The Impact of Access to Substance Abuse Treatment on Disability

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Abstract

The paper provides a preliminary examination of whether changes in access to substance abuse treatment due to state Medicaid expansions from the Affordable Care Act (ACA) affected the number of disability beneficiaries. To do so, we use variation in the number of substance abuse treatment facilities accepting Medicaid as a form of payment over time and across counties, to identify the effect of changes in access to licensed substance abuse treatment facilities on disability claims in states that expanded Medicaid. We use a differences-in-differences estimation strategy to examine the impact of state Medicaid expansions by exploiting county level pre-expansion variation in the supply of substance abuse treatment facilities. Our specification uses within state variation in the pre-treatment supply of substance abuse treatment facilities among states that expanded Medicaid. Ultimately, our results suggest that state Medicaid expansions did not have a significant impact on the number of treatment facilities accepting Medicaid as a form of payment, and that access to substance abuse treatment did not have a significant impact on the number of disability beneficiaries. However, we do note that the number of treatment facilities declines disproportionately in counties that had a high pre-treatment supply of treatment facilities compared to counties with a low supply of treatment facilities.

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1. Introduction

Substance use disorder (SUD) is more prevalent among the disabled compared to the non-disabled (Glazier and Kling, 2013). In 2016, the most common diagnoses among Social Security Administration (SSA) disability beneficiaries was diseases of the musculoskeletal system and connective tissue, which are typically pain-related ailments (e.g., arthritis, back pain, degenerative joint disease) (SSA, 2017). This study seeks to determine the extent to which access to substance abuse treatment affects the fraction of individuals on Social Security Disability Insurance (DI) by using policy-induced variation generated by state Medicaid expansions occurring post-Affordable Care Act (ACA).

Our project is particularly important because it contributes to the literature examining the effect of Medicaid expansions on disability and the availability of substance abuse treatment. The current literature finds that the direct effect of Medicaid expansions on disability are mixed (Chatterji and Li, 2016; Anand et al., 2019). However, due to data constraints, these studies fail to consider how access to treatment changed because of the ACA's Medicaid expansions.

We leverage variation in the number of treatment facilities as well as the number of facilities specifically accepting Medicaid as a form of payment over time and across counties, to identify the effect of changes in access to licensed substance abuse treatment facilities on disability claims. Based on predictions by health policy experts (Buck, 2011), and the previous literature (Maclean & Saloner, 2017; Meinhofer and Wittman, 2018), we expect that state Medicaid expansions will allow more people to access these treatment facilities by expanding the population covered by health insurance, assuming that these facilities are not at capacity prior to the expansion. In addition, the Medicaid expansions themselves could impact the number of facilities accepting Medicaid as a form of payment or where facilities open and close if those decisions are contingent upon the size of the potential population it could treat. The existing literature is mixed. There is evidence that more treatment facilities accepted Medicaid as a form of payment due to state Medicaid expansions, but that research generally relies on cross-sectional data of treatment facilities (Meinhofer & Witman, 2018). That said one longitudinal study using a randomly selected subset of treatment facilities found state Medicaid expansions had no effect on the likelihood of accepting Medicaid as a form of payment (Aletraris, Edmond, & Roman, 2018). To date there has been no study of how ACA Medicaid expansions impact the likelihood

that licensed substance abuse facilities accept it as a form of payment using annual panel-data on the near census of treatment facilities. This study fills this gap in the literature.

The predicted effect of increased access to substance abuse treatment on disability is theoretically ambiguous, and thus, left as an empirical question. For example, if increased access to substance abuse treatment leads to better management of pain-related ailments, then this could reduce the number of disability beneficiaries. However, individuals cannot qualify for disability benefits if drug and alcohol addiction are determined to be a material factor causing disability, increased access to substance abuse treatments could increase disability beneficiaries by reducing the number of people disqualified from substance abuse related conditions.

Our preliminary results show that state Medicaid expansions had no significant impact on the number of treatment facilities accepting Medicaid as a form of payment among counties in states with a Medicaid expansion, and that access to substance abuse treatment did not have significant impact on the number of disability beneficiaries. However, we do find a relative decline in the number of treatment facilities in a county with a high pre-expansion supply of treatment facilities compared to a county with a low supply of treatment facilities. Future work will expand upon this analysis by estimating additional empirical specifications and using other ways to define variation in access to treatment prior to ACA Medicaid expansions to ensure these preliminary results are robust.

The remainder of the paper is organized as follows. In section 2, we provide a brief overview of the existing literature on state Medicaid expansions and substance abuse treatment. In section 3, we describe the various data sources used. We discuss our empirical strategy in section 4 and the results in section 5. In section 6, we conclude with a discussion of the implications of the results.

2. Background

ACA and substance use disorder

Before the ACA, Medicaid was only available to certain categories of low-income individuals based on state income eligibility criteria. The ACA contained a provision that allowed all individuals under 138% of the poverty line to qualify for Medicaid. The change in policy caused an increase in federal funding for all states to cover those who now qualified for Medicaid. However, the Supreme Court in the case *National Federal of Independent Business v.*

Sebelius ruled that individual states could decide whether to expand Medicaid or not. In 2014, half of the states and the District of Columbia participated and in 2017 that number rose to 32 states and the District of Columbia.

At the time, the ACA's state Medicaid expansions were viewed as one way to increase access to treatment for both SUD and opioid use disorder (OUD) by increasing the financing for treatment via Medicaid and increasing the number of possible sources of treatment that accepted Medicaid as a form of payment (Abraham et al. 2017; Buck 2011; Humphreys and Frank 2014). There are two main reasons to expect that state Medicaid expansions would impact specialty SUD treatment. First, the number of Medicaid enrollees would increase (Humphreys & Frank, 2014). States that expanded Medicaid have consistently been found to have increased enrollment on Medicaid (Courtemanche et al. 2017; Decker & Lipton, 2017; Kaestner et al., 2017; Wherry & Miller, 2016). Furthermore, it is expected that over 1.6 million Americans with SUD gained insurance coverage in states that decided to expand Medicaid (Humphreys & Frank, 2014). Second, benefit plans in states that expanded Medicaid has SUD treatment listed as a required benefit.

Given that there was an increase in the number of individuals enrolled on Medicaid we would expect that the supply for SUD treatment would also increase in response. Either the number of treatment facilities will increase or the likelihood that an individual treatment provider accepting Medicaid as a form of payment will increase. An additional possibility is that the increase in the population covered by Medicaid will benefit larger facilities that are more likely to accept Medicaid, increase consolidation and potentially favor substitution from smaller facilities to larger facilities.

There are multiple studies that have tried to unpack the relationship between state Medicaid Expansions and the treatment of SUD or OUD. Olfson and colleagues (2018) found that state Medicaid expansions did not cause an increase in overall treatment for SUD using the National Survey on Drug Use and Health (NSDUH) (Olfson et al., 2018). However, Wen et al. (2015) concluded that state Medicaid expansions led to a decline in the percentage of individuals reporting a perceived unmet need for SUD treatment and an increase in the probability of receiving specialty SUD treatment (Wen, Druss & Cummings, 2015). Corresponding to the increase in the number of individuals receiving specialty treatment, both Maclean and Saloner

(2017) and Wen et al. (2017) concluded that state Medicaid expansions did lead to an increase in the use of Medicaid as payment for SUD and OUD treatment.

Within the existing literature, there are two studies that focus on the effect of state Medicaid expansions on specialty treatment for SUD. Meinhofer and Witman (2018) used state variation in the number of treatment providers that offer medication-assisted treatment (MAT) in the National Survey of Substance Abuse Treatment Services (N-SSATS) between the years 2007 and 2016. The authors focused on treatment facilities that offer detoxification for OUD, methadone, naltrexone or buprenorphine or those that are federally certified as opioid treatment programs. Leveraging state-level cross section variation, they concluded that state Medicaid expansions led to both the entry of more facilities and a greater acceptance of Medicaid payments as a form of payment (Meinhofer & Witman 2018). These findings are in contrast to recent work by Aletraris and colleagues (2018) who found that state Medicaid expansions had no effect on the likelihood of accepting Medicaid as a form of payment. Contrary to the work by Meinhofer and Witman (2018), Aletraris used longitudinal data on a random subsample of treatment facilities and is limited to years 2011 and 2013 (Aletraris, Edmond, & Roman, 2018). Our study improves on Meinhofer and Witman (2018) and Aletraris et al. (2018) by using the first panel dataset of the near census of licensed substance abuse treatment facilities between the years 2005 and 2017 that is geocoded at the address level.

Longitudinal data of licensed treatment facilities has historically been much more difficult to collect, explaining the reliance of previous studies on more aggregated data or only a subset of treatment providers. To address this limitation in the existing literature, we use data on licensed substance abuse treatment centers that is geocoded at the address-level. We link these data across years to observe the opening and closing of licensed treatment facilities, the changes in acceptable forms of payment, and the types of services offered. We use this facility-level variation to instrument for changes in the availability of treatment and the effect of it on the number of disability beneficiaries within a county.

ACA and Disability

There are several recent papers that study the effect of ACA's Medicaid expansions on disability insurance both of which found mixed results. As a consequence, the policy

implications for the impact of ACA-induced Medicaid expansions on DI beneficiaries remains an open research question.

Chatterji and Li (2016) examined how state Medicaid expansions affected Supplemental Security Income (SSI) applications, SSI and DI awards, and the number of SSI and DI beneficiaries in Connecticut, Minnesota, California, and the District of Columbia using two empirical strategies. The first strategy uses a differences-in-differences approach that compared outcomes among states that expanded Medicaid prior to 2014, early adopters (treatment group), to those of states that eventually expanded Medicaid in 2014 (control group). The second strategy uses synthetic controls in which the control group was a weighted combination of states that expanded Medicaid in 2014. While their results showed a significant reduction in SSI beneficiaries in Connecticut using both empirical approaches, they found mixed results on outcomes in the other states.

Anand et al. (2019) focused on 15 states that expanded Medicaid in 2014 to estimate how additional Medicaid coverage affected applications to the federal disability program. They used a differences-in-differences approach to compare geographic areas within states that expanded Medicaid to propensity score matched areas in states that did not expand Medicaid. Their results varied across the 15 states studied. In particular, the authors found that there were statistically significant impacts on SSI application rates and SSDI-only application rates among a subset of states, but the magnitude and direction of the effects varied across states.

3. Data

Licensed Substance Abuse Facilities

Our primary data source is a novel longitudinal dataset of licensed substance abuse facilities between the years 2005 and 2017 as found in the National Directory of Substance Abuse Treatment Facilities. The data include facilities that are licensed, certified or otherwise approved for inclusion in a national directory by each state's substance abuse service agency and that responded to the N-SSATS in the previous year.[1] Information contained in these data include the name of the facility, the address of the facility, the primary focus of the provider, the service setting, the services provided by the facility, the type of care provided by the facility, the special

[1]Throughout the paper we refer to the year as the year that the N-SSATS response was logged. For example, responses listed in the 2017 directory will be logged for the year 2016.

programs and groups that are offered by the facility, and which payment or insurance forms are accepted by the facility (Medicare, Medicaid, private insurance, military insurance, state financed insurance (other than Medicaid), cash or self-payment or no payment accepted). The facility data are geocoded at the address level using Google Map's API. We use the results from the API for linking across years.

Machine Learning Model to Construct Facility Panel Data

The N-SSATS facility data is a cross sectional survey of licensed substance abuse treatment centers. The data lack any identifiable information on the specific treatment center. That said, the directories contain both the name and the address of the treatment center. To link the data, we use a machine learning algorithm that groups together records that are highly likely to refer to the same licensed treatment facility, and then assign this group a unique identifier. The random forest model uses fields with identifying information (such as treatment center name, street address, geocoded address, etc.) to estimate similarity metrics to build a model that predicts whether two records refer to the same treatment center. To build that model, we rely on instances where we can know with high confidence whether two records refer to the same treatment center. Since the directories do not provide this information directly, we leverage geocoded addresses to identify records that are highly likely to refer to the same treatment center.[2]

The algorithm then uses these "known" record pairs to model the optimal way of linking records with the end result that pairs of records that have a high probability of matching are grouped together with any additional records that likely refer to the same treatment center. For example, if records A and B likely refer to the same center, and records B and C likely refer to the same center, then the algorithm can identify that all three records likely refer to the same center. A new unique identifier is then created that is consistent across all high-probability matched records for each center.

We leverage the policy induced variation due to Medicaid's expansion under the ACA to study how changes in access to substance abuse treatment facilities affect the fraction of people on disability across counties. As shown in Table 1, Medicaid expansions occurred in 2010, 2011, 2014, 2015, and 2017, with most states (21) expanding Medicaid in 2014. Because our data end

[2]Even though our proxy for "known" instances of two records referring to the same treatment center no doubt contains errors (such as when two different treatment centers reside in the same building), manual verification of a preliminary run of our algorithm reveals very strong performance.

in 2016, we only include states that experienced Medicaid expansions in 2010, 2011, and 2014 to make sure there are at least two years of post-Medicaid expansion data. To ensure that the pre- and post-treatment time periods are symmetric, we restrict the estimation window to include five years of data for each county consisting of two years before and after Medicaid expanded and the year of expansion itself. Denoting event time by t, this means that t ranges from -2 to 2.

We merge the substance abuse facilities data with county level SSA disability beneficiary data and county level U.S. Census American Community Survey (ACS) data. The ACS data contain county level demographics that allow us to control for population differences when estimating the effect of Medicaid expansions on the supply of treatment facilities and examining how pre-expansion supply of treatment facilities impacts DI beneficiaries. One drawback to the ACS data is that it does not include all counties in the U.S., but only those that exceed a population threshold.[3] Table 2 shows the percentage of counties included in our study by state. While a majority of counties are omitted from our study (84 percent of the over 3,100 U.S. counties), the counties included represent a majority of the U.S. population. In particular, the counties in the 2016 ACS data cover 65 percent of the total U.S. population.

Because one of the key sources of variation exploited in our empirical strategy will be Medicaid expanding at the state-level, we further restrict our sample to states that expanded Medicaid in 2014 or earlier to ensure that there are at least two years of post-expansion data for each county.

We use two sources of disability beneficiary data. The first source is publicly available data from the Social Security Administration (SSA), which provides historical annual county level disability beneficiary information as of the end of each calendar year.[4] The second source is administrative county level data on disability beneficiaries, disability terminations, disability applications, and disability awards provided by SSA. We estimate our models using both sources of data to determine whether the results are consistent across the two data sources. We also use the disability termination, application, and award data from SSA to determine whether access to substance abuse treatment impacts exit from or entry into DI.

[3] U.S. Census 1-Year Estimates are restricted to counties with populations of at least 65,000. https://www2.census.gov/programs-surveys/acs/tech_docs/data_suppression/ACSO_Data_Suppression.pdf
[4] https://www.ssa.gov/oact/STATS/OASDIbenies.html

Table 3 shows how the number of disability beneficiaries varies among the population of counties in states with Medicaid expansions in 2014 or earlier versus the set of counties included in the ACS data. As expected, the number of DI beneficiaries are greater in the set of counties included in the ACS data both before and after state Medicaid expanded. For the population of counties, average DI beneficiaries were just under 2,000 in both time periods. In contrast, the average number of DI beneficiaries prior to Medicaid expanding was approximately 14,830 and the average number of DI beneficiaries after Medicaid expanded was approximately 15,360 among counties included in the ACS data.

4. Empirical Strategy

Our empirical analysis consists of two sets of analysis. The first set studies the impact of state Medicaid expansions on the supply of substance abuse treatment facilities, using a simple pre-post analysis and a differences-in-differences estimation that exploits variation in pre-expansion supply of treatment facilities. The second set studies the impact of access to substance abuse treatment on DI beneficiary rolls using variation in pre-expansion supply of treatment. As mentioned earlier, we restrict to states that experienced Medicaid expansions in 2010, 2011, and 2014. Furthermore, we limit the sample to include two years of pre-expansion data and two years of post-expansion data to make the pre and post periods the same length. If t=0 represents the year in which a state expanded Medicaid, then the empirical estimation includes t=-2 through t=2 for each county or five years of data.

Impact of Medicaid Expansion on Number of Substance Abuse Treatment Facilities

To understand how access to substance abuse treatment affects the number of people on DI, we first empirically estimate the extent to which Medicaid expansions affected access to substance abuse treatment. If state Medicaid expansions affected the supply of substance abuse treatment facilities, then the expansions could affect DI through a change in supply as well as a change in the population covered through Medicaid, and thus eligible for treatment, at facilities accepting Medicaid.

We first test for whether there are differences in the number of substance abuse facilities after Medicaid expanded in counties among states that experienced an expansion by estimating the following equation:

$$Y_{isy} = \beta_0 + \beta_1 Post_{sy} + \Omega X_{isy} + \delta_i + \gamma_y + \varepsilon_{isy} \qquad (1)$$

where Y is the outcome variable of interest in county *i,* in state *s* for year *y*. The outcomes of interest will include the number of substance abuse facilities, the number of substance abuse facilities accepting Medicaid, and the fraction of facilities accepting Medicaid. Post equals one in years after state s expanded Medicaid, X_{isy} is a vector of county-time varying characteristics such as local employment and population demographics, and δ_i and γ_y are county and year dummies.

Second, we estimate a differences-in-differences estimation that examines the impact of Medicaid expansions on the availability of substance abuse treatment facilities by exploiting county level *pre-expansion variation* in the supply of substance abuse treatment facilities. To do so, we follow the methodology used by Mian and Sufi (2012) and Berger et al. (2017) in which geographic variation in ex-ante exposure to a policy is exploited to study the policy's effects. In our case, this entails exploiting within state variation in the pre-treatment supply of substance abuse treatment among Medicaid expansion states.

We consider three different methods to categorize counties into high versus low supply based on the number of substance abuse treatment facilities within a county in the year prior to the state expanding Medicaid. Table 4 shows the number and percentage of counties by number of substance abuse treatment facilities in the year prior to Medicaid expanding. Out of the 256 counties included in the analysis, only one county had zero substance abuse treatment facilities. Twenty-one percent of counties had 1-5 facilities, 24 percent had 6-10 facilities, 27 percent had 11-20 facilities, and 27 percent had more than 20 facilities. Table 5 presents the number and percentage of counties by number of substance abuse treatment facilities accepting Medicaid in the year prior to Medicaid expanding. Comparing the county counts between Table 4 and Table 5 demonstrates that not all substance abuse treatment facilities accepted Medicaid as a form of payment. In particular, 48 percent of counties had five or fewer substance abuse treatment facilities that accepted Medicaid in the year prior to Medicaid expanding. As a result, we use multiple methods to categorize counties into high supply versus low supply based on measures of facility counts overall and facilities accepting Medicaid.

The first method is to categorize counties as high supply if the number of facilities in the county was at or above the median county facility count in its state in the year prior to Medicaid expanding. The second method is to categorize counties as high supply if the number of facilities accepting Medicaid as a form of payment in a county at or above the median county count of

facilities accepting Medicaid in its state in the year prior to Medicaid expanding. The third method is to categorize counties as high supply if at least 50 percent of facilities accepted Medicaid as a form of payment in the year prior to Medicaid expanding. Table 6 shows the distribution of counties by state into high supply and low supply using the three different methods.

After the expansion of Medicaid, we predict that there will be additional incentive for facilities to open within those states, and/or facilities, to begin accepting Medicaid as a form of insurance because the population covered by Medicaid will increase. And there is evidence that facilities in states that expanded Medicaid experienced an increase in revenues from Medicaid (Aletraris, Edmond, & Roman, 2018). Whether or not this incentive is greater among counties with low or high supply of substance abuse facilities prior to the policy change is unclear and left as an empirical question. For example, counties with a low supply of facilities prior to Medicaid expanding may have had a low supply because the population eligible to receive treatment was too small, suggesting that an expansion in Medicaid could cause the supply of facilities in these low supply counties to grow. Additional reasons for the low supply of facilities prior to Medicaid expanding include a shortage in healthcare providers or prohibitively expensive costs to create a billing system that can comply with the requirements of insurance providers (Aletraris, Edmond, & Roman, 2018), which would suggest that the supply of facilities in these low supply counties would be unaffected.

Figures 1-3 show trends in the outcome variables of interest from time period t = -2 to 2 by the different high supply definitions. With the exception of the fraction of facilities accepting Medicaid depicted in Panel C of each Figure, we find that while the high supply definitions using median number of facilities both in total in Figure 1 and by those that accept Medicaid in Figure 2 yield roughly parallel pre-trends prior to Medicaid expanding in time t=0. In contrast, the categorization into high versus low supply using the threshold of 50 percent for the fraction of facilities accepting Medicaid in year t=-1 does not yield parallel pre-trends. As a result, the empirical analysis will not include results using this definition of high supply.

To understand how the characteristics of counties differ by whether they are categorized as high versus low supply, we present pre-Medicaid expansion summary statistics in Tables 7 and 8 by high and low supply. Table 7 reports the results for the total number of substance abuse facilities in the county. Table 8 reports the results for the total number of substance abuse

treatment facilities that accept Medicaid as a form of payment. We find that high supply counties not only have more substance abuse facilities, which is by construction, but they are also larger on average in terms of population size and number of DI beneficiaries. While the mean fractions of the population who are aged 65 or older, at least college educated and unemployed are similar, high supply counties have higher shares of minority populations and a greater share of residents living in a metro area compared to low supply counties. These differences in demographics suggest that it's important to account for these characteristics as controls in our empirical specification.

We estimate the following differences-in-differences model:

$$Y_{ist} = \beta_0 + \beta_1 Post_{st} * HighSupply_{is} + \beta_2 Post_{st} + \beta_3 HighSupply_{is} + \Omega X_{ist} + \delta_i + \gamma_t + \varepsilon_{ist} \quad (2)$$

where Y is the outcome of interest as defined in equation (1), Post equals one in years after state s expanded Medicaid, and HighSupply is an indicator that equals one if county i in state s had high supply of substance abuse treatment in the years prior to the Medicaid expansion based on the measures described above (e.g., HighSupply could equal one in a county if there are any facilities prior to the expansion and zero otherwise). X_{ist} is a vector of county-time varying characteristics such as local employment and population demographics, and δ_i and γ_t are county and year dummies. β_1 estimates the impact of the Medicaid expansion on outcome Y in high supply counties relative to low supply counties.

The results from this second empirical specification will allow us to determine whether certain counties were differentially impacted by the Medicaid expansion, and provide implications for how the supply of substance abuse treatment may have affected DI beneficiaries through Medicaid expansions. As a robustness check, we also estimated model (2) at the facility level.

Impact of Access to Substance Abuse Treatment on Disability Beneficiaries

To estimate how access to substance abuse treatment affects disability beneficiaries, we use the same empirical specification outlined in equation 2, except the outcome variable now equals different measures of DI beneficiaries. We predict that more patients would have access to treatment after Medicaid expanded in counties that had a greater supply of treatment licensed substance abuse treatment facilities pre-expansion, particularly those that had facilities accepting

Medicaid, since there would be more people covered by Medicaid. However, as discussed earlier, the impact of increased access to care has a theoretically ambiguous impact on the number of disability beneficiaries. In particular, if more access leads to better pain care management, then this could reduce the number of disability beneficiaries. In contrast, individuals cannot qualify for disability benefits if drug and alcohol addiction are determined to be a material factor causing disability. Thus, increased access to substance abuse treatments could reduce the number of people disqualified from substance abuse related conditions and cause an increase in disability beneficiaries.

Our baseline empirical specification is a differences-in-differences estimation that examines the impact of access to substance abuse treatment facilities on county level disability rates. This specification allows us to leverage county level variation to isolate how changes to a local population's access to treatment affects disability rate.

We estimate the following model:

$$DI_{ist} = \beta_0 + \beta_1 Post_{st} * HighSupply_{is} + \beta_2 Post_{st} + \beta_3 HighSupply_{is} + \Omega X_{ist} + \delta_i + \gamma_t + \varepsilon_{ist} \quad (3)$$

where DI is the fraction of the population on DI in county i, in state s, and year t, Post equals one in years after state s expanded Medicaid, and HighSupply is an indicator that equals one if county i in state s had high supply of substance abuse treatment in the years prior to the Medicaid expansion based on the measures described above (e.g., HighSupply could equal one in a county if there are any facilities prior to the expansion and zero otherwise). X_{ist} is a vector of county-time varying characteristics such as local employment and population demographics, and δ_i and γ_t are county and year dummies. β_1 estimates the impact of the Medicaid expansion on disability rates in high supply counties relative to low supply counties.

The key outcomes of interest are the fraction of the county population on disability, the log of total county DI beneficiaries, and the count of total county DI beneficiaries. We present results using both the publicly available SSA data and administrative SSA Figures 4 and 5 show pre-trends in these outcome variables of interest by our two categorizations of high and low supply. In Figure 4, high supply is defined as counties with a substance abuse treatment facility count greater than the median county count in that state in the year prior to Medicaid expanding. In Figure 5, high supply is defined as counties with the number of substance abuse treatment facilities accepting Medicaid greater than the median county count in that state in the year prior to Medicaid expanding. As shown in both figures, the outcomes variables of interest exhibit

parallel pre-trends prior to Medicaid expanding, demonstrating that high and low supply counties are similar in terms of trends in DI beneficiaries prior to Medicaid expanding.

5. Results

Impact of Medicaid Expansion on Number of Substance Abuse Treatment Facilities

Table 9 contains the results from estimating the post expansion change in the number of substance abuse treatment facilities in total and the number of substance abuse treatment facilities accepting Medicaid specified in equation 1. On average, we do not find any significant change in the number of facilities among counties in states with a Medicaid expansion.

Table 10 reports the results from the differences-in-differences specification in equation 2, which estimates the effect of state Medicaid expansions on the number of facilities in high supply counties relative to low supply counties. In columns 1 and 2, counties are considered high supply if the number of substance abuse treatment facilities in the year prior to Medicaid expanding was greater than or equal to that state's median count. In columns 3 and 4, counties are considered high supply if the number of substance abuse treatment facilities accepting Medicaid in the year prior to Medicaid expanding was greater than or equal to that state's median count. The coefficient of interest estimates the effect of the interaction term, Medicaid Expansion * High Supply. The results show that, relative to low supply counties, high supply counties had fewer facilities after Medicaid expanded using both definitions of high supply with the reduction ranging from 1.8 to 2.0 facilities. In columns 2 and 4, the differences-in-differences coefficient is statistically insignificant. Given that coefficient estimates on the Medicaid expansion variable is positive, although not statistically significant, could suggest that on average, counties experience increases in the number of substance abuse treatment facilities after Medicaid expanded, and that these increases were smaller in high supply counties relative to low supply counties.

Impact of Access to Substance Abuse Treatment on Disability Beneficiaries

Tables 11 and 12 contain results from the specification in equation 3, estimating the impact of access to substance abuse treatment on DI beneficiary rolls utilizing variation in county level pre-Medicaid expansion levels of supply to treatment. Results described above provide suggestive evidence that the number of substance abuse treatment facilities grew after Medicaid expanded, and this increase was larger in low supply counties relative to high supply

counties. In Table 11, high supply counties are the set of counties with at least median levels of facilities in the pre-expansion year. In Table 12, high supply counties are the set of counties with at least median levels of facilities accepting Medicaid in the pre-expansion year. The coefficient estimates on the interaction term, Post Medicaid Expansion * High Supply, are all statistically insignificant, regardless of the source of SSA data used. These results suggest that disability beneficiaries in high supply counties were not significantly affected by changes in access in treatment generated by Medicaid expansions relative to low supply counties.

Using SSA administrative data on county level DI terminations as the outcome variable of interest in equation 3 (unreported results), we find that the number of DI terminations was significantly higher among high supply counties relative to low supply counties after Medicaid expanded. We also find that the number of DI awards and the number of DI applications were significantly lower among high supply counties relative to low supply counties after Medicaid expanded, but the actual award rate, as measured by the number of DI awards divided by DI applications, was not significantly different. These termination and award results suggest that there should be a reduction in DI beneficiaries in high supply counties relative to low supply counties after a state expanded Medicaid, yet we do not find a significant difference in our baseline specifications. In future work, we will explore these results further to determine whether these results are robust or if alternative specifications are more appropriate.

Robustness Checks

In this section, we describe the results from several robustness checks using different time periods and alternative specifications to determine the extent to which our results depend on the specifications used in the main analysis.

First, as a placebo test, we arbitrarily redefined each state's Medicaid expansion year. In three separate iterations, we reclassified the Medicaid expansion year to be 2, 3, and 4 years prior to the actual year the state expanded Medicaid. In each instance, we did not find a significant effect of the placebo Medicaid expansion on the number of facilities overall or among those accepting Medicaid as payment in the specification estimating the overall impact of the expansion (equation (1)) or in the specification estimating the differential response by high versus low supply counties. Although, we expect DI beneficiaries to be unaffected by the placebo expansion year, when the outcome variables are DI beneficiaries, we find that the

number of DI beneficiaries is significantly lower in high supply counties after the placebo expansion year relative to low supply counties. However, we also find that total county populations of high supply counties are also significantly lower after the placebo expansion year, but the fraction of the population on DI is not significantly different. This implies that DI beneficiaries and the population are decreasing at the same rate and that the decline in DI beneficiaries may be a result of a reduction in population.

Second, we estimated two separate regression models where the unit of observation was a treatment facility. First, we estimate our main specification with county fixed effects. The second model adds in facility fixed effects. In this specification, we leverage variation within a facility. In our county, fixed effect only results we find that facilities being present in a state that expanded Medicaid had no impact on the likelihood of accepting Medicaid. Similar results are also found with the inclusion of facility fixed effects.

It is important to note that these results are in contrast to Meinhofer and Witman (2018) who use the N-SSATS. One possible explanation is that Meinhofer and Witman restrict their analysis to opioid treatment programs. Whereas our models include the near universe of licensed substance abuse treatment facilities. An additional explanation can be the year chosen for when a state expands Medicaid. Meinhofer and Witman (2018) used the year in which non-disabled enrollment into Medicaid was highest. In accordance with their study we changed the year that a state expanded Medicaid to match theirs. Again, we estimate our models separately using county fixed effects and both county and facility fixed effects. When using the same expansion years as Meinhofer and Witman we find that individual treatment facilities are more likely to accept Medicaid as a form of payment. We get inconsistent results between the county fixed effect and both the county fixed effect and facility fixed effect model. We find in the county fixed effects model that facilities which opened in the past year are more likely to accept Medicaid. Once we include facility fixed effects the result switches sign. It is also notable that the inclusion of facility fixed effects impacts the likelihood of offering buprenorphine. Facilities are 3.01% more likely to offer buprenorphine in states that expanded Medicaid in this model.

6. Conclusion

This is the first study to use a panel-level dataset of licensed substance abuse treatment facilities to examine the impact of state Medicaid expansions on substance abuse treatment

availability. We then use variation in pre-expansion supply of substance abuse treatment facilities to estimate the impact of access to treatment on the number of disability beneficiaries. We use the Affordable Care Act's state Medicaid expansions to test whether broader access to Medicaid and changes in the availability of substance abuse treatment services impact the number of individuals with Social Security disability benefits. Ultimately, our preliminary results show that state Medicaid expansions had no impact on the likelihood of an individual treatment facility accepting Medicaid as a form of payment or that access to substance abuse treatment did not have a significant impact on the number of disability beneficiaries. That said, we do find a relative decline in the number of treatment facilities in a county with a high supply of treatment facilities compared to a county with a low supply of treatment facilities within states that expanded Medicaid. These results are potentially important considering state Medicaid expansions were projected to have a transformative impact on substance abuse treatment. That said, our results are consistent with recent studies that have found either no change in the likelihood of receiving treatment (Olfson et al. 2018), or specialty treatment centers not changing their acceptance of Medicaid as a form of payment (Aletraris et al. 2017).

Our results on disability beneficiaries are consistent with those from other studies in the literature. In general, we find that expanding Medicaid did not have any impact on the number of disability beneficiaries. Previous studies have indicated that the effect of state Medicaid expansions are state specific. Thus, while it was expected that access to Medicaid would reduce disability caseloads, our results suggest this was not the case. In particular, we focused on the mechanism of the availability of substance abuse treatment. But it is possible that variation in access to other forms of healthcare could impact the number of disability beneficiaries.

There are several limitations to the present study. First, while our main source of substance abuse treatment is licensed substance abuse treatment facilities, we do not include unlicensed specialty providers, other relevant behavioral mental health programs and individual physicians who are waivered for buprenorphine. This is an important omission. However, there is no database that contains information on the location of unlicensed substance abuse treatment facilities currently or historically. Second, our empirical strategy relies on variation based on a crude measure of the supply for treatment, namely the number of treatment facilities. In future work, we will refine our categorization of high supply and low supply counties to account for differences in population size and potentially use information on facility size instead of the raw

number of facilities if the data are available to determine whether the baseline results in the study hold under these different definitions. To further ensure that our results are robust, we will also consider using additional empirical specifications as part of our next steps. For example, we could estimate a differences-in-difference model that uses cross state variation in Medicaid expansions, comparing treatment and control counties that had similar pre-ACA measures of supply. We could also compare counties that share a border, but are in different states, one of which expanded Medicaid and one that did not. Finally, we plan to explore the possibility of using synthetic controls to construct a set of counties that have similar pre-treatment characteristics and supply of licensed substance abuse treatment facilities as those in states with Medicaid expansions.

Our preliminary results suggest that there was no significant change in the likelihood of individual licensed treatment facilities would accept Medicaid as a form of payment due to state Medicaid expansions. This type of analysis is important given that several states are actively considering enacting similar measures that would increase the number of individuals enrolled on Medicaid. Given that the effect of state Medicaid expansions appear to be state-specific it will be important for researchers to continuously examine the effects of recent Medicaid expansions on the number of disability beneficiaries.

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Table 1: List of States with Medicaid Expansions

Medicaid Expansion Year	Count	States
2010	2	CT, DC
2011	4	CA, MN, NJ, WA
2014	21	AR, AZ, CO, DE, HI, IA, IL, KY, MA, MD, MI, ND, NH, NM, NV, NY, OH, OR, RI, VT, WV
2015	5	AK, IN, LA, MT, PA
2017	1	ME

Table 2: Percentage of Counties Included in Analysis

State	%
AK	1.5
AR	4.6
AZ	33.3
CA	58.6
CO	2.5
CT	100
DC	0
DE	100
HI	40
IA	5.2
IL	12.5
IN	13.6
KY	3.2
LA	11.6
MA	14.3
MD	47.6
ME	15.1
MI	17.2
MN	8.5
MT	1
ND	1.9
NH	5.8
NJ	86.5
NM	9.1
NV	11.8
NY	32.9
OH	21.9
OR	17.4
PA	31.6
RI	60
VT	0
WA	23.1
WV	0
Total	15.9

Table 3: Average Total Disability Beneficiaries by Pre/Post Medicaid Expansion

	Population Pre Expansion		Population Post Expansion		Analysis Sample Pre Expansion		Analysis Sample Post Expansion	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Total Disability Beneficiaries	1,952	3242	1,940	3,298	14,829	18,553	15,361	19,381
Observations	2,518		3,477		512		712	

Notes: Disability beneficiary data come from Social Security Administration, https://www.ssa.gov/policy/docs/statcomps/oasdi_sc/ Limited to t = -2 to 2

Table 4: County Counts of Substance Abuse Treatment Facilities in Year Prior to Medicaid Expansion

Number of Facilities	County Count	Percentage of Counties
0	1	0%
1-5	55	21%
6-10	61	24%
11-20	69	27%
>20	70	27%
Total	256	

Table 5: County Counts of Substance Abuse Treatment Facilities Accepting Medicaid in Year Prior to Medicaid Expansion

Number of Facilities	County Count	Percentage of Counties
0	6	2%
1-5	119	46%
6-10	61	24%
11-20	38	15%
>20	32	13%
Total	256	

Table 6: Number of Counties Categorized as Low and High Supply by Different High Supply Measures, defined based on year prior to Medicaid expansion

	Facility Count >= 50th Percentile		Facility Count Accepting Medicaid >= 50th Percentile		Fraction of Facilities Accepting Medicaid >= 0.50	
State	Low Supply	High Supply	Low Supply	High Supply	Low Supply	High Supply
AK	0	1	0	1	1	0
AR	2	2	2	2	4	0
AZ	2	3	0	5	3	2
CA	17	17	16	18	31	3
CO	0	1	0	1	0	1
CT	4	4	4	4	0	8
DE	1	2	1	2	0	3
HI	1	1	1	1	2	0
IA	2	2	0	4	0	4
IL	9	9	7	11	11	7
IN	8	8	8	8	6	10
KY	1	4	2	3	5	0
LA	4	4	4	4	1	7
MA	1	1	1	1	0	2
MD	6	6	6	6	2	10
ME	1	2	1	2	0	3
MI	8	8	7	9	2	14
MN	3	4	3	4	6	1
ND	0	1	0	1	1	0
NJ	9	10	9	10	11	8
NM	1	2	1	2	0	3
NV	1	1	1	1	0	2
NY	10	11	10	11	0	21
OH	8	13	10	11	1	20
OR	4	4	3	5	2	6
PA	10	10	10	10	0	20
RI	1	2	1	2	0	3
WA	4	5	4	5	4	5
Total	118	138	112	144	93	163

Table 7: Pre-Medicaid Expansion Summary Statistics by High and Low Supply Counties: High Supply = Facility Count >= 50th Percentile

	Low Supply		High Supply	
	Mean	SD	Mean	SD
Number of Substance Abuse Facilities	7.44	4.65	32.85	2,327.15
Number of Substance Abuse Facilities Accepting Medicaid	4.06	6.77	16.63	365.26
Public SSA Data				
Total Disability Beneficiaries	6,780	3,411	21,941	23,125
Worker Disability Beneficiaries	5,491	2,742	17,991	19,030
Spouse Disability Beneficiaries	96	63	268	357
Children Disability Beneficiaries	1,193	636	3,683	3,813
SSA Administrative Data				
Total DI Beneficiaries	7,098	3,615	23,596	25,558
American Community Survey Data				
Total Population	203,126	109,893	807,892	1,081,975
Age 65+	0.14	0.03	0.14	0.03
College Graduate or Higher	0.26	0.07	0.28	0.07
Unemployed	0.05	0.02	0.05	0.01
Black	0.07	0.08	0.12	0.12
Hispanic	0.11	0.15	0.14	0.13
Live in a Metro Area	0.88	0.32	0.96	0.19
Observations	118		138	

Table 8: Pre-Medicaid Expansion Summary Statistics by High and Low Supply Counties: High Supply = Facility Count Accepting Medicaid >= 50th Percentile

	Low Supply		High Supply	
	Mean	SD	Mean	SD
Number of Substance Abuse Facilities	8.44	85.08	31.04	2,243.75
Number of Substance Abuse Facilities Accepting Medicaid	3.69	6.01	16.40	349.96
Public SSA Data				
Total Disability Beneficiaries	7,098	4,768	21,062	22,815
Worker Disability Beneficiaries	5,763	3,897	17,258	18,777
Spouse Disability Beneficiaries	97	77	260	349
Children Disability Beneficiaries	1,238	819	3,544	3,763
SSA Administrative Data				
Total DI Beneficiaries	7,466	5,215	22,623	25,204
American Community Survey Data				
Total Population	234,143	297,334	758,569	1,050,873
Age 65+	0.14	0.03	0.14	0.03
College Graduate or Higher	0.26	0.07	0.28	0.07
Unemployed	0.04	0.01	0.05	0.01
Black	0.06	0.07	0.12	0.12
Hispanic	0.11	0.14	0.14	0.14
Live in a Metro Area	0.87	0.34	0.97	0.17
Observations	112		144	

Table 9: Effect of Medicaid Expansion on Supply of Facilities

	Number of Facilities	Number of Facilities Accepting Medicaid
	(1)	(2)
Post Medicaid Expansion	0.268	0.618
	-0.888	-0.729
Age 65+	113.960**	40.736
	-56.917	-31.044
College Graduate or Higher	-3.304	-0.261
	-6.537	-4.664
Unemployed	-13.816	-16.662
	-21.097	-12.199
Black	43.664	7.453
	-28.658	-16.114
Hispanic	107.573	30.105
	-128.315	-44.651
Live in a Metro Area	2.383*	-0.285
	-1.33	-0.44
Constant	-11.582	-1.716
	-19.505	-7.001
Observations	1,038	1,038
R-squared	0.991	0.988

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 10: Effect of Medicaid Expansion on Supply of Facilities Using Pre-Expansion Variation in County Supply

	High Supply = Facility Count >=50th Percentile		High Supply = Facility Count Accepting Medicaid >=50th Percentile	
	Number of Facilities	Number of Facilities Accepting Medicaid	Number of Facilities	Number of Facilities Accepting Medicaid
	(1)	(2)	(3)	(4)
Post Medicaid Expansion	1.110	0.399	1.223*	0.567
	(0.701)	(0.779)	(0.726)	(0.769)
High Supply	-22.294	-2.773	-0.929	-1.662
	(40.976)	(14.771)	(4.908)	(2.105)
Post Medicaid Expansion*High Supply	-1.799**	0.466	-1.995**	0.106
	(0.829)	(0.376)	(0.892)	(0.379)
Age 65+	90.901*	46.710	86.774*	42.186
	(49.572)	(29.772)	(48.858)	(29.540)
College Graduate or Higher	-2.262	-0.531	-3.239	-0.265
	(6.762)	(4.597)	(6.663)	(4.658)
Unemployed	-11.604	-17.235	-8.561	-16.942
	(20.552)	(12.178)	(19.896)	(12.332)
Black	41.351	8.053	43.568	7.458
	(28.092)	(15.877)	(28.813)	(16.095)
Hispanic	102.730	31.360	113.474	29.790
	(125.798)	(44.820)	(129.764)	(45.002)
Live in a Metro Area	1.934*	-0.168	1.844	-0.256
	(1.112)	(0.443)	(1.120)	(0.436)
Constant	-9.685	-2.208	-8.415	-0.173
	(18.675)	(6.950)	(14.590)	(5.928)
Observations	1,038	1,038	1,038	1,038
R-squared	0.991	0.988	0.991	0.988

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 11: Disability Beneficiary Outcomes, High Supply based on Facility Count >= 50th Percentile

	Public SSA Data			Administrative SSA Data		
	Fraction on Disability	Ln(Disability Beneficiaries)	Total Disability Beneficiaries	Fraction on Disability	Ln(Disability Beneficiaries)	Total DI beneficiaries
	(1)	(2)	(3)	(4)	(5)	(6)
Post Medicaid Expansion	0.000	0.006	9.016	0.000	0.005	86.692
	(0.000)	(0.004)	(83.930)	(0.000)	(0.005)	(89.434)
High Supply	0.013***	1.019***	14,001.566*	0.015**	1.021***	13,014.714*
	(0.005)	(0.134)	(8,229.636)	(0.006)	(0.150)	(7,366.237)
Post Medicaid Expansion*High Supply	-0.000	-0.000	266.404	-0.000	-0.004	47.812
	(0.000)	(0.004)	(169.495)	(0.000)	(0.008)	(166.111)
Age 65+	0.009	0.111	-5,090.094	0.012	0.200	4,569.641
	(0.015)	(0.349)	(9,950.690)	(0.035)	(0.782)	(11,651.378)
College Graduate or Higher	0.002	0.048	-664.002	0.002	0.036	-1,060.219
	(0.002)	(0.057)	(1,157.889)	(0.003)	(0.068)	(1,350.697)
Unemployed	0.006	0.074	4,817.777	0.005	-0.061	6,073.523
	(0.005)	(0.139)	(4,168.100)	(0.006)	(0.162)	(4,595.099)
Black	0.004	0.431**	4,010.428	0.008	0.513**	8,476.809
	(0.007)	(0.188)	(5,047.672)	(0.009)	(0.216)	(6,000.456)
Hispanic	-0.004	0.036	-26,445.500	-0.004	0.086	-22,456.233
	(0.015)	(0.408)	(25,281.313)	(0.017)	(0.419)	(22,535.359)
Live in a Metro Area	0.000	-0.010	-851.321***	0.000	-0.006	-790.163***
	(0.000)	(0.009)	(203.757)	(0.000)	(0.007)	(192.300)
Constant	0.019***	7.867***	5,971.701*	0.020***	7.931***	4,939.466
	(0.002)	(0.062)	(3,480.517)	(0.004)	(0.098)	(3,212.666)
Observations	1,038	1,038	1,038	1,038	1,038	1,038
R-squared	0.996	1.000	0.999	0.992	0.999	0.999

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

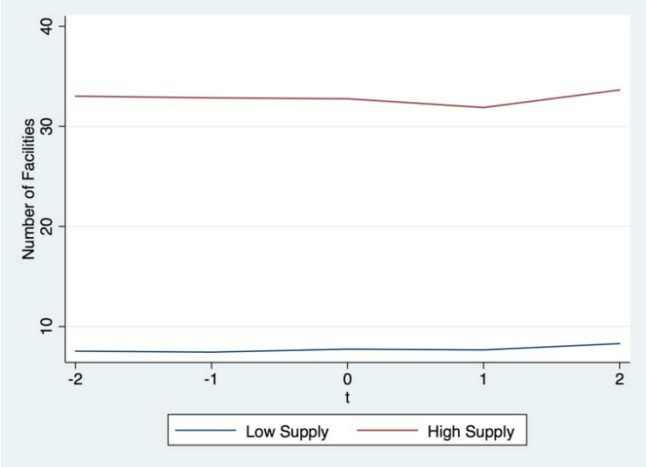
Table 12: Disability Beneficiary Outcomes, High Supply based on Facility Count Accepting Medicaid>= 50th Percentile

	Public SSA Data			Administrative SSA Data		
	Fraction on Disability	Ln(Disability Beneficiaries)	Total Disability Beneficiaries	Fraction on Disability	Ln(Disability Beneficiaries)	Total Disability Beneficiaries
	(1)	(2)	(3)	(4)	(5)	(6)
Post Medicaid Expansion	0.000	0.005	8.944	-0.000	0.004	84.996
	(0.000)	(0.004)	(87.563)	(0.000)	(0.005)	(93.501)
High Supply	-0.010***	-0.795***	-2.933.133***	-0.010***	-0.792***	-2,847.559***
	(0.001)	(0.023)	(1,079.663)	(0.001)	(0.029)	(990.903)
Post Medicaid Expansion* High Supply	0.000	0.002	260.749	-0.000	-0.002	50.313
	(0.000)	(0.005)	(177.813)	(0.000)	(0.009)	(172.049)
Age 65+	0.011	0.139	-4,951.239	0.014	0.221	4,642.470
	(0.015)	(0.348)	(9,856.492)	(0.035)	(0.795)	(11,628.919)
College Graduate or Higher	0.002	0.048	-518.140	0.002	0.034	-1,034.155
	(0.002)	(0.057)	(1,150.028)	(0.003)	(0.068)	(1,343.015)
Unemployed	0.006	0.069	4,458.470	0.005	-0.060	5,999.777
	(0.005)	(0.138)	(4,115.293)	(0.006)	(0.159)	(4,585.606)
Black	0.005	0.431**	3,680.448	0.009	0.518**	8,417.757
	(0.007)	(0.190)	(5,143.097)	(0.009)	(0.216)	(6,086.813)
Hispanic	-0.004	0.032	-27,934.191	-0.003	0.102	-22,733.812
	(0.015)	(0.403)	(25,797.550)	(0.016)	(0.401)	(22,935.393)
Live in a Metro Area	0.000	-0.010	-847.349***	0.000	-0.005	-788.500***
	(0.000)	(0.009)	(199.141)	(0.000)	(0.007)	(188.890)
Constant	0.028***	8.660***	8,893.097***	0.030***	8.721***	7,780.973***
	(0.002)	(0.056)	(2,646.919)	(0.005)	(0.113)	(2,588.645)
Observations	1,038	1,038	1,038	1,038	1,038	1,038
R-squared	0.996	1.000	0.999	0.992	0.999	0.999

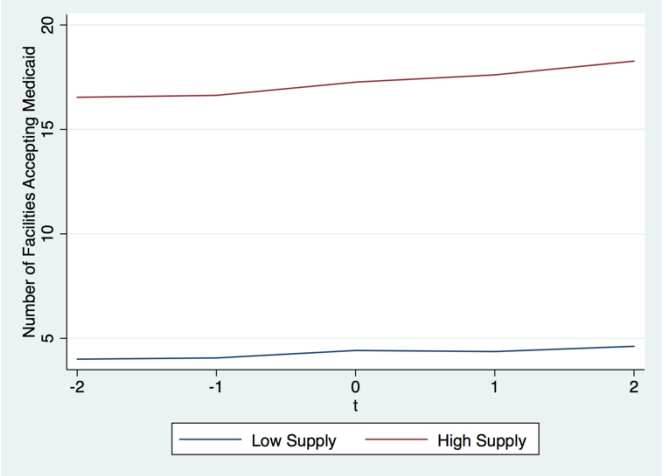
Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Figure 1: Facility Outcome Trends by High and Low Supply, High Supply = Facility Count > 50th Percentile

A. Number of Substance Abuse Treatment Facilities



B. Number of Substance Abuse Treatment Facilities Accepting Medicaid



C. Fraction of Facilities Accepting Medicaid

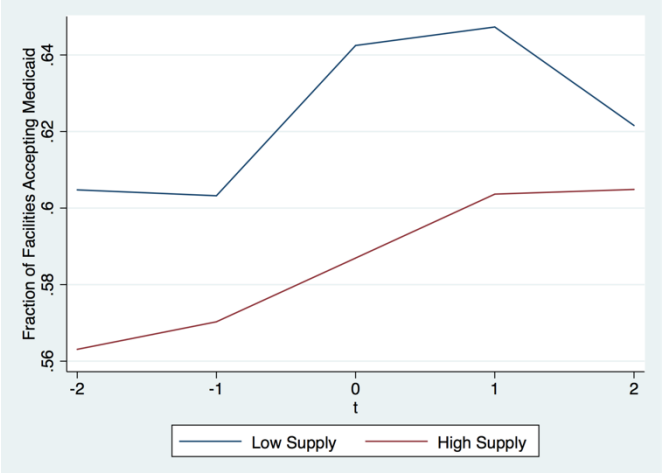
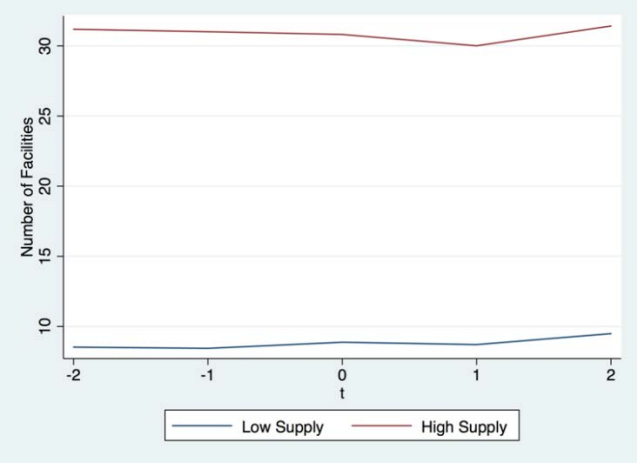
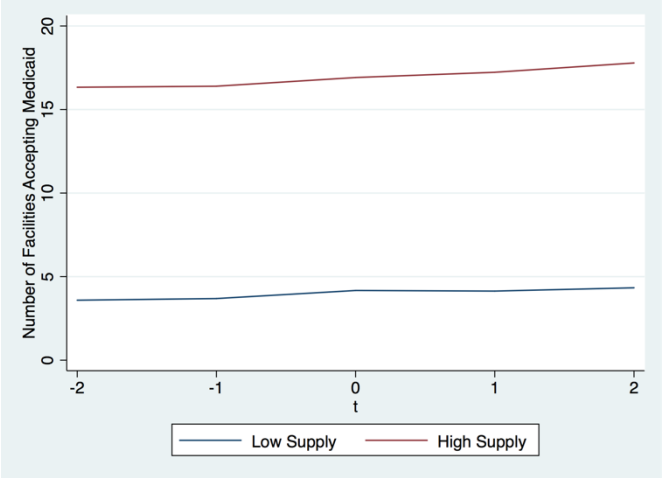


Figure 2: Facility Outcome Trends by High and Low Supply, High Supply = Facility Count Accepting Medicaid > 50th Percentile

A. Number of Substance Abuse Treatment Facilities



B. Number of Substance Abuse Treatment Facilities Accepting Medicaid



C. Fraction of Facilities Accepting Medicaid

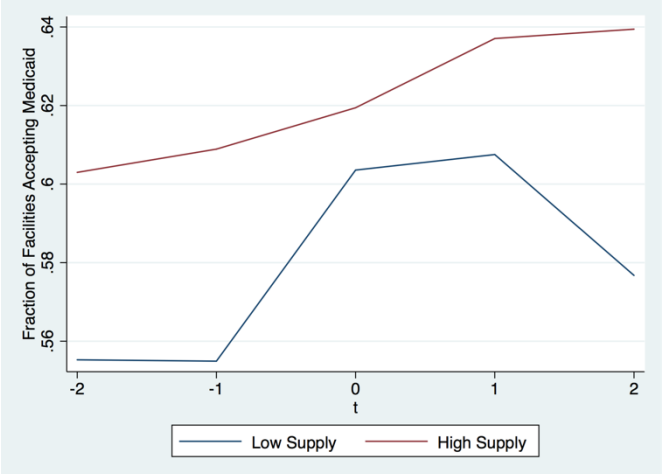
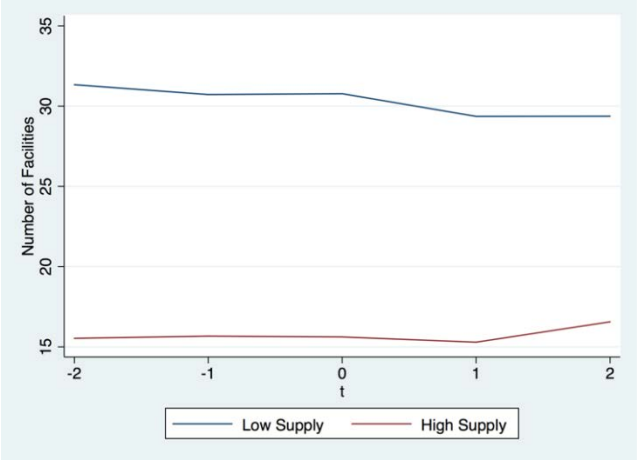
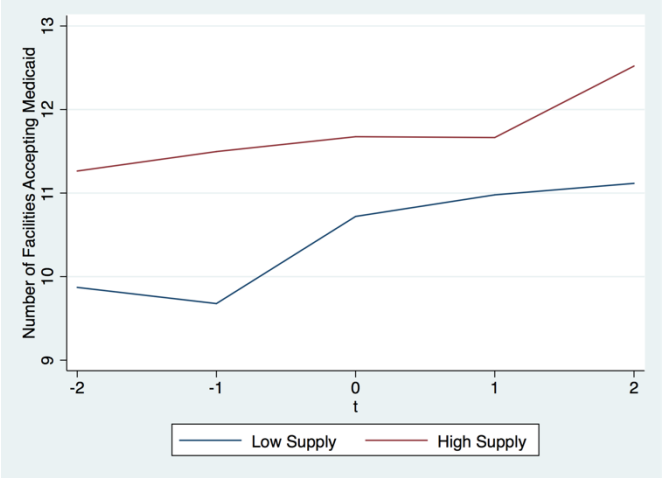


Figure 3: Facility Outcome Trends by High and Low Supply, High Supply = Fraction of Facilities Accepting Medicaid >= 50%

A. Number of Substance Abuse Treatment Facilities



B. Number of Substance Abuse Treatment Facilities Accepting Medicaid



C. Fraction of Facilities Accepting Medicaid

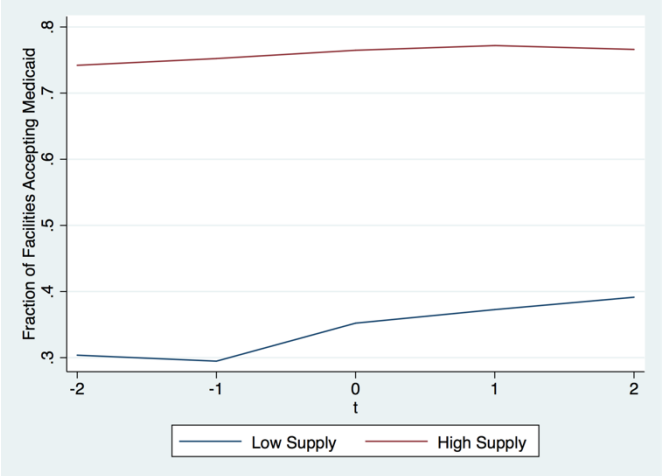
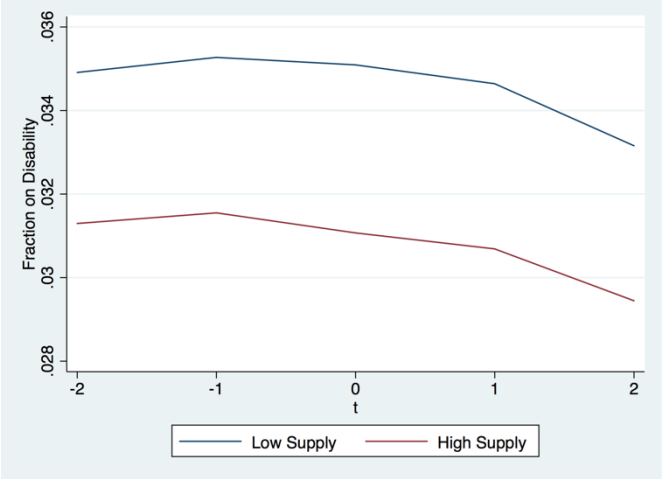
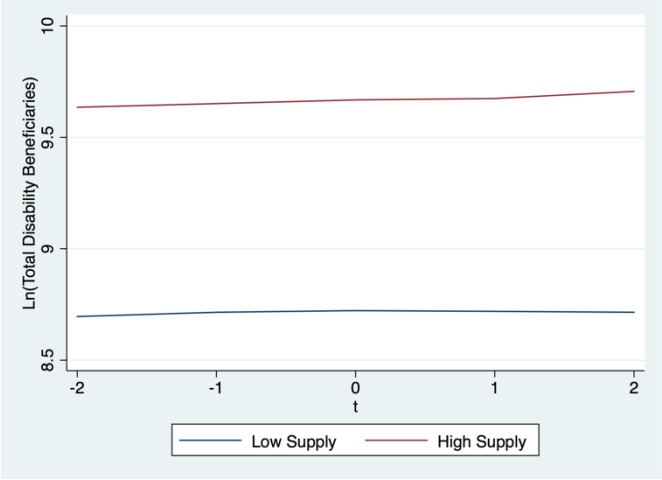


Figure 4: Disability Beneficiaries by High and Low Supply, High Supply = Facility Count > 50th Percentile

A. Fraction on Disability, Public SSA Data



B. Ln(Disability Beneficiaries), Public SSA Data



C. Total Disability Beneficiaries, Public SSA Data

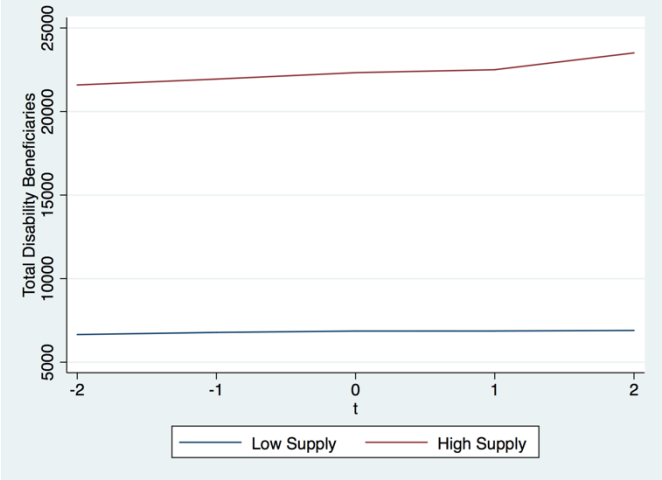
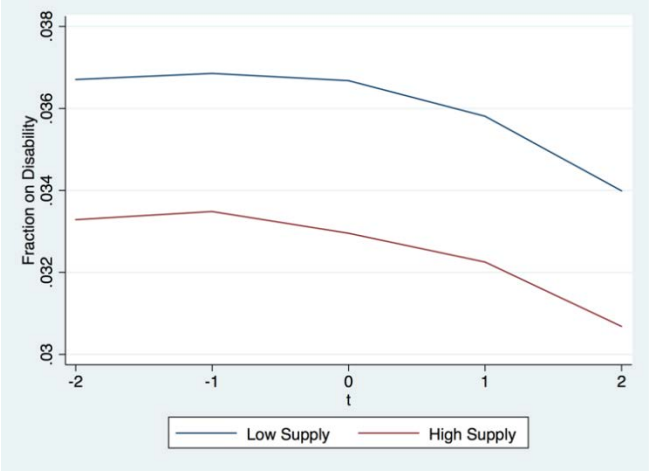
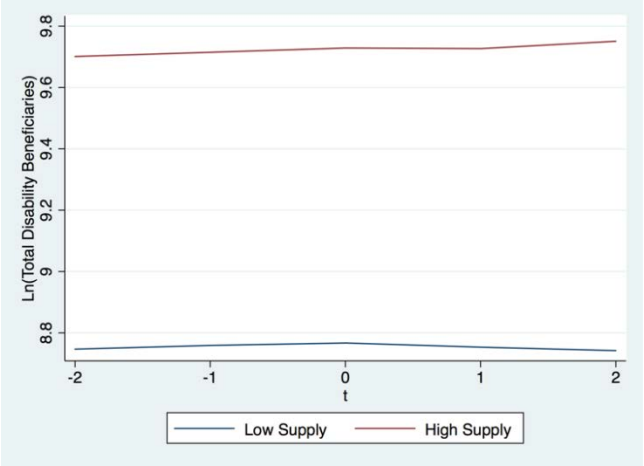


Figure 4: Disability Beneficiaries by High and Low Supply, High Supply = Facility Count > 50th Percentile

D. Fraction on Disability, Administrative SSA Data



E. Ln(Disability Beneficiaries), Administrative SSA Data



F. Total Disability Beneficiaries, Administrative SSA Data

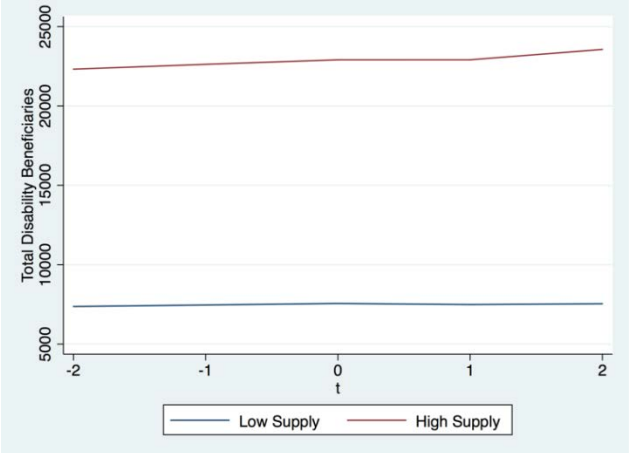
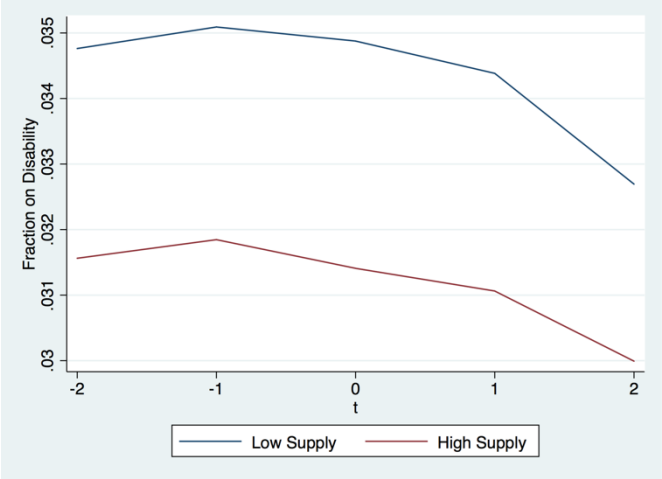
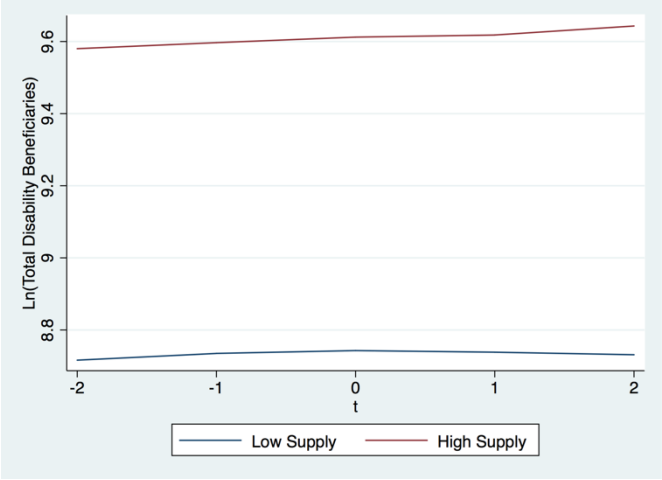


Figure 5: Disability Beneficiaries by High and Low Supply, High Supply = Facility Count Accepting Medicaid > 50th Percentile

A. Fraction on Disability, Public SSA Data



B. Ln(Disability Beneficiaries), Public SSA Data



C. Total Disability Beneficiaries, Public SSA Data

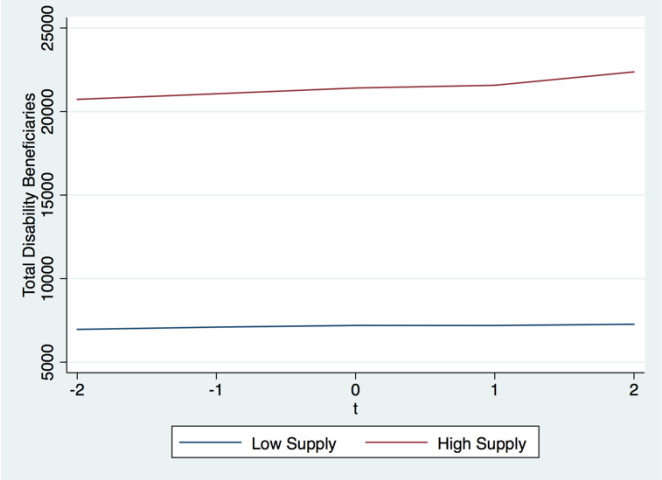
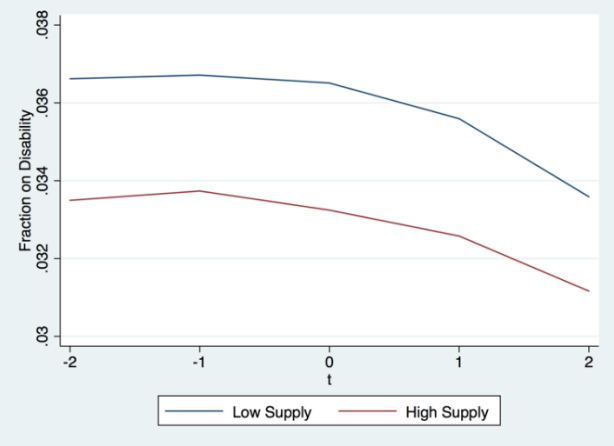
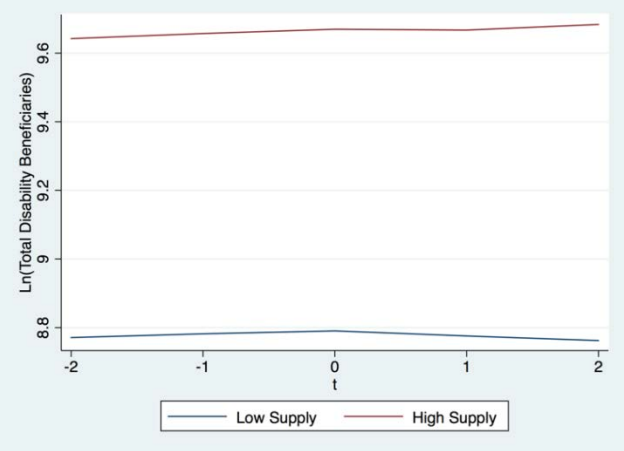


Figure 5: Disability Beneficiaries by High and Low Supply, High Supply = Facility Count Accepting Medicaid > 50th Percentile

D. Fraction on Disability, Administrative SSA Data



E. Ln(Disability Beneficiaries), Administrative SSA Data



F. Total Disability Beneficiaries, Administrative SSA Data