Health Insurance Expansions and Provider Behavior: Evidence from Substance Use Disorder Providers

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HEALTH INSURANCE EXPANSIONS AND PROVIDER BEHAVIOR: EVIDENCE FROM SUBSTANCE USE DISORDER PROVIDERS

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We examine how substance use disorder (SUD) treatment providers respond to private health insurance expansions induced by state parity laws for SUD treatment. We use data on the near universe of specialty SUD treatment providers in the United States 1997-2009. During this period, 16 states implemented SUD parity laws. Our findings suggest that admissions and client volumes increase following parity law passage, treatment shifts to less intensive settings, and quality is unchanged. Providers alter the type of payment they accept and patients they admit. We find no evidence that SUD parity laws improve public health, proxied by overdose deaths.

Keywords: healthcare; provider behavior; substance use disorders; health insurance mandates.

JEL codes: I1; I11; I18

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I. INTRODUCTION

In this study, we examine how substance use disorder (SUD) treatment providers respond to increases in private insurance coverage for SUD treatment attributable to state-level parity laws. SUD treatment providers are a component of the safety net healthcare system in the United States. Safety net providers 'deliver a significant level of healthcare to uninsured, Medicaid, and other vulnerable populations' (Institute of Medicine 2000). Such providers are important as they meet the healthcare needs of the most vulnerable members of society: the poor and the uninsured. However, such providers may themselves be somewhat vulnerable to market forces as they often operate with precarious financing, are unable to satisfy demand for services, rely on government contracts and grants for financing rather than insurance payments, and are slow to adopt modern administrative practices (e.g., electronic billing systems). Thus, such providers may be unable to respond optimally to demand-side shocks such as state-level parity laws.

State parity laws regulate coverage for SUD treatment in private health insurance plans. Previous studies show that these laws increase SUD treatment use, in other words, the quantity of treatment (Dave and Mukerjee 2011, McConnell, Ridgely et al. 2012, Wen, Cummings et al. 2013). Additionally, work by Pauly and Pagan (2007) suggests that the type of insurance held by individuals within a market can affect the quality of healthcare services. For example, if newly privately insured individuals demand different types of healthcare services, providers may respond by adjusting the type, and thus potentially the quality, of offered services towards those demanded by the newly privately insured. We build on these two strands of literature to better understand how SUD treatment providers respond to demand-side shocks, such as private health insurance expansions, which target particular segments of the population. Our findings may be informative for safety net provider behaviors more broadly.

There are several reasons why understanding factors that affect the quantity and quality of SUD treatment is important independent of economic interest in provider response to demand-side shocks. These reasons relate to the financial and non-financial costs SUDs impose on society. In terms of direct financial costs, the U.S. spends nearly $27B per year on SUD treatment (Substance Abuse and Mental Health Services Administration 2013).[1] The full costs of SUDs extend well beyond financial costs of addiction treatment, however. SUDs are linked with morbidity and mortality (Carpenter and Dobkin 2009, Carpenter and Dobkin 2011), increased use of general healthcare (Balsa, French et al. 2009, French, Fang et al. 2011), employment problems (Terza 2002, Mullahy and Sindelar 2008), crime and violence (Carpenter 2005, Carpenter 2007), traffic accidents (Adams, Blackburn et al. 2012, Adams, Cotti et al. 2013), use of social services (Jayakody, Danziger et al. 2000), and child maltreatment (Balsa 2008). Not surprisingly, the total annual economic costs, which incorporate both direct and indirect costs, of SUDs in the U.S. are estimated to be high: $743B (Caulkins, Kasunic et al. 2014).[2]

Although SUDs place a great burden on society, specialty treatment has been shown to reduce SUDs and their associated harms among treated patients (Rajkumar and French 1997, Lu and McGuire 2002, Stewart, Gossop et al. 2002, Kunz, French et al. 2004, Reuter and Pollack 2006). For example, Swensen (2015) documents that a 10% increase in the number of specialty SUD treatment providers lowers the SUD overdose rate by 2%. Thus, understanding how SUD providers respond to changes in coverage for treatment, such as those induced by private health insurance expansions, is important for promoting public health and minimizing social costs.

To study this question, we use highly-detailed data on the near universe of specialty SUD treatment providers in the U.S. between 1997 and 2009. Over this time period, 16 states

[1] The authors used the Consumer Price Index to inflate the original estimate ($24B in 2009 dollars) to 2015 dollars.
[2] The authors used the Consumer Price Index to inflate the original estimate ($700B in 2011 dollars) to 2015 dollars.

implemented parity legislation, offering a quasi-experiment with which to study parity impacts on the supply side of treatment (providers). Using a differences-in-differences design, we examine provider response along several margins: admissions, client volumes (the number of patients in treatment on a given day), treatment setting, offered treatments (a proxy for quality), accepted forms of payment, and client characteristics. We also explore heterogeneity by ownership status: for-profits vs. nonprofits. Lastly, we estimate the effect of parity laws on public health outcomes, which we proxy using overdose deaths attributable to SUDs.

Our findings suggest that SUD providers alter their care practices following SUD state parity law implementation. Consistent with previous studies, we show that annual admissions increase. We also find that client volumes increase, and this increase is mainly driven by treatment received in an outpatient setting. Thus, the share of treatment received in less intensive settings may increase following parity law passage. The bundle of offered treatments is largely unchanged. Providers alter the type of i) payment they are willing to accept and ii) clients they choose to admit into treatment in response to parity laws. In particular, following a parity law passage providers are more likely to accept private health insurance and less likely to accept public health insurance. In addition, providers are less likely to provide discounted care. These findings suggest a trade-off. While privately insured patients may gain access to treatment services following a parity law passage, some publicly insured and uninsured patients may lose access to these services. Providers admit a higher share of patients who were *ex ante* more likely to respond favorably to treatment following parity law passage. We identify heterogeneity by ownership status. We find no evidence that parity laws reduce overdose deaths attributable to SUDs. These findings have implications for predicting the impacts of the Patient Protection and Affordable Care Act (ACA) and the Mental Health Parity and Addiction Equity Act, two recent

pieces of legislation that are expected to increase access to SUD treatment for millions of Americans and transform the SUD treatment delivery system (Buck 2011).

This manuscript is organized as follows: Section II describes state-level SUD treatment parity laws and related literature. Data and methods are outlined in Section III. In Section IV we present our main findings and Section V reports robustness checks. Section VI concludes.

II. BACKGROUND AND RELATED LITERATURE

In this section, we first discuss Federal and state efforts to regulate SUD treatment services in private health insurance plans. Second, we review the available literature on SUD treatment and health insurance expansions for SUD treatment services and third, we provide a discussion of how ownership status may influence such responses.

A. Federal and State Efforts to Expand SUD Treatment Coverage

Historically, behavioral health treatment - substance use and mental health treatment - benefits have been covered less favorably than physical health benefits in health insurance plans – both public and private (Starr 2002). For myriad reasons, Medicaid has played a much more substantial role in financing mental health services than SUD services (Andrews, Grogan et al. 2015). Perhaps due to the limited coverage of SUD treatment in health insurance plans, federal block grants and state contracts that support safety-net treatment providers are the primary funding sources for SUD treatment in the U.S. (Substance Abuse and Mental Health Services Administration 2013, Andrews, Grogan et al. 2015).

1. Federal Reforms

We first consider Federal efforts to improve access to behavioral health services, including SUD benefits. The 1996 Mental Health Parity Act (MHPA), effective January 1998, addressed the differential coverage for physical and behavioral health treatment to some extent.

The Act mandated (with exclusions) that private group health insurance plans that covered mental health treatment cover this treatment at parity with physical health treatment in terms of aggregate lifetime and annual dollar limits. The Act had several important limitations for the provision of behavioral health treatment. Most notably, the Act did not include SUD treatment, did not require private health plans to cover mental health benefits, did not address financial inequalities (i.e., cost-sharing), and only regulated group plans.

The 2008 Mental Health Parity and Addiction Equity Act (MHPAEA), effective October 2009, addressed some loopholes in the MHPA. The MHPAEA prohibited (with exclusions) differences in treatment limits and cost-sharing and extended coverage requirements to SUD treatment services. However, the Act did not mandate that plans must provide SUD coverage. While both Acts represented steps toward equality of coverage between physical and SUD treatment, they did not result in full parity.

More recently, the ACA, effective January 2014, listed coverage for SUD treatment as one of ten required benefits for Medicaid plans and private insurance plans offered for sale on online health insurance exchange marketplaces. This Act extended the MHPAEA by mandating coverage rather than requiring parity only to plans that offered benefits and offers an opportunity for expanded access to SUD treatment for many Americans.

2. State Reforms

Given the historical dearth of federal regulation, states attempted to address less generous coverage for SUD treatment on their own by mandating that private health insurance plans provide coverage for such services.[3] The first state to implement a mandate for SUD treatment was Massachusetts in 1974 (National Council of State Legislatures 2015). By 2015 38 states had

[3] States have also extended coverage of SUD treatment through their Medicaid and State Children's Health Insurance (SCHIP) programs. These efforts are important, but are beyond the scope of this paper.

implemented some form of parity law for SUD treatment. Although there is substantial heterogeneity in states' regulatory efforts, these laws can be broadly classified into three categories (National Council of State Legislatures 2015).

First, 'full parity' or equal coverage laws prohibit private insurers from discriminating between coverage for SUD treatment and physical disorders. That is, full parity laws mandate that private insurers provide the same level of benefits for SUD treatment as for other physical disorders in terms of visit limits, cost-sharing (deductibles, co-payments, etc.), and lifetime and annual service limits. Second, 'mandated benefit' laws require that some minimum level of coverage be provided for SUD treatment. These laws are not considered full parity as they permit discrepancies between the level of benefits provided for SUD treatment and physical health treatment. Third, 'mandated offering' laws which come in two forms: 1) require that an option of SUD treatment be provided to the insured (this option can be accepted or rejected by the insured individual and, if accepted, the insurance contract typically requires a higher premium for SUD treatment) or ii) require that – if SUD benefits are offered – they must be equal. In general, full parity is considered the strongest type of regulation followed by mandated benefit laws and then mandated offer laws. For brevity, we refer to state laws that regulate coverage of SUD treatment – to any extent – in private health insurance plans as 'parity laws'.

B. Evidence from Previous Health Insurance Expansions

1. Treatment Utilization

Basic consumer demand theory suggests that the presence of insurance coverage for SUD treatment should increase the quantity of SUD treatment services demanded by reducing the price of SUD treatment to consumers (Abraham 2014). The question of whether, and to what extent, insurance increases the quantity of treatment demanded is a question of fundamental

interest to economists and policy makers alike. To this end, a set of studies has used private health insurance expansions to study the effect of insurance access on SUD treatment utilization. Many of these studies have relied on five expansions:[4] 1) the 2006 healthcare reform in the state of Massachusetts (this reform increased both private and public insurance coverage); 2) the Federal Employees Health Benefits program (Federal employees, roughly 8.5 million enrollees, gained access to full parity for SUD treatments in 2001); 3) the ACA dependent coverage provision (which was implemented in 2010 and required that private insurers offer coverage to dependent children of beneficiaries through the child's 26th birthday); 4) MHPAEA; and 5) state-level parity laws (as we do in our study).

Overall, a review of these studies paints a mixed picture of how utilization of SUD treatment may respond to health insurance coverage. Meara, Golberstein et al. (2014) examine changes in inpatient hospital care among young adults after the 2006 healthcare reform law in Massachusetts. The authors find substantively large declines in SUD-related emergency department use and inpatient hospitalizations, which could be attributable to expanded access to outpatient SUD treatment services. Studies that use variation in parity for SUD treatment generated by the Federal Employees Health Benefits program find that this parity law lead to, at most, modest increases in treatment utilization, but decreases in out-of-pocket payments for patients (Lo Sasso and Lyons 2004, Goldman, Frank et al. 2006, Azzone, Frank et al. 2011). A recent study by Busch, Epstein et al. (2014) uses insurance claims to examine the effect of MHPAEA on SUD treatment utilization. The authors use states that had not enacted parity prior to MHPAEA (2009) as a treatment group and states that had enacted parity as a control group. Findings suggest that Federal parity had little impact on SUD treatment utilization.

[4] There are numerous studies that examine individual decisions to obtain health insurance, but we focus our attention here on studies that examine changes in Federal or state laws as they are most comparable to our analysis.

A growing body of literature examines the effect of the ACA dependent coverage provision on general healthcare use (Antwi, Moriya et al. 2013). More recently, this literature has been extended to SUD treatment. Golberstein, Busch et al. (2015) find that the provision was associated with an increase in psychiatric admissions to hospitals, with SUD admissions accounting for the largest share of this increase. Using the National Survey of Drug Use and Health Saloner and Cook (2014) find that the provision had no effect on SUD treatment use. Saloner, Akosa et al. (2014) use the Treatment Episode Data Set, a national database of admissions to public sector SUD treatment providers, to study dependent coverage provision effects in this setting. The authors show that the provision decreased the number of admissions but increased the share of clients using private health insurance to pay for treatment. The findings of Saloner, Akosa et al. (2014) are consistent with the hypothesis that newly privately insured young adults may choose to receive care for their SUD in other settings.

Three recent studies use variation in insurance coverage for SUD treatment generated by state parity laws. Dave and Mukerjee (2011) document that parity laws not only increased the number of admissions to SUD treatment but also the fraction of clients admitted with private health insurance. Similarly, using data from the National Survey of Substance Abuse Treatment System (the data set we employ in our study), Wen, Cummings et al. (2013) find that state parity laws increased the number of admissions to SUD treatment by 9%. Lastly, McConnell, Ridgely et al. (2012) use a differences-in-differences design to study the effect of a full parity law in the state of Oregon, using Washington as a control group. Parity was found to increase alcohol use disorder treatment, but not illicit drug use disorder treatment.

An important point to consider when evaluating this body of literature is that each health insurance expansion has a different target group (in terms of both composition and size) and

occurred within a different treatment delivery system. For example, the ACA dependent coverage provision affects young adults (19 to 25 years) with parents who hold private insurance while the Massachusetts healthcare reform affected a wide range of individuals and expanded both private and public insurance coverage. Thus, the extent to which one should expect comparable estimates across expansions hinges on a willingness to accept the idea of homogenous treatment effects.

2. Supply of Treatment

To the best of our knowledge, only a handful of studies examine how the supply side of SUD treatment reacts to demand-side shocks induced by insurance coverage expansions (Capoccia, Grazier et al. 2012, Buchmueller, Miller et al. 2014, Maclean and Saloner 2015). Two studies examine the 2006 healthcare reform in Massachusetts and another examines public health insurance expansions. While this information cannot reconcile differences in findings across studies, it can shed new light on how the type, and potentially quality, of care changes.

Capoccia, Grazier et al. (2012) document that the Massachusetts reform did not substantially increase admissions to treatment, increased facility revenues, and shifted payment source from safety net funders to insurers (primarily Medicaid). Though qualitative interviews with facility administrators, Capoccia, Grazier et al. (2012) found that administrative burdens and patient cost-sharing hindered expansion. However, the authors considered just five providers and did not consider the full range of treatment options (e.g., inpatient services). Moreover, the lack of a comparison group raises questions as to the causal interpretation of the findings.

Maclean and Saloner (2015) use the National Survey of Substance Abuse Treatment Services (the data set we utilize) to examine provider response to the reform. The authors find that Massachusetts providers altered their care practices following the reform relative to a group

of comparison states. In particular, following the reform, admissions and client volumes increased, service offerings increased, programs for special populations decreased, the mixture of accepted payments forms shifted toward private insurance, and provision of discounted care decreased in Massachusetts relative to a (nearly) national sample of comparison states. Findings were generally stronger among for-profits than nonprofits.

Buchmueller, Miller et al. (2014) examine how dentists respond to Medicaid coverage expansions. The authors document that, following expansions, dentists' participation in the Medicaid market increased. Dentists treated more Medicaid patients and did not reduce provision of care to privately insured patients. Such providers use substitutes (e.g., hygienists) more intensely in order to offer more care following expansions. Relatedly, a handful of papers document that public health insurance expansions may induce providers to adopt new technologies (Clemens 2013, Freedman, Lin et al. 2015).

C. The Importance of Ownership

Whether, and to what extent, SUD treatment providers respond to increased coverage for treatment services could depend on their ownership status. Research on hospitals suggests potential differences in expenditures, treatment offerings, and quality of care by ownership status (Sloan, Picone et al. 2001, Silverman and Skinner 2004, Horwitz 2005). In particular for-profit hospitals are more likely than government or nonprofit hospitals to respond to incentive changes to minimize costs and maximize revenues. Moreover, there is some evidence that SUD treatment provider behavior may also vary across ownership status (Richter, Choi et al. 2004, Bachhuber, Southern et al. 2014, Swensen 2015). We expect that for-profit SUD treatment providers will be more responsive to increased demand from newly privately insured clients.

D. Factors That May Mute SUD Treatment Providers' Response to Parity Laws

Several features of the SUD treatment delivery system may limit providers' ability to respond to increased coverage of SUD benefits (Andrews 2014). First, long term contracts with service providers (Center for Substance Abuse Treatment 1998) may limit providers' ability to absorb new patients and/or alter treatment offerings. Second, state-level staffing requirements, both in terms of staff quantity and certification, (Andrews 2014) may prevent providers from optimally responding to increases in coverage. Third, administrative capacity and other supply side factors may impede the ability of providers to optimally respond to economic incentives, including changes in coverage for treatment. Fourth, SUD treatment providers often operate with precarious finances (Institute of Medicine 2000), and therefore may lack capital resources necessary to expand treatment (e.g., build new facilities). Fifth, although the privately insured offer a new revenue source for providers, previous financial support from the Federal block grant and state contracts may be more generous and/or allow for more flexibility on the part of providers. Grants and contracts offer lump sums of financial support while insurers reimburse for specific patients and treatments received.

Finally, the number of individuals affected by state-level private health insurance mandates may simply be too small to induce a response from providers. Jensen and Morrisey (1999) estimate that this affected share is roughly 33% to 42% of the state population. Many private insurers voluntarily offer non-mandated benefits (including SUD treatment) and therefore state laws may have little to no 'bite' for individuals covered by such policies (Gruber 1994). Additionally, those who suffer from SUDs, and are therefore likely to need treatment, are less likely to hold private insurance (Levit, Kassed et al. 2008, Bouchery, Harwood et al. 2012, Rowan, McAlpine et al. 2013).

III. DATA AND METHODS

A. National Survey of Substance Abuse Treatment Services (N-SSATS)

We use the N-SSATS as our primary source of data. These data are ideal for our study as they provide detailed information on all providers known to the Substance Abuse and Mental Health Services Administration (SAMHSA) that offered specialty SUD treatment between 1997 and 2012. We focus here on the years 1997 to 2009.[5] We truncate the sample in 2009 as MHPAEA became effective in October 2009. SAMHSA defines a specialty SUD treatment facility as a hospital, a residential facility, an outpatient treatment facility, or other facility with an SUD treatment program that offers the following services: 1) outpatient, inpatient, or residential/rehabilitation treatment; 2) detoxification treatment; 3) opioid treatment (e.g., methadone maintenance); and 4) halfway-house services.

The N-SSATS data provide a 'snap shot' of one day of a provider's operations. Between 1997 and 2000 the survey day was September 1st, and March 1st thereafter. N-SSATS administrators send a survey to all known providers each year. A staff member familiar with the facility's operations completes the survey. Over our study period (1997 to 2009) the N-SSATS response rates ranged from 86% to 97%. The N-SSATS is an unbalanced panel of providers and our analysis data set consists of 144,878 provider/year observations located in the U.S. (we exclude non-U.S. providers). We aggregate the N-SSATS data to the state year level.

B. State Parity Laws

Our source of variation is changes in state parity laws between 1997 and 2009. We use information on state parity laws maintained by the National Council of State Legislatures (2015) and our own reading of the original state statutes. As noted earlier in the manuscript, state regulations of SUD treatment in private health insurance plans can be categorized into three

[5] The N-SSATS has undergone several major survey re-designs. Due to these survey re-designs no data are available for 1999 or 2001.

broad groups: i) full parity, ii) mandated benefits, and iii) mandated offer. Several states implemented what we refer to as 'weak' parity laws during this period. Such laws extend full parity to specific beneficiary groups (state employees, Veterans, those receiving mental health services). We include these states in our definition of mandated offer as they are unlikely to impact a large share of the population.

During our study period 16 states implemented a state parity law: seven states (Connecticut, Delaware, Maryland, Minnesota, Oklahoma, Virginia, and West Virginia) implemented full parity, five states (Alaska, Indiana, Oregon, Tennessee, and Texas) implemented a minimum mandated benefit law, and four states (Colorado, Florida, Louisiana, and New Mexico) implemented a mandated offer/weak parity law.

Several other states implemented parity laws in 1997, but they offer no variation during our study period. Moreover, states that adopted parity laws before and after our study period do not offer variation in our empirical models. Adopting states and effective years (regardless of whether or not they occurred during our study period) are presented in Table 1. In our analysis, we match effective dates to the N-SSATS survey day and thus our coding departs from the actual effective date for some states. For example, while Alaska passed a mandated benefit law in July 2004 this law would not affect the N-SSATS outcomes in 2004 as the survey was fielded on March 1st (before the law effective date).[6] We include a third column in Table 1 that indicates the relevant 'effective' year in the N-SSATS data. For Alaska this year is 2005.

We construct two variables based on the parity laws: i) an indicator of any law (full parity, mandated benefits, or mandated offer) and ii) an indicator of a strong law (full parity or mandated benefits). These laws may affect specific groups of insurance contracts (e.g., group

[6] Providers could anticipate the passage of a parity law and alter their care practices pre-emptively. In unreported analyses, we re-estimate our models using a lag in the parity variables which should, to some extent, capture anticipatory behaviors on the part of providers. Results are broadly comparable.

only) or the full population. We chose not to report results for full parity as such models rely on just seven 'changer' states for identification and, as described in the next section, a sub-set of our outcome variables are only available 2000-2009, further reducing the number of changer states to just one state (West Virginia in 2002).

A feature of our study period that is important for interpreting our findings is that we identify treatment effects off 16 changer states. While these changer states vary in terms of geography, size, income, demographics, and social and political norms, they may not be representative of the full U.S. population. Unfortunately, there is no clear solution to this issue.

C. Outcome Variables

We consider a range of possible margins along which specialty SUD treatment providers may respond to changes in coverage for SUD treatment. First, we examine annual admissions to treatment and the total number of clients in the facility on the census day. We also examine the number of clients across two treatment modalities: inpatient (hospital and residential) and outpatient. These categories are not mutually exclusive across providers: a provider may provide treatment in more than one modality (this is true for 12.1% of providers in our sample). Inpatient care arguably captures a more intensive, and costly, form of treatment than outpatient care. If the newly privately insured are able to access inpatient care, we may observe 'treatment upgrading' from outpatient to inpatient on the part of providers (for example, it may be difficult for previously uninsured individuals to access costly forms of treatment). On the other hand, it may be less costly for providers to expand outpatient care (Capoccia, Grazier et al. 2012). For example, it is plausibly less costly to hire a therapist than construct a new hospital room.

Second, to assess the degree to which providers alter the bundle of offered treatments in response to state parity laws, we consider the number of testing and ancillary services (variable

range: 0-22),[7] and programs for special populations (variable range: 0-6).[8, 9] We also consider an indicator for use of any pharmacotherapies to treat addiction.[10] These services are viewed by national addiction experts as critical components of effective SUD treatment (National Institute on Drug Abuse 2012). If, for example, such treatments are of more value to privately insured individuals, we might expect that providers will increase these treatment offerings following state parity law implementation (Pauly and Pagan 2007). We view these services as, albeit imperfect, proxies for quality of treatment.

Third, we examine accepted forms of payment: private insurance, public insurance (Medicaid, Medicare, state financed, Federal military), and self-payment or other payment forms ('self-pay'). We also consider the provision of discounted or free care to the poor as measured by acceptance of a sliding-fee-scale (that is, the facility offers lower fees to clients with lower incomes), other payment assistance programs, and provision of free care ('discounted care'). These outcomes are important to study as they represent care provided to the most vulnerable segments of the population: those clients who have limited or no means to pay for treatment.

As the share of privately insured individuals increases within a state, we might expect that providers shift towards accepting such patients and away from patients with other, or no, insurance forms. However, such behavior is predicated on the fact that privately insured patients

[7] Testing and ancillary services include comprehensive SUD assessment at intake, comprehensive mental health assessment at intake, alcohol blood testing, alcohol/illicit drug urine testing, HIV/AIDS testing, other STD testing, TB testing, discharge planning, aftercare counseling, child care, social services assistance, employment assistance, housing assistance, domestic violence education, HIV/AIDS education, transportation assistance, acupuncture, individual counseling, group counseling, family counseling, and outcome follow-up after discharge.
[8] Special programs include adolescents, dually diagnosed, women, pregnant/postpartum women, and other groups. This variable is not truly continuous as it takes on just seven values. In unreported analyses, we constructed an indicator for any special program and re-estimated our regression models. Results are not appreciably changed.
[9] In selecting the special programs and testing services to include, we chose those services that were reported in each year of the N-SSATS between 1997 and 2009.
[10] Although the specific pharmacotherapies collected in N-SSATS change across survey year, we include the following pharmacotherapies where available: antabuse, naltrexone, buprenorphine, methadone, campral, nicotine replacement, medications for psychiatric disorders, and smoking cessation products.

are in fact more profitable to the provider, which may be the case for some but not all services (Ku and Broaddus 2008).

Payment and discounted care variables were added to the N-SSATS in 2000, thus we can only study these outcomes for the period 2000-2009.[11] During this period seven states implemented parity laws. Moreover, with these variables we are able to study the extensive margin of provider participation in these markets only. In other words, we can observe changes in whether a provider participates in a particular market (e.g., accepts public insurance) but not the intensity of participation in the market (e.g., share of publicly insured clients in treatment).

Fourth, we consider characteristics of clients in treatment. If SUD providers can be more selective about the type of patient they admit, we may observe shifts in client characteristics (i.e., 'cream skimming'). Although examination of accepted forms of payments allows us to examine this possibility to some extent, we try to provide further evidence on provider selectivity. We use the share of clients in treatment for i) alcohol and illicit drug use disorder (poly-substance use), and ii) alcohol or illicit drug use disorder (mono-substance use). Previous research suggests that clients suffering from poly-substance use disorders are less responsive to SUD treatment (Dutra, Stathopoulou et al. 2008, Martinotti, Carli et al. 2009). If providers engage in cream-skimming, we might expect that the share of clients in treatment for mono-substance (poly-substance) use will increase (decrease) following the enactment of a parity law. A limitation of these variables is that we cannot separate clients who misuse one or more illicit drugs, and such patterns of use also constitute poly-substance use.

We consider heterogeneity in provider response based on ownership status. Specifically, we separately consider providers operated by a private for-profit organization ('for-profits') or

[11] In unreported analyses, we re-ran our regression models for all outcomes on the period 2000-2009. Results, available on request, are not appreciably changed.

nonprofit ('nonprofits') organization. We categorize both private nonprofit and government (local, county, or community; state; or Federal) organizations as nonprofits. As described earlier in the manuscript, we expect that for-profit providers will be more likely to respond to changes in demand-side shocks, such as parity laws, in ways that maximize profits than other providers.

D. State-level Control Variables

SUD treatment provider behaviors are plausibly influenced by myriad factors. We attempt to control for a detailed set of variables in our regression models to proxy such factors. To this end, we merge data from several other sources into the N-SSATS on state and year.

First, we merge in the share of the population that is employed by a large firm (500 or more employees) from the U.S. Census Bureau as such firms are more likely to self-insure and thus be exempt from state SUD parity laws (Jensen and Morrisey 1999, Kaiser Family Foundation 2014). Second, we merge state year level demographic variables (sex, age, race/ethnicity, marital status, education, family income) from the Annual Social and Economic Supplement to the Current Population Survey.[12]

Third, we include variables that proxy state preferences towards substance use and addiction treatment: the state beer tax (in dollars) from the Brewers' Almanac (The Beer Institute 2012), an indicator for marijuana decriminalization (Pacula, Chriqui et al. 2003), an indicator for legalization of medical marijuana (Pacula, Powell et al. 2013), and annual funding from the Substance Abuse Prevention and Treatment (SAPT) block grant program (obtained from SAMHSA). Funds from this program are used by states to support SUD prevention and treatment services. We inflate all monetary values to 2009 using the Consumer Price Index –

[12] Income data in the ASEC pertains to the past year and we merge these data into the N-SSATS on lagged year.

Urban Consumers. Lastly, we include the state level population from the U.S. Census to proxy for differences in the size of the population potentially seeking SUD treatment.[13]

E. Empirical Model

We estimate the relationship between state parity laws and specialty SUD treatment service provision with the following regression model:

$$(1) \qquad Y_{st} = \alpha_0 + \alpha_1 P_{st} + \alpha_2' X_{st} + \alpha_3 PE_s * t_t + \theta_s + \tau_t + \varepsilon_{st}$$

Y_{st} is a measure of specialty SUD treatment provider behavior in state *s* in year *t*. P_{st} is an indicator for a parity law (any law or a strong law) in state *s* in year *t*.[14] X_{st} is a vector of state demographics and policies that may influence specialty SUD treatment provider behavior. PE_s is an indicator variable that takes on a value of one if a state ever enacted a parity law before or during our study period (i.e., on or before 2009) and zero otherwise. t_t is a linear time trend that takes on a value of 2000, 2001, and so forth. We interact the indicator for ever passing a parity law with the time trend to allow for different trends in the outcome variables between the 'treatment' and 'control' groups (i.e., states that ever passed a parity law and states that did not at any point pass a parity law before or during our study period). θ_s and τ_t are vectors of state and year fixed effects. State fixed effects capture time invariant state-level characteristics that influence provider behavior while year fixed effects capture changes in specialty SUD treatment provider behavior that emerge overtime at the national level (e.g., new pharmaceuticals to treat SUDs). Lastly, ε_{st} is the error term.

We utilize least squares (LS) for all outcomes. We cluster the standard errors around the state (Bertrand, Duflo et al. 2004). In all analyses, we weight each state year observation by the

[13] We considered including state-level measures of need for SUD treatment (e.g., SUD prevalence rates). However, such data are not available for our full study period (1997-2009). In addition, need for SUD treatment may be influenced by SUD treatment parity laws and including measures of need in our regression models could lead to over-controlling bias. For these reasons, we choose not to include need for treatment in our regression models.
[14] In unreported analyses, we use a lag in parity law. Results, available on request, are broadly robust.

number of providers in the state in that year as indicated by the N-SSATS data (unweighted results are not appreciably different and are available on request). In robustness checking reported later in the manuscript we include state-specific linear time trends in our regression models to more flexibly control for between-state differences.

IV. RESULTS

A. Summary Statistics

Table 2 reports summary statistics for our sample. The average number of annual admissions is 312, with average total, inpatient, and outpatient client volumes of 88, 27, and 98 clients respectively. The average number of offered services is 12 while the average number of special programs is 2. Pharmacotherapies are used for addiction treatment in 35% of providers in our sample. The share of providers that accept private health insurance, public health insurance, and self-payment are 68%, 66%, and 91% respectively. 78% of providers offer some form of discounted care. The share of patients in treatment for alcohol and illicit drug treatment is 54%, the remainder of patients are in treatment for alcohol or illicit drug treatment. 52% of state year observations in our analysis sample have any parity law in place and 38% of state year observations have a strong parity law (mandated benefit or full parity). State demographics are consistent with the U.S. population.

We also report in Table 2 summary statistics separately by i) states that passed a parity law before or during our study period and ii) states that did not. We examine the statistical significance of these differences using two-tailed *t*-tests. In general, states that passed and did not pass a parity law on or before 2009 are broadly comparable in terms of our outcome variables. Although there are differences in the mean values, the differences are generally not statistically distinguishable from zero. Exceptions are special programs and acceptance of private health

insurance. Providers located in states that passed a parity law before or during our study period have somewhat lower numbers of special programs (1.6 vs 1.8) but were more likely to accept payment from private insurers (0.70 vs. 0.65).

There are differences between the two groups of states in terms of demographic, and policy and social norm variables. States that passed parity laws have slightly older populations, have higher (lower) proportions of female (minorities), are less educated, and are smaller. The pattern of differences between these two groups of states in terms of our SUD policy and social norm variables is less clear, however. For example, states that pass a parity law have higher beer taxes and are less likely to decriminalize marijuana than states that do not pass parity laws.

B. Regression Analysis of Annual Admissions and Client Volumes

Table 3A reports results for annual admissions and client volumes. We take the logarithm of these outcome variables, therefore coefficient estimates have the interpretation of an approximation to the percent change. We find that parity laws increase the number of annual admissions and client volumes, however estimates are only statistically different from zero for strong parity laws (mandated benefits or full parity). Moreover, effects for client volumes are driven by outpatient client volumes, suggesting that overall treatment shifts to less intensive (and less costly) settings following passage of a parity law. Specifically, we find that implementation of a strong parity law increases total admissions by 8.7%, total client volume by 10.6%, inpatient client volume by 5.0%, and outpatient client volume by 11.4% (the coefficient on inpatient volumes is not statistically different from zero, however).

C. Regression Analysis of Offered Treatments

We next examine whether, and to what extent, specialty SUD providers alter the bundle of offered treatments following parity law implementation. We view these variables as proxies

for treatment quality. Results are reported in Table 3B. The estimates do not suggest that providers substantially alter their services, programs, or pharmacotherapy use following implementation of a state parity law. Only one coefficient estimate is statistically distinguishable from zero, and then only at the 10% level: the strong parity coefficient in the any pharmacotherapies regression, the sign is negative suggesting that providers may reduce use of pharmacotherapies. Half of the coefficient estimates are negative and half are positive, however.

D. Regression Analysis of Accepted Payment Forms and Discounted Care

Table 3C reports results from our analysis of the effects of state parity laws on the types of payments SUD providers are willing to accept and provision of discounted care. We find evidence that, following passage of a state parity law, providers increase (decrease) acceptance of private (public) health insurance and decrease their provision of discounted care. In terms of private health insurance acceptance, following implementation of any (a strong) parity law providers increase acceptance of private insurance by 2.1 percentage point or 3.0% (1.7 percentage points or 2.4%). Only the any parity law estimate is statistically different from zero, however. We identify any parity law effects off 7 changer states and strong parity law effects off 5 changer states (see Table 1). Although we might expect stronger laws to induce more response from providers, it may be that the increased variation in the any parity laws simply gives us more power to estimate treatment effects. We find that passage of any (a strong) law leads to a 2.0 (2.6) percentage point or 3.1% (3.9%) decrease in the share of providers accepting public health insurance as a form of payment.

Moreover, passage of a parity law, any law and a strong law respectively, leads to a 4.0 (3.7) percentage point or 5.1% (4.8%) decrease in the probability of provision of discounted care. The coefficients are broadly comparable across the two models in terms of both statistical

significance and magnitude, and 95% confidence intervals overlap. We find no statistically significant evidence that providers alter acceptance of self-payments. These findings provide suggestive evidence that public health insurance and discounted care are potentially crowded out of specialty SUD treatment following parity law implementation.

E. Regression Analysis of Client Characteristics

We next attempt to shed light on the degree to which specialty SUD treatment providers may alter the type of client they admit following private health insurance expansions. In particular, if newly privately insured are, on average, more desirable to treat we might expect that the composition of clients changes following the law passage. As noted earlier in the manuscript, we proxy client desirability/cream skimming on the part of providers using the share of clients in treatment for poly-substance use (alcohol and illicit drugs). Findings (Table 3D), although never statistically different from zero, suggest that providers may decrease the share of patients in treatment for both alcohol and illicit drug use by 0.5% to 1.4% (findings for alcohol or illicit drug use are essentially reversed). This pattern of results suggests that cream-skimming behavior may occur. However, given the imprecision of our estimates we cannot draw strong conclusions from this analysis.

F. Heterogeneity by Ownership Status

We expect that providers operating under different ownership statues to respond differentially to demand-side shocks induced by state-level parity laws. Tables 4A, 4B, 4C, and 4D report regression results for annual admissions and client volumes, offered treatments, accepted forms of payments, and cream-skimming behaviors for i) for-profits (top panel) and ii) nonprofits (bottom panel).

Our results are broadly consistent with our hypothesis that for-profits and nonprofits respond differently to state parity law implementation for most outcomes we consider here. In terms of admissions, the coefficient estimate is only precisely estimated in the nonprofit sample (although only at the 10% confidence level) suggesting that increases in the number of clients admitted to treatment is driven by nonprofits only. The client volume effects are precisely estimated only in the for-profit sample (total client volumes and outpatient client volumes increase, while inpatient volume effects are not precisely estimated). Combining findings from admissions and client volumes, this pattern of results provides some suggestive evidence that for-profits may increase intensity of treatment: the number of admissions is unchanged following a parity law passage, but the number of clients in treatment on a given day increases. These findings are consistent with the hypothesis that length of stay, a measure of treatment intensity, is increasing among for-profit providers. However, we do not want to place too much credence in this hypothesis as there may be other mechanisms at play.

As in the full sample, we find little evidence that for-profits and nonprofits alter the bundle of treatments (our proxy for quality of care) they offer in response to state parity laws. For-profits may reduce the number of offered services (the coefficients are negative in both regressions, but only statistically distinguishable from zero in the any parity regression, and only at the 10% level). We find somewhat stronger evidence that nonprofits reduce the use of pharmacotherapies following parity law passage: the coefficients are negative and statistically distinguishable from zero at the 5% level in the strong parity regression.

For-profits and nonprofits also respond differently in terms of accepted forms of payments following a state parity law implementation (Table 4C). Only for-profits reduce acceptance of public health insurance. Thus, for-profits accepting private and public insurance

may choose, when they serve insured clients, to serve exclusively privately insured clients following a parity law passage. Contrawise, nonprofits increase acceptance of private insurance. Both types of providers reduce provision of discounted care, although findings are more precisely estimated among nonprofits.

Finally, we find strong evidence of cream-skimming behavior among for-profit providers only. The findings suggest that for-profits admit fewer patients in need of treatment for poly-substance use following parity law passage. Although imprecisely estimated, the signs of the coefficient estimates are reversed in the nonprofit sample.

G. Regression Analysis of Overdose Death Rates

Thus far we have considered how providers respond to private health insurance expansions. It may also be informative to examine whether these expansions influence public health. To address this question, we examine how the passage of state-level parity laws influences overdose death rates. We use data on total overdoses (alcohol and illicit drug), alcohol overdoses, and illicit drug overdoses from the Centers for Disease Control and Prevention Compressed Mortality Files 1999 to 2009.[15] Thus, we have less variation with which to identify treatment effects for these outcomes (see Table 1). Because these data are at the annual level (i.e., we do not know when any particular death occurred), we match the state parity laws to the overdose death data in the following manner. We code a law as a one in year *t* if it became effective between January 1st and June 30th, otherwise we code the law as zero in year *t* and one in year *t+1*. We take the logarithm of the rate per 100,000 individuals (population data is from

[15] We classify the following ICD-10 codes as SUD overdose deaths: alcohol (F10.0, X45, X65, and Y15) and illicit drugs (F11.0, F12.0, F13.0, F14.0, F15.0 F16.0, F19.0, X41, X42, X43, X44, X60, X61, X62, X63, X64, X85, Y10, Y11, Y12, Y13, and Y14). The ICD system was revised in 1999 (ICD-9 to ICD-10) and, to the best of our knowledge, there is not a validated approach to crosswalk SUD deaths across the two sets of codes.

the U.S. Census Bureau), thus coefficients have an interpretation of an approximation to the percent change, and weight regressions by the state population. Results are reported in Table 5.

We find no evidence that the passage of a state parity law reduces overdose death rates. The coefficients are generally small and indistinguishable from zero. Indeed, in one regression (alcohol overdose death regression which includes an indicator for a strong parity law) the coefficient estimate suggests that law passages actually *increases* the overdose rate (statistically different from zero at the 10% level).

Although our null finding is perhaps surprising, it may be that changes in treatment attributable to private insurance expansions may not lead to meaningful changes in SUD within the population. We find that the increases in treatment quantity appear to be driven by outpatient treatment, a less intensive treatment setting. Perhaps this treatment does not influence the type of client who is likely to experience an overdose death. Moreover, we find that quality (at least as measured by some of our variables) may decline following passage of a parity law. We only measure a small set of quality measures, if quality declined in other ways that we cannot measure in N-SSATS this may explain the null findings for overdose deaths. Relatedly, perhaps the type of individual who gains access to SUD treatment through a private health insurance expansion is not likely to experience this outcome (i.e., overdose death). On the other hand, our overdose measure captures just one, extreme and acute, measure of SUDs. Future studies could more rigorously address this question using alternative data sources that capture different patterns of SUDs that may be more responsive to parity laws (e.g., binge drinking, substance use-related emergency room episodes, drinking and driving).

V. EXTENSIONS AND ROBUSTNESS CHECKS

We next describe robustness checks we conduct to assess the sensitivity of our findings to alternative modeling approaches. For brevity, we do not report analyses in tables, but results are available on request.

A. Facility Composition

We consider whether the number of providers offering SUD treatment changes in response to state-level parity laws. For example, in response to increases in private insurance coverage new providers may enter the market. Such a response might suggest that our main findings are driven by compositional shifts in the type of provider offering care rather than parity laws inducing providers to alter their care practices. To study this question, we model the (logarithm of the) number of providers (total, for-profit, and nonprofit) in a state as function of state parity laws and other controls using Equation (1) with least squares. We find no evidence that providers enter the market following a parity law passage. Interestingly, we find some evidence, which is generally imprecise, that the number of providers *declines* following the passage of a state parity law. However, we note that this is a rather crude test of compositional shifts as we only observe the number of providers in a state.

B. Alternative Controls for Between State Differences

In our core models, we control for unobservable differences between states with state fixed effects. Including these fixed effects allow us to control for time invariant characteristics of the state that may influence both parity law passage and our outcomes. We also allow treatment and control states to follow different, linear trends in these models. We next augment our model with state-specific linear time trends where each state is allowed to follow a different linear trend over time. Results generated in these models are broadly consistent with our core findings. However, coefficient estimates are somewhat smaller and less precisely estimated. We rely on

just 16 changer states in the full sample and 7 changer states in the payment sample, and we have data for just 11 years. Including state-specific linear time trends may ask too much of our data.

C. Massachusetts Healthcare Reform

In April 2006, the state of Massachusetts began to implement an ambitious reform of its healthcare system. The objective of the reform was to obtain near universal coverage for its population. Previous research shows that the provision increased coverage and affected health and healthcare use (Kolstad and Kowalski 2012, Miller 2012, Courtemanche and Zapata 2014), as well as SUD provider behavior (Capoccia, Grazier et al. 2012, Maclean and Saloner 2015). The reform required individuals to purchase health insurance plans that covered a minimum set of benefits. One of these benefits was SUD treatment (The Massachusetts Health Insurance Connector Authority 2008). Low income groups covered by the Massachusetts' Medicaid program also had access to such benefits (Kaiser Family Foundation 2015).

Therefore, it is reasonable to ask whether our findings are disproportionately influenced by the Massachusetts experience as we include this state in our analysis. In our sample, we treat Massachusetts as strong parity state for all years in our study period. To assess this possibility we re-run all analyses excluding the state of Massachusetts. Results are robust.

VI. DISCUSSION

Understanding how providers respond to health insurance expansions, in particular those expansions that target particular segments of the population, is important to both economists and policy makers alike. However, to the best of our knowledge little evidence on this question exists (Capoccia, Grazier et al. 2012, Clemens 2013, Buchmueller, Miller et al. 2014, Freedman, Lin et al. 2015, Maclean and Saloner 2015). In this study we provide new information on how SUD

treatment providers alter their care practices in response to the passage of state-parity laws for SUD treatment in private health insurance plans.

We find that SUD providers alter their care practices in several ways: they increase admissions and client volumes, shift treatment to less intensive settings, alter the type of payment forms they are willing to accept (increase/reduce acceptance of private insurance/public insurance), decrease provision of discounted care, and select patients who are *ex ante* more likely to respond to treatment. Moreover, we find evidence that for-profits and nonprofits respond in different ways to parity law passage. Finally, we find no evidence that parity laws influence public health as proxied by overdose deaths.

It may be worthwhile to consider why we find little evidence that providers do not increase the number of services, programs, and use of pharmacotherapies following a parity law. Indeed, we find some evidence that providers may have decreased treatment quality. First, it may be that insurance expansions cause providers to shift away from non-reimbursed services (Kolstad and Kowalski 2012). Second, providers may lack the resources or capacity to fully respond to increases in coverage. That is, such providers face a trade-off in terms of increasing access (admissions, client volumes) and specific treatments (for example, offering a particular service such as childcare requires additional resources that may only benefit a small share of clients). Thus, providers may find it most feasible to expand access overall, but not specific treatments. Moreover, as providers rely less on financing from Federal block grants and state agency contracts, they may have less ability to initiate specific programs, services, and pharmacotherapies. This decision, in conjunction with other factors, may have implications for treatment success and is consistent with our null findings for overdose deaths.

Our study may have important implications for predicting the full effect of the ACA and MHPAEA. If one is willing to extrapolate from our analysis to these policies, collectively the ACA and MHPAEA may lead to an increase in the number of patients who receive specialty SUD treatment. However, treatment may be more likely to be received in less intensive settings (outpatient). An important finding is that unless reimbursement and cost-containment strategies (e.g., medically necessary reviews) are standardized across insurance contracts (public and private), some insured individuals may be unable to access needed treatments. Moreover, individuals who remain uninsured, roughly 11% of the population will remain uninured through 2016 (Congressional Budget Office 2013), may be unable to access treatment. Lastly, providers may cherry pick the most desirable patients in the post ACA/ MHPAEA era.

Although our study is novel in several ways, it is not without limitations. First, due to our study window (1997 to 2009), our main analysis relies on variation from just 16 'changer' states (and just 7 changer states for our analysis of accepted forms of payments and discounted care). We argue that these changer states vary across geography, size, income, demographics, and substance use and treatment social norms. However, it is not clear how well our findings may generalize to the broader U.S. Second, although the N-SSATS is a rich data and, in our opinion, the best available data set to study this question, it lacks information on key variables: staffing (quantity and quality), prices/costs, and detailed client characteristics. Third, our findings represent a combination of supply and demand side factors. It is not possible to fully isolate the relative contribution of each factor (for example, following a parity law passage, newly privately insured patients may demand more services).

Finally, our classification of SUD parity laws follows coding provided by the National Council of State Legislatures (2015) and our own reading of the original statutes. Different

studies apply different coding schemes, even when the same underlying source documents are used to construct the coding scheme (Dave and Mukerjee 2011, Wen, Cummings et al. 2013).

In summary, we offer new evidence on how SUD providers respond to demand side shocks that target particular segments of the population. Moreover, providers respond along several margins, not simply by admitting additional patients. Such unequal expansions have implications for the quantity and quality of care, and the composition of individuals who are able to receive such care. Because SUD providers are a classic example of safety net healthcare providers, our findings may be informative for other, similar provider types.

Table 1. State parity laws effective dates

Law	Effective month and year	N-SSATS effective year
Full parity		
Arkansas	November, 1987	1988
Connecticut	January, 2000	2000*
Delaware	January, 1999	1999*
Hawaii	1988 (no month listed)	1988
Illinois	July, 2010	2011
Maryland	October, 1997	1998*
Minnesota	1999 (no month listed)	1999*
New Jersey	July, 1985	1985
Oklahoma	January, 2000	2000*
Rhode Island	1994 (no month listed)	1994
Vermont	January, 2011	2011
Virginia	January, 2000	2000*
West Virginia	2002 (no month listed)	2002*
Mandated benefits		
Alaska	July, 2004	2005*
Indiana	June, 2003	2004*
Iowa	January, 2011	2011
Kansas	July, 2009	2010
Maine	1984 (no month listed)	1984
Massachusetts	December, 1973	1974
Michigan	January, 1982	1982
Mississippi	January, 1975	1975
Missouri	July, 1991	1991
Montana	September, 1987	1988
Nebraska	1980 (no month listed)	1980
Nevada	1979 (no month listed)	1979
New Hampshire	1975 (no month listed)	1975
North Dakota	1985 (no month listed)	1985
Ohio	1979 (no month listed)	1979
Oregon	2007 (no month listed)	2007*
Pennsylvania	1990 (no month listed)	1990
Tennessee	July, 2000	2000*
Texas	April, 2005	2006*
Wisconsin	December, 2010	2011
Mandated offer/weak parity		
Colorado	January, 2003	2003*
Florida	1993 (no month listed)	1993
Georgia	1998 (no month)	1998*
Indiana	June, 1997	1997
Louisiana	January, 2009	2009*
New Mexico	July, 1999	1999*
New York	January, 2011	2011
North Carolina	July, 1997	1997
South Carolina	1976 (no month provided)	1976
Tennessee	1982 (no month provided)	1982
Utah	March, 2010	2011

Notes: Source is the National Conference of State Legislatures Mental Health Benefits Database (accessed May 5th, 2015) and original statutes.

*Law change occurred during study period (1998-2009). We do not consider law changes in 1997 as these changes do not offer variation in our differences-in-differences models. If no month is listed, we assume that the law passage occurred in January of the effective year. The N-SSATS survey month is September 1st between 1997 and 2000, and March 1st from 2002 onward.

Table 2. Summary statistics: N-SSATS 1997-2009

Sample:	Full sample	Ever pass parity law*	Never pass parity law*	Difference (*p*-value)**
Annual admissions and client volumes				
Annual admissions	311.5	319.1	300.3	0.1987
Total client volumes	88.38	86.60	90.99	0.9566
Inpatient client volumes	26.64	26.04	27.52	0.6179
Outpatient client volumes	97.53	93.35	103.7	0.9705
Offered treatments				
Services	11.59	11.51	11.71	0.4198
Special programs	1.703	1.618	1.829	0.0214
Any pharmacotherapies	0.354	0.369	0.332	0.2572
Accepted forms of payments and provision of discounted care†				
Private health insurance	0.681	0.700	0.652	0.0461
Public health insurance	0.659	0.682	0.625	0.5723
Self/other payment	0.914	0.917	0.910	0.5723
Discounted care	0.782	0.772	0.797	0.7466
Share of patients in treatment by substance				
Alcohol and illicit drug treatment	53.62	53.28	54.12	0.6669
Alcohol or illicit drug treatment	46.24	46.58	45.74	0.6735
Parity variables				
Any parity	0.516	0.867	--	--
Strong parity (mandated benefits or full parity)	0.379	0.636	--	--
State characteristics and policies				
Large firm ratio	0.0195	0.0215	0.0165	0.3138
Age	36.20	36.54	35.68	0.0001
Female	0.510	0.511	0.509	0.0425
Male	0.490	0.489	0.491	0.0425
White	0.811	0.812	0.810	0.0012
Non-white	0.189	0.188	0.190	0.0012
Hispanic	0.134	0.0998	0.184	0.0386
Less than high school	0.198	0.193	0.205	0.0525
High school or more education	0.802	0.807	0.795	0.0525
Family income	74,830	74,597	75,172	0.2066
Population (millions)	12.14	8.326	17.76	0.0278
Beer tax (dollars)	0.262	0.292	0.218	0.0120
Marijuana decriminalized	0.389	0.277	0.555	0.0120
Medical marijuana legalized	0.274	0.170	0.426	0.0428
Federal block grant funding for SUD treatment (millions)	79.73	48.90	125.1	0.0033
Observations	561	385	176	

Notes: The unit of observation is a state in a year. Observations are weighted by the number of providers in the state/year pair.

*Ever pass parity law refers to ever passing a parity law of any form before or during our study period (i.e., on or before 2009).

**Differences in variables between ever passing and never passing states conducted with a two-tailed *t*-test.

†Accepted forms of payment information only available between 2000 and 2009.

Table 3A. Effect of state parity laws on annual admissions and client volumes: N-SSATS 1997-2009

	Log admissions	Log total clients	Log inpatient clients	Log outpatient clients
Untransformed sample mean	311.5	88.38	26.64	97.53
Any parity law	-0.0027	0.0391	0.0066	0.0453
	(0.0712)	(0.0508)	(0.0568)	(0.0577)
Strong parity law†	0.0871**	0.1062**	0.0501	0.1136**
	(0.0423)	(0.0477)	(0.0537)	(0.0541)
Observations	561	561	561	561

Notes: The unit of observation is a state in a year. All models estimated with least squares and control for demographics, population, SUD policies, state and year fixed effects, and a separate linear time trends for states that did and did not ever pass a parity law on or before 2009. Observations are weighted by the number of providers in a state/year pair. Standard errors are reported in parentheses and clustered at state level.

†A strong parity law is defined as a law that requires mandated benefits or full parity.

***;**;*=statistically different from zero at the 1%;5%;10% level.

Table 3B. Effect of state parity laws on offered treatments: N-SSATS 1997-2009

	Services	Special programs	Any pharmacotherapies
Sample mean	11.59	1.703	0.354
Any parity law	-0.2166	0.0442	0.0126
	(0.1526)	(0.0556)	(0.0322)
Strong parity law†	-0.0864	0.0203	-0.0279*
	(0.1240)	(0.0582)	(0.0144)
Observations	561	561	561

Notes: The unit of observation is a state in a year. All models estimated with least squares and control for demographics, population, SUD policies, state and year fixed effects, and a separate linear time trends for states that did and did not ever pass a parity law on or before 2009. Observations are weighted by the number of providers in a state/year pair. Standard errors are reported in parentheses and clustered at state level.
†A strong parity law is defined as a law that requires mandated benefits or full parity.
***;**;*=statistically different from zero at the 1%;5%;10% level.

Table 3C. Effect of state parity laws on accepted forms of payments and provision of discounted care: N-SSATS 2000-2009

	Accept private	Accept public	Accept self-pay	Discounted care
Sample mean	0.681	0.659	0.914	0.782
Any parity law	0.0206**	-0.0204*	0.0096	-0.0395**
	(0.0084)	(0.0102)	(0.0108)	(0.0159)
Strong parity law†	0.0166	-0.0257**	0.0051	-0.0372***
	(0.0111)	(0.0124)	(0.0111)	(0.0135)
Observations	459	459	459	459

Notes: The unit of observation is a state in a year. All models estimated with least squares and control for demographics, population, SUD policies, state and year fixed effects, and a separate linear time trends for states that did and did not ever pass a parity law on or before 2009. Observations are weighted by the number of providers in a state/year pair. Standard errors are reported in parentheses and clustered at state level.
†A strong parity law is defined as a law that requires mandated benefits or full parity.
***;**;*=statistically different from zero at the 1%;5%;10% level.

Table 3D. Effect of state parity laws on client characteristics: N-SSATS 1997-2009

	Percent of clients in treatment for alcohol & illicit drugs	Percent of clients in treatment for alcohol or illicit drugs
Sample mean	53.62	46.24
Any parity law	-0.2688	0.2225
	(1.0126)	(1.0415)
Strong parity law†	-0.7441	0.5913
	(1.0435)	(1.0933)
Observations	561	561

Notes: The unit of observation is a state in a year. All models estimated with least squares and control for demographics, population, SUD policies, state and year fixed effects, and a separate linear time trends for states that did and did not ever pass a parity law on or before 2009. Observations are weighted by the number of providers in a state/year pair. Standard errors are reported in parentheses and clustered at state level.
†A strong parity law is defined as a law that requires mandated benefits or full parity.
***;**;*=statistically different from zero at the 1%;5%;10% level.

Table 4A. Effect of state parity laws on annual admissions and client volumes, by ownership status: N-SSATS 1997-2009

	Log admissions	Log total clients	Log inpatient clients	Log outpatient clients
For-profit				
Untransformed sample mean	311.47	91.63	25.95	95.35
Any parity law	-0.0053	0.0812	-0.1341	0.0733
	(0.0797)	(0.0900)	(0.1282)	(0.0968)
Strong parity law†	0.1019	0.1769**	0.0134	0.1678*
	(0.0703)	(0.0830)	(0.1488)	(0.0926)
Nonprofit				
Untransformed sample mean	333.79	88.35	26.82	99.61
Any parity law	0.0001	0.0138	-0.0040	0.0167
	(0.0751)	(0.0662)	(0.0539)	(0.0723)
Strong parity law†	0.0899*	0.0900	0.0324	0.0949
	(0.0462)	(0.0605)	(0.0483)	(0.0669)
Observations	561	561	561	561

Notes: The unit of observation is a state in a year. All models estimated with least squares and control for demographics, population, SUD policies, state and year fixed effects, and a separate linear time trends for states that did and did not ever pass a parity law on or before 2009. Observations are weighted by the number of providers in a state/year pair. Standard errors are reported in parentheses and clustered at state level.

†A strong parity law is defined as a law that requires mandated benefits or full parity.

***;**;*=statistically different from zero at the 1%;5%;10% level.

Table 4B. Effect of state parity laws on offered treatments, by ownership status: N-SSATS 1997-2009

	Services	Special programs	Any pharmacotherapies
For-profit			
Sample mean	10.51	1.611	0.3537
Any parity law	-0.4551*	-0.0051	0.0287
	(0.2447)	(0.0672)	(0.0365)
Strong parity law†	-0.1523	0.0546	-0.0159
	(0.2220)	(0.0684)	(0.0267)
Nonprofit			
Sample mean	12.07	1.758	0.3634
Any parity law	-0.2260	0.0193	-0.0139
	(0.1417)	(0.0634)	(0.0313)
Strong parity law†	-0.1503	-0.0221	-0.0425**
	(0.1300)	(0.0638)	(0.0194)
Observations	561	561	561

Notes: The unit of observation is a state in a year. All models estimated with least squares and control for demographics, population, SUD policies, state and year fixed effects, and a separate linear time trends for states that did and did not ever pass a parity law on or before 2009. Observations are weighted by the number of providers in a state/year pair. Standard errors are reported in parentheses and clustered at state level.

†A strong parity law is defined as a law that requires mandated benefits or full parity.

***;**;*=statistically different from zero at the 1%;5%;10% level.

Table 4C. Effect of state parity laws on accepted forms of payments and provision of discounted care, by ownership status: N-SSATS 2000-2009

	Accept private	Accept public	Accept self-pay	Discounted care
For-profit				
Sample mean	0.7075	0.5680	0.9811	0.5985
Any parity law	-0.0100	-0.0703**	0.0034	-0.0503
	(0.0171)	(0.0283)	(0.0088)	(0.0308)
Strong parity law†	-0.0141	-0.0862***	0.0045	-0.0549*
	(0.0197)	(0.0282)	(0.0091)	(0.0322)
Nonprofit				
Sample mean	0.6803	0.71067	0.8890	0.8503
Any parity law	0.0378***	-0.0113	0.0158	-0.0336**
	(0.0122)	(0.0110)	(0.0122)	(0.0144)
Strong parity law†	0.0264***	-0.0123	0.0096	-0.0340***
	(0.0096)	(0.0109)	(0.0127)	(0.0118)
Observations	459	459	459	459

Notes: The unit of observation is a state in a year. All models estimated with least squares and control for demographics, population, SUD policies, state and year fixed effects, and a separate linear time trends for states that did and did not ever pass a parity law on or before 2009. Observations are weighted by the number of providers in a state/year pair. Standard errors are reported in parentheses and clustered at state level.
†A strong parity law is defined as a law that requires mandated benefits or full parity.
***;**;*=statistically different from zero at the 1%;5%;10% level.

Table 4D. Effect of state parity laws on client characteristics, by ownership status: N-SSATS 1997-2009

	Percent of clients in treatment for alcohol & illicit drugs	Percent of clients in treatment for alcohol or illicit drugs
For-profit		
Sample mean	47.61	52.17
Any parity law	-3.9371**	4.1022***
	(1.4734)	(1.4556)
Strong parity law†	-3.3551*	3.8056**
	(1.6999)	(1.6973)
Nonprofit		
Sample mean	56.13	43.75
Any parity law	1.2530	-1.3372
	(1.1902)	(1.1898)
Strong parity law†	0.1249	-0.4173
	(1.1723)	(1.1705)
Observations	561	561

Notes: The unit of observation is a state in a year. All models estimated with least squares and control for demographics, population, SUD policies, state and year fixed effects, and a separate linear time trends for states that did and did not ever pass a parity law on or before 2009. Observations are weighted by the number of providers in a state/year pair. Standard errors are reported in parentheses and clustered at state level.

†A strong parity law is defined as a law that requires mandated benefits or full parity.

***;**;*=statistically different from zero at the 1%;5%;10% level.

Table 5. Effect of state parity laws on overdose death rates: CDC Compressed Mortality Files 1999-2009

	Log overdose death rate	Log illicit drug overdose death rate	Log alcohol overdose death rate
Untransformed sample mean	9.582	2.487	7.095
Any parity law	-0.0724	0.0296	-0.0964
	(0.0532)	(0.0616)	(0.0609)
Strong parity law†	0.1039	0.1265*	0.1141
	(0.1136)	(0.0674)	(0.1402)
Observations	510	510	510

Notes: The unit of observation is a state in a year. All models estimated with least squares and control for demographics, population, SUD policies, state and year fixed effects, and a separate linear time trends for states that did and did not ever pass a parity law on or before 2009. Observations are weighted by the population in a state/year pair. Standard errors are reported in parentheses and clustered at state level.

†A strong parity law is defined as a law that requires mandated benefits or full parity.

***;**;*=statistically different from zero at the 1%;5%;10% level.

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