the unincorporated self-employed are considerably more responsive to state Medicaid expansion than the incorporated self-employed and paid-employees. The main regression estimates indicate that SME increased the average probability of having any health insurance by 4.0 percentage points for the unincorporated self-employed but only by 1.5 percentage points for the incorporated self-employed and only by 1.6

percentage points for paid-employees. Restricting the sample to lower income persons yields larger impacts, but the effects are still larger for the unincorporated self-employed.

We also find that the impacts of SME on having Medicaid are much larger than the impacts on having any health insurance implying that Medicaid expansion crowded out other types of coverage. In particular, we find that SME reduced purchased coverage, especially among the self-employed. However, inspection of sample means indicates that rates of purchased coverage actually increased in both Medicaid expansion and non-SME states, but the increase in purchased coverage was much larger in non-expansion states, driving a negative effect of SME on purchased coverage. Increased purchased coverage was largely driven by other aspects of the Affordable Care Act including the individual mandate and federal subsidies in the Health Insurance Marketplace. Thus, the crowd out that is observed is not pure crowd out of private insurance.

We also document heterogeneous effects on health insurance by income and over time. Specifically, the effects of Medicaid expansion on the self-employed are largest for low income persons, which is to be expected. Impacts on having health insurance generally increase with time passed since state Medicaid expansion.

While Medicaid expansion did not increase self-employment, it did increase health insurance coverage rates of the self-employed, especially for the unincorporated self-employed. The unincorporated self-employed face a number of significant barriers to their success and well-being. Health insurance access has historically been a major challenge for many small business operators. State Medicaid expansion has provided significant benefits to many self-employed persons.

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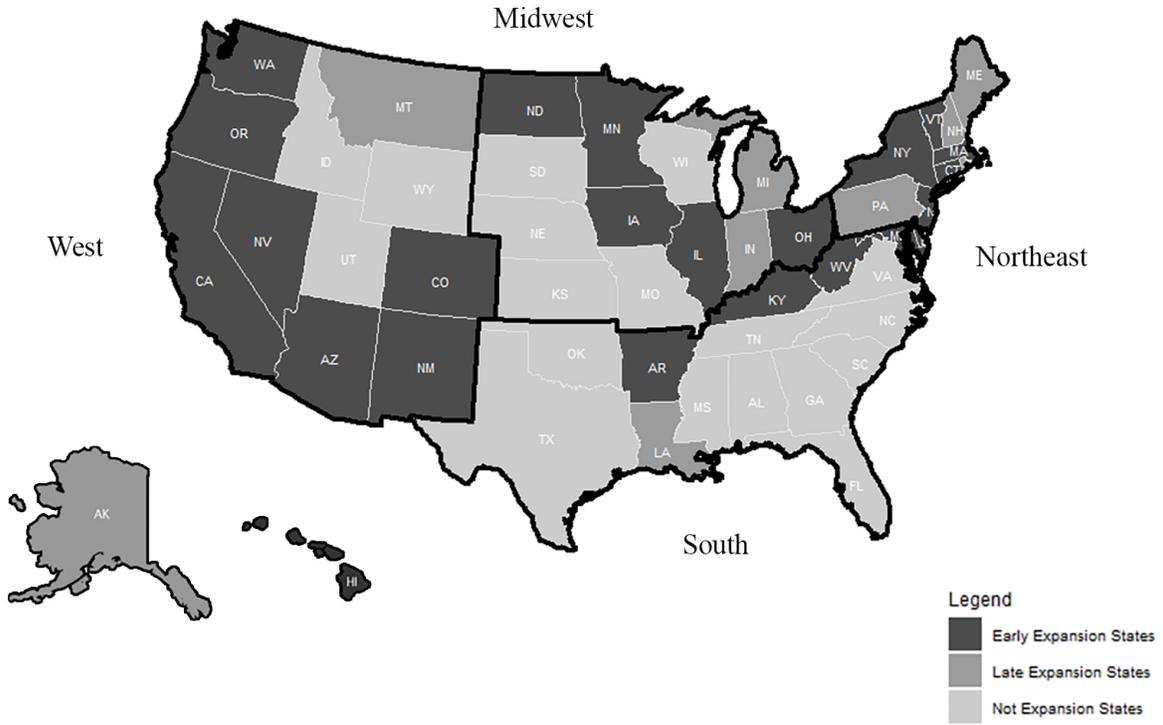
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Figure 1: State Medicaid Expansion Status by State



Notes: States are labelled by their two-letter postal abbreviations. The map was created based on data from the Kaiser Family Foundation; for more details see <https://www.kff.org/medicaid/issue-brief/status-of-state-medicaid-expansion-decisions-interactive-map/>

Table 1: Employment Outcomes by Time Period and State Medicaid Expansion

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Early Expansion States			Non-Expansion States			DID
	Pre-	Post-	Diff.	Pre-	Post-	Diff.	(3)-(6)
Unincorporated Self-Employed	0.047	0.045	-0.002	0.043	0.043	-0.001	-0.0011**
Incorporated Self-Employed	0.028	0.029	0.001	0.028	0.029	0.001	0.0004
Paid Employee	0.650	0.674	0.024	0.641	0.661	0.020	0.0041
Non-Employed	0.275	0.251	-0.024	0.287	0.267	-0.020	-0.0034

Notes: the data come from the American Community Survey. 2009-2013 are pre-state Medicaid expansion years. 2014-2018 are post-state Medicaid expansion years. The sample includes U.S. citizens who are ages 26-64.

*Significantly different from zero at the ten percent level via clustered standard errors.

Table 2: Health Insurance Rates and Type by Emp. Group, Time Period, and State Medicaid Expansion

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Early Expansion States			Non-Expansion States			DID
	Pre-	Post-	Diff.	Pre-	Post-	Diff.	(3)-(6)
<u>A. Unincorporated Self-Employed Sample</u>							
Any HI Coverage	0.746	0.861	0.114	0.651	0.738	0.087	0.0278*
Medicaid Coverage	0.080	0.182	0.101	0.046	0.067	0.020	0.0809***
Employer Coverage	0.399	0.399	-0.0002	0.351	0.364	0.013	-0.0132*
Purchased Coverage	0.283	0.296	0.013	0.256	0.307	0.051	-0.0385***
Other Health Insurance	0.017	0.017	-0.0002	0.026	0.027	0.001	-0.0014
<u>B. Incorporated Self-Employed Sample</u>							
Any HI Coverage	0.869	0.918	0.049	0.815	0.862	0.047	0.0028
Medicaid Coverage	0.035	0.081	0.045	0.018	0.029	0.010	0.0350***
Employer Coverage	0.532	0.506	-0.026	0.469	0.449	-0.020	-0.0066
Purchased Coverage	0.335	0.356	0.021	0.348	0.396	0.048	-0.0267**
Other Health Insurance	0.010	0.011	0.002	0.017	0.020	0.002	-0.0009
<u>C. Paid Employees Sample</u>							
Any HI Coverage	0.901	0.944	0.043	0.859	0.893	0.034	0.0091*
Medicaid Coverage	0.049	0.092	0.043	0.031	0.040	0.009	0.0343***
Employer Coverage	0.808	0.794	-0.014	0.769	0.768	-0.001	-0.0133***
Purchased Coverage	0.069	0.079	0.009	0.072	0.092	0.020	-0.0109***
Other Health Insurance	0.015	0.016	0.000	0.027	0.028	0.001	-0.0002
<u>D. Non-Workers Sample</u>							
Any HI Coverage	0.768	0.882	0.114	0.696	0.761	0.065	0.0486***
Medicaid Coverage	0.279	0.402	0.122	0.226	0.265	0.039	0.0836***
Employer Coverage	0.357	0.333	-0.024	0.311	0.299	-0.012	-0.0123**
Purchased Coverage	0.113	0.126	0.013	0.107	0.139	0.032	-0.0194***
Other Health Insurance	0.067	0.071	0.004	0.095	0.104	0.009	-0.0049**

Notes: the data come from the American Community Survey. 2009-2013 are pre-state Medicaid expansion years. 2014-2018 are post-state Medicaid expansion years. All samples are limited to U.S. citizens who are ages 26-64.

*Significantly different from zero at the ten percent level using clustered standard errors; **Significant at 5% level; *** Significant at 1% level.

Table 3: State Medicaid Expansion Effects on Employment Outcomes DID Regressions by Sample

Dependent Variable:	(1)	(2)	(3)	(4)
	Unincorporated Self-Employed	Incorporated Self-Employed	Paid Employee	Non- Employed
<u>A. Main Sample</u>				
State Medicaid Expansion	0.0004 (0.0006)	0.00004 (0.0003)	0.0008 (0.0025)	-0.0012 (0.0026)
<u>B. Low and Moderate Income Sample (Income < 250% of Poverty)</u>				
State Medicaid Expansion	0.0003 (0.0008)	0.0007 (0.0005)	-0.0010 (0.0030)	0.00003 (0.0034)
<u>C. Low Income Sample (Income < 138% of Poverty)</u>				
State Medicaid Expansion	-0.0001 (0.0009)	0.0012** (0.0005)	0.0028 (0.0032)	-0.0039 (0.0039)
<u>D. Courtemanche et al. (2019a) New and Never Expander 21 State Sample</u>				
State Medicaid Expansion	0.0010 (0.0009)	-0.0005 (0.0005)	0.0038 (0.0052)	-0.0042 (0.0057)
<u>E. Adding Controls for Marital Status and Number of Children</u>				
State Medicaid Expansion	0.0004 (0.0006)	0.00003 (0.0003)	0.0008 (0.0024)	-0.0012 (0.0026)

Notes: Each coefficient and standard error combination comes from a different DID regression that includes state fixed effects, region-year effects, and individual dummy variable controls for age, sex, race, ethnicity, and education. Standard errors are clustered by state. All samples are limited to U.S. citizens who are ages 26-64. The samples in Panels B-D are further restricted as stated. See the text for more details.

**Significantly different from zero at the five percent level.

Table 4: State Medicaid Expansion Effects on Health Insurance by Employment Group for Main Sample

Dependent Variable:	(1) Any Health Insurance	(2) Medicaid Insurance	(3) Employer Insurance	(4) Purchased Insurance	(5) Other Insurance
<u>A. Unincorporated Self-Employed Sample</u>					
State Medicaid Expansion	0.0396*** (0.0093)	0.0827*** (0.0093)	-0.0093* (0.0048)	-0.0318*** (0.0078)	-0.0015 (0.0010)
<u>B. Incorporated Self-Employed Sample</u>					
State Medicaid Expansion	0.0151*** (0.0056)	0.0343*** (0.0037)	0.0059 (0.0053)	-0.0241*** (0.0076)	-0.0011 (0.0015)
<u>C. Paid Employees Sample</u>					
State Medicaid Expansion	0.0163*** (0.0048)	0.0366*** (0.0046)	-0.0101*** (0.0027)	-0.0104*** (0.0023)	0.0002 (0.0004)
<u>D. Non-Workers Sample</u>					
State Medicaid Expansion	0.0568*** (0.0089)	0.0871*** (0.0110)	-0.0117*** (0.0028)	-0.0169*** (0.0034)	-0.0037 (0.0023)

Notes: Each coefficient and standard error combination comes from a different DID regression that includes state fixed effects, region-year effects, and individual dummy variable controls for age, sex, race, ethnicity, and education. Standard errors are clustered by state. All samples are limited to U.S. citizens who are ages 26-64.

*Significantly different from zero at the ten percent level; *** Significant at 1% level.

Table 5: Robustness Checks for SME Effects on Health Insurance for the Unincorporated Self-Employed

Dependent Variable:	(1)	(2)	(3)	(4)	(5)
	Any Health Insurance	Medicaid Insurance	Employer Insurance	Purchased Insurance	Other Insurance
<u>A. Main Sample</u>					
State Medicaid Expansion	0.0396*** (0.0093)	0.0827*** (0.0093)	-0.0093* (0.0048)	-0.0318*** (0.0078)	-0.0015 (0.0010)
<u>B. Low and Moderate Income Sample (Income < 250% of Poverty)</u>					
State Medicaid Expansion	0.0919*** (0.0134)	0.1705*** (0.0166)	-0.0105* (0.0054)	-0.0672*** (0.0093)	-0.0011 (0.0019)
<u>C. Low Income Sample (Income < 138% of Poverty)</u>					
State Medicaid Expansion	0.1254*** (0.0199)	0.2180*** (0.0238)	-0.0183** (0.0069)	-0.0772*** (0.0106)	-0.0013 (0.0032)
<u>D. Courtemanche et al. (2019a) New and Never Expander 21 State Sample</u>					
State Medicaid Expansion	0.0699*** (0.0125)	0.1092*** (0.0176)	-0.0073 (0.0064)	-0.0267* (0.0147)	-0.0036** (0.0015)
<u>E. Adding Controls for Marital Status, Number of Children, and Income</u>					
State Medicaid Expansion	0.0408*** (0.0094)	0.0816*** (0.0092)	-0.0073 (0.0047)	-0.0315*** (0.0078)	-0.0015 (0.0010)

Notes: Each coefficient and standard error combination comes from a different DID regression that includes state fixed effects, region-year effects, and individual dummy variable controls for age, sex, race, ethnicity, and education. Standard errors are clustered by state. All samples are limited to U.S. citizens who are ages 26-64.

*Significantly different from zero at the ten percent level; **Significant at 5% level; *** Significant at 1% level.

Table 6: Robustness Checks for SME Effects on Health Insurance for the Incorporated Self-Employed

Dependent Variable:	(1)	(2)	(3)	(4)	(5)
	Any Health Insurance	Medicaid Insurance	Employer Insurance	Purchased Insurance	Other Insurance
<u>A. Main Sample</u>					
State Medicaid Expansion	0.0151*** (0.0056)	0.0343*** (0.0037)	0.0059 (0.0053)	-0.0241*** (0.0076)	-0.0011 (0.0015)
<u>B. Low and Moderate Income Sample (Income < 250% of Poverty)</u>					
State Medicaid Expansion	0.0511*** (0.0125)	0.1246*** (0.0127)	-0.0092 (0.0132)	-0.0651*** (0.0153)	-0.0061 (0.0041)
<u>C. Low Income Sample (Income < 138% of Poverty)</u>					
State Medicaid Expansion	0.0904*** (0.0232)	0.1614*** (0.0227)	-0.0004 (0.0174)	-0.0886*** (0.0238)	0.0055 (0.0056)
<u>D. Courtemanche et al. (2019a) New and Never Expander 21 State Sample</u>					
State Medicaid Expansion	0.0200** (0.0078)	0.0459*** (0.0047)	-0.0018 (0.0095)	-0.0229 (0.0142)	-0.0031 (0.0032)
<u>E. Adding Controls for Marital Status, Number of Children, and Income</u>					
State Medicaid Expansion	0.0163*** (0.0056)	0.0323*** (0.0035)	0.0076 (0.0050)	-0.0227*** (0.0076)	-0.0011 (0.0015)

Notes: Each coefficient and standard error combination comes from a different DID regression that includes state fixed effects, region-year effects, and individual dummy variable controls for age, sex, race, ethnicity, and education. Standard errors are clustered by state. All samples are limited to U.S. citizens who are ages 26-64.

Significantly different from zero at the five percent level; * Significant at 1% level.

Table 7: Event Analysis of SME Effects on Health Insurance for the Unincorporated Self-Employed

Dependent Variable:	(1) Any Health Insurance	(2) Medicaid Insurance	(3) Employer Insurance	(4) Purchased Insurance	(5) Other Insurance
Medicaid Expansion State pre-t-5	-0.0086 (0.0136)	0.0048 (0.0099)	0.0017 (0.0105)	-0.0190 (0.0124)	0.0015 (0.0027)
Medicaid Expansion State in t-5	-0.0069 (0.0075)	-0.0094* (0.0054)	0.0053 (0.0085)	-0.0079 (0.0097)	0.0027 (0.0020)
Medicaid Expansion State in t-4	-0.0134* (0.0069)	-0.0093* (0.0051)	0.0003 (0.0069)	-0.0051 (0.0081)	0.0005 (0.0018)
Medicaid Expansion State in t-3	-0.0075 (0.0060)	-0.0082 (0.0054)	0.0063 (0.0070)	-0.0047 (0.0073)	-0.0006 (0.0019)
Medicaid Expansion State in t-2	0.0087* (0.0051)	-0.0028 (0.0032)	0.0144** (0.0057)	0.0006 (0.0050)	-0.0029** (0.0013)
Medicaid Expansion State in t	0.0199*** (0.0049)	0.0428*** (0.0055)	-0.0046 (0.0056)	-0.0161** (0.0071)	-0.0011 (0.0015)
Medicaid Expansion State in t+1	0.0326*** (0.0089)	0.0739*** (0.0084)	-0.0027 (0.0090)	-0.0376*** (0.0104)	-0.0010 (0.0020)
Medicaid Expansion State in t+2	0.0422*** (0.0098)	0.0937*** (0.0095)	-0.0013 (0.0072)	-0.0508*** (0.0086)	-0.0008 (0.0017)
Medicaid Expansion State in t+3	0.0508*** (0.0129)	0.0957*** (0.0129)	-0.0023 (0.0085)	-0.0412*** (0.0108)	-0.0002 (0.0021)
Medicaid Expansion State in t+4	0.0593*** (0.0139)	0.0996*** (0.0141)	-0.0057 (0.0096)	-0.0247* (0.0138)	-0.0074*** (0.0023)
Joint signif. p-value for t to t+4	0.0006	<0.0001	0.9681	<0.0001	0.0020
Joint signif. p-value for pre-periods	0.0634	0.0034	0.1550	0.4198	0.0600

Notes: Each regression includes state fixed effects, region-year effects, and individual dummy variable controls for age, sex, race, ethnicity, and education. Standard errors are clustered by state. The sample is limited to U.S. citizens who are ages 26-64. The omitted event reference period is t-1.

*Significantly different from zero at the ten percent level; **Significant at 5% level; *** Significant at 1% level.

Table 8: Event Analysis of SME Effects on Health Insurance for the Incorporated Self-Employed

Dependent Variable:	(1) Any Health Insurance	(2) Medicaid Insurance	(3) Employer Insurance	(4) Purchased Insurance	(5) Other Insurance
Medicaid Expansion State pre-t-5	0.0069 (0.0101)	0.00005 (0.0027)	0.0107 (0.0113)	-0.0086 (0.0167)	-0.0009 (0.0027)
Medicaid Expansion State in t-5	0.0011 (0.0072)	-0.0102*** (0.0029)	0.0103 (0.0127)	-0.0046 (0.0128)	0.0002 (0.0023)
Medicaid Expansion State in t-4	-0.0005 (0.0065)	-0.0076** (0.0031)	0.0060 (0.0115)	-0.0057 (0.0128)	-0.0003 (0.0017)
Medicaid Expansion State in t-3	0.0124 (0.0076)	-0.0056* (0.0029)	0.0170 (0.0115)	0.0007 (0.0102)	-0.0032* (0.0016)
Medicaid Expansion State in t-2	0.0022 (0.0052)	-0.0038 (0.0027)	0.0093 (0.0076)	-0.0042 (0.0066)	-0.0019 (0.0015)
Medicaid Expansion State in t	0.0065 (0.0053)	0.0174*** (0.0037)	0.0137** (0.0057)	-0.0286*** (0.0077)	-0.0032* (0.0017)
Medicaid Expansion State in t+1	0.0165** (0.0068)	0.0279*** (0.0048)	0.0200** (0.0096)	-0.0307*** (0.0090)	-0.0002 (0.0021)
Medicaid Expansion State in t+2	0.0178** (0.0073)	0.0370*** (0.0052)	0.0070 (0.0119)	-0.0250* (0.0128)	-0.0012 (0.0028)
Medicaid Expansion State in t+3	0.0227*** (0.0081)	0.0340*** (0.0053)	0.0202* (0.0106)	-0.0330*** (0.0117)	-0.0036 (0.0024)
Medicaid Expansion State in t+4	0.0325*** (0.0087)	0.0411*** (0.0062)	-0.0001 (0.0101)	-0.0092 (0.0149)	-0.0025 (0.0023)
Joint signif. p-value for t to t+4	0.0189	<0.0001	0.0028	<0.0001	0.2898
Joint signif. p-value for pre-periods	0.2650	0.0007	0.5980	0.8587	0.1763

Notes: Each regression includes state fixed effects, region-year effects, and individual dummy variable controls for age, sex, race, ethnicity, and education. Standard errors are clustered by state. The sample is limited to U.S. citizens who are ages 26-64. The omitted event reference period is t-1.

*Significantly different from zero at the ten percent level; **Significant at 5% level; *** Significant at 1% level.