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The effects of mandated health insurance benefits for autism on out-of-pocket costs and access to treatment

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Abstract

As of 2013, 31 states have in effect health insurance mandates specifically pertaining to Autism Spectrum Disorders (ASD). These mandates require many private health insurance policies to cover diagnostic and treatment services for ASD. In this paper, we explore whether state ASD mandates are associated with out-of-pocket costs and financial burden related to privately insured children's treatment, and cost or insurance-related problems with access to treatment. We use difference-in-difference (DD) and difference-in-difference-in-difference (DDD) approaches, comparing pre-post mandate changes in outcomes among children with special health care needs who have ASD vs. children with special health care needs other than ASD. Data come from the 2005–2006 and 2009–2010 waves of the National Survey of Children with Special Health Care Needs. Based on the model used, our findings show no statistically significant association between state ASD mandates and caregivers' reports about access to care and unmet need for services. There are no consistent effects of mandates on caregivers' reports of having adequate insurance coverage, or on needing but not being able to access services due to cost or insurance barriers. Moreover, we find no effects of mandates on out-of-pocket spending for children's health care needs. We caution that we do not study the characteristics of ASD mandates, and most ASD mandates have gone into effect very recently during our study period. It may take time for these mandates to have measurable effects on families affected by ASD.

Keywords

health insurance mandates; mental health; child health; autism

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I. Introduction and Background

Autism spectrum disorders (ASD) are a group of developmental disorders, typically apparent by age three, that are characterized by impaired development in socialization, communication, and behavior (MMWR, 2009). Financing services for children with autism spectrum disorders is a growing concern among families, private and public insurers, and policymakers at the state and federal level (US GAO, 2005; CAHI, 2009; Holland, 2010; Sharpe & Baker, 2007). This growing concern primarily stems from three issues. First, identification of ASD has increased dramatically in recent years. In 2011–2012, the prevalence of parent-reported diagnosed ASD among school-aged children was 2 percent, or 1 in 50 children, an increase from a prevalence rate of 1.2 percent in 2007 (Blumberg et al., 2013). ASD is now considered to be the second most common serious developmental disability (intellectual disability is first) affecting children in the United States (Newschaffer et al., 2007).

Second, depending on the severity of the disorder, treatment for ASD tends to be extensive, multi-faceted, individualized, and, as a result, costly (Sharpe & Baker, 2007, Amendah et al., 2011).[1] Prior research based on data such as national surveys (Liptak et al., 2006, Liptak et al., 2008), private health insurance claims (Shimbabukuro, Grosse and Rice 2008; Leslie and Martin 2007), a managed care organization (Croen et al., 2006;) and state Medicaid programs (Mandell et al. 2006, 2008) indicates that children with ASDs have high utilization of health services, particularly psychiatric services and prescription drugs, even when compared to children with other types of developmental delays. Third, families affected by ASD report more difficulty in accessing services and less satisfaction with services compared to families of children with other special health care needs (Montes et al., 2009).

Private insurance plans, typically exclude coverage for some types of services for ASD, particularly behavioral treatments. Some plans exclude coverage of ASD altogether.[2] By federal law, public schools must provide early intervention and special education for children with ASD. It is often unclear, however, whether ASD services constitute educational, medical, or habilitative services. As a result, there is ongoing debate regarding the role of health insurance and schools, and what services each should and should not cover for children with ASD (Holland, 2010). To ease the financial burden on affected families, as of 2013, 31 states have in effect health insurance mandates specifically pertaining to ASD. These state mandates require many private health insurance policies to cover diagnostic and treatment services for ASD.

In this paper, we explore whether state ASD mandates are associated with three types of outcomes among privately insured children with special health care needs (CSHCN) who have ASD: (1) out-of-pocket costs and financial burden related to children's treatment; (2)

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[1] Early detection and engagement in treatment is considered critical for children with ASDs (Bryson et al., 2003; Rogers, 1998; Liptak et al., 2008). Treatment for ASD depends on the severity of the disorder and may include: (1) behavioral interventions, often based on Applied Behavioral Analysis (ABA); (2) speech and language, occupational, and physical therapy; (3) neurosensory therapies; (4) biochemical interventions; and (5) complementary and alternative treatments (Sharpe & Baker, 2007; NICHD, 2005; Young et al., 2009).

[2] Peele et al., 2002, for example, in an analysis of children's behavioral health coverage in 46 private, employment-based insurance plans, report that all of the plans exclude coverage for ASD services (Peele et al., 2002).

cost or insurance-related problems with access to treatment; (3) utilization of services that may not be covered extensively or covered at all in standard private health insurance plans, such as therapy and specialty providers. Economists have examined the effectiveness of health insurance mandates in expanding the use of a variety of health care services including mental health services (McGuire and Montgomery 1982; Frank 1985; Pacula and Sturm 2000), substance abuse treatment (Dave and Mukerjee 2011), and infertility treatments (Bundorf et al. 2007). However, research on the effectiveness of the ASD mandates in easing the financial burden and improving access to treatment is currently very limited. To our knowledge, only one study has examined this question. Parish et al. (2012) use data from the 2005–2006 National Survey of Children with Special Health Care Needs (NS-CSHCN) to examine the effects of state insurance mandates relating to autism services on the probability of any out-of-pocket expenses associated with the child’s medical care in the past 12 months, and on the probability of having high expenditures (>$500) relative to low expenditures (<$250). At the time of their study, nine states had some type of mandated benefit. Their results show a negative association between mandated autism benefits and their measures of out-of-pocket expenditures among families with autistic children. However, these results can only be interpreted as descriptive, as the estimates are hindered by a lack of comparison to a control group, and there is no examination of outcomes within a state before and after the policy change.

We address these limitations by using difference-in-difference (DD) and difference-in-difference-in-difference (DDD) approaches. In the DD models, we compare pre-post mandate changes in outcomes among privately insured CSHCN with ASD vs. privately insured CSHCN other than ASD in states that passed mandates. In the DDD models, we compare pre-post changes in outcomes among privately insured CSHCN with ASD vs. privately insured CSHCN other than ASD in states that passed mandates vs. in states that did not pass mandates. Data come from the 2005–2006 and 2009–2010 waves of the NS-CSHCN.

Based on the model used, our findings show no statistically significant association between state ASD mandates and caregivers’ reports about access to care and unmet need for services. There are no consistent effects of mandates on caregivers’ reports of having adequate insurance coverage, or on needing but not being able to access services due to cost or insurance barriers. Moreover, we find no effects of mandates on out-of-pocket spending for CSHCN’s health care. We caution that most ASD mandates have gone into effect very recently, and it may take time for these mandates to have measurable effects on families affected by ASD. Also, the characteristics of mandates are not analyzed. The lack of effects of ASD mandates, however, is consistent with recent literature on mental health parity legislation, which shows little or no effects on access to services (for example, Pacula and Sturm 2000).

II. Methods

To estimate the effects of ASD health insurance mandates, we use a difference-in-difference (DD) and a difference-in-difference-in-difference (DDD) approach. Conceptually, the treatment group is the group targeted by the mandates. The treatment group, therefore, is privately insured CSHCN with ASD. We compare pre-post mandate changes in outcomes in this treatment group to a comparison group which includes privately insured CSHCN in the same state who do not have ASD. We use two alternative comparison groups: (1) privately insured CSHCN with psychiatric conditions other than ASD; (2) privately insured CSHCN with psychiatric conditions other than ASD, and/or with chronic medical conditions.

We begin with a simple difference-in-difference (DD) model as specified in Equation (1):

$$\begin{aligned} Y_{ijt} = \quad & \alpha + \beta_1 Mandate_{jt} * ASD_{ijt} + \beta_2 ASD_{ijt} + \beta_3 Survey\ Year_t + \beta_4 X_{ijt} + \gamma_j \\ & + \varepsilon_{ijt} \end{aligned} \tag{1}$$

In Equation 1, Y_{ijt} is an outcome variable for child i in state j at time t; ASD_{ijt} is an indicator that the child is in the group targeted by the mandate (i.e.,, the child has ASD); $Mandate_{jt}$ is an indicator that turns on when the state ASD mandate has been in effect for at least a year (the mandate variable is discussed in further detail in Section 3); and X_{ijt} represents child characteristics. Equation 1 also includes state fixed effects (γ_j) and survey year fixed effects. We estimate Equation 1 using a sample limited to privately insured CSHCN in the Treatment Group or the Comparison group who reside in states that *have ever passed an ASD mandate during our study period* ("Mandate States"). This way, we can make a clean comparison, examining pre-post mandate changes in outcomes among CSHCN with ASD, netting out pre-post changes among CSHCN without ASD, in states that passed mandates.

Next, we move to a triple difference approach. This approach allows us to compare pre-post differences in outcomes between the treatment group and the comparison group in states that passed mandates, while netting out this same difference in states that did not pass mandates.

The DDD econometric specification is:

$$\begin{aligned} Y_{ijt} = \quad & \alpha + \beta_1 Mandate_{jt} * ASD_{ijt} + \beta_2 ASD_{ijt} + \beta_3 Survey\ Year_t + \beta_4 ASD_{ijt} \\ & * Survey\ Year_t + \beta_5 X_{ijt} + \gamma_j + \beta_6 ASD_{ijt} * \gamma_j + \beta_7 Survey\ Year_t * \gamma_j + \varepsilon_{ijt} \end{aligned} \tag{2}$$

where Y_{ijt} is a outcome variable for child i in state j at time t; ASD_{ijt} is an indicator that the child is in the group targeted by the mandate (e.g., the child has ASD); $Mandate_{jt}$ is an indicator that turns on when the state has had an ASD mandate in effect for at least a year; and X_{ijt} represents child characteristics (e.g., age). Equation 2 also includes state fixed effects (γ_j), interaction terms between the state fixed effects and the ASD indicator, interactions between the ASD indicator and the survey fixed effects, and full interaction terms between the state fixed effects and the survey year fixed effects.

This empirical set-up is a slight improvement to the standard DD and DDD set-ups, in which we would make "pre-post" comparisons between the second and first survey waves (2005–2006 and 2009–2010 respectively, data source discussed below), because we utilize information on the month and the year in which the interview was conducted within each survey wave. This information about the year and the month of interview is important for two reasons. First, it allows us to be more accurate about when a mandate was in effect. This is crucial to the analysis, since some of the mandates were becoming effective during the months in which the second wave of the survey was being conducted. That is, two survey respondents from the same state in the second wave of the survey may have been interviewed at different times, so one respondent may have had a mandate prior to the time of the interview while the other did not. We created the mandate variable based on the interview month and year to address his issue.

Second, because we have the year and month of the interview, in the triple difference models, we can include survey year fixed effects, interactions between survey year fixed effects and state fixed effects, and interactions between survey year fixed effects and treatment group status. The use of control groups plus the inclusion of these terms, which are year specific rather than specific to the second wave of the survey as a whole, allow us to better capture potentially confounding, unmeasured events occurring around the same time as the ASD mandates become effective.

We estimate these equations using a sample limited to privately insured CSHCN who meet criteria for inclusion in either the treatment group or in the comparison group. Details regarding the measures and the construction of the treatment and comparison groups are discussed in Section 3 below. Although all of our outcomes are binary, we estimate linear probability models to make interpretation of estimated coefficients on interaction terms straight-forward. We use Huber-White corrected standard errors adjusted for clustering at the state level (Bertrand et al, 2004).[3] All models are estimated using survey sampling weights.

The key independent variables in Equations 1–2 are the interaction terms between mandate and ASD. The estimated coefficient on this interaction term in the DD model represents the effect of the mandate on outcomes of the targeted group (CSHCN with ASD) before and after a mandate becomes effective relative to the pre-post change in outcomes among CSHCN in the same state without ASD. In the DDD models, we further net out the analogous comparison in states that did not pass ASD mandates. The assumption underlying this model is that there is no unmeasured state-specific event that occurred in the same month as the ASD mandate becomes effective that affected pre-post differences in outcomes differentially for CSHCN with ASD vs. the comparison group.

Mandates were designed to improve access and increase use of services specifically for children with ASDs so we would expect to see that mandates are associated with improvements in access to and utilization of specialized services. We note, however, that the net effect of mandates on affected families' out-of-pocket costs and financial burden may be positive or negative. That is, better insurance coverage reduces the proportion of uncovered costs, but it also induces greater utilization of services, making the net effect of mandates on out-of-pocket costs and financial burden ambiguous.

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[3] Since the adoption of ASD mandates varies by state, analyses allowed for arbitrary correlation of standard errors within state cells rather than sampling design unit to avoid underestimating standard errors on our mandate variable (Donald and Lang, 2007; Moulton 1990). Allowing clustering of errors only by sampling design unit (i.e., by household, state, and cell or land line status), results in very similar though usually somewhat lower standard errors since the design units are subsets of states, therefore allowing for a departure from an assumption of independent errors only for smaller units. For example, the mean percent of children with ASD or in comparison group 1 is 3.9 percent. The standard error of this estimate is 0.71 allowing for clustering of errors by state compared to 0.58 with the standard error only accounting for the design of the survey.

We estimate all of the DDD and DD models limiting the samples to CSHCN with private health insurance coverage, since only children with private, state-regulated health insurance plans should be directly affected by mandates. However, one may argue that insurance status is potentially endogenous. Insurance status may be affected if passage of a mandate induces families, for example, to move their children from public to private insurance plans. Furthermore, passage of a mandate may affect diagnosis of ASD, and/or a caregiver's likelihood of reporting ASD. It also may affect location decisions of families of children with ASD – for example, families may re-locate to states with particularly favorable policy environments. We explore these ideas by testing whether ASD mandates are associated with the likelihood of a privately insured child currently having ASD, as shown in Equation 3a, and whether mandates are associated with the likelihood that children with ASD are privately insured relative to children without ASD, as shown in Equation 3b. The samples used to estimate all equations are limited to privately-insured CSHCN in the Treatment Group and the Comparison Group. However, when estimating Equation 3b, we do not limit the sample to privately insured children.

$$ASD_{ijt} = \alpha + \beta_1 Mandate_{jt} + \beta_2 Survey\ Year_t + \beta_3 X_{ijt} + \gamma_j + \varepsilon_{ijt} \tag{3a}$$

$$PrivIns_{ijt} = \alpha + \beta_1 Mandate_{jt} * ASD_{ijt} + \beta_2 ASD_{ijt} + \beta_3 Survey\ Year_t + \beta_4 X_{ijt} + \gamma_j + \varepsilon_{ijt} \tag{3b}$$

Note that these analyses represented by Equations 3a–b are exploratory for several reasons. First, we do not know when the ASD diagnosis was made, or the timing of the private insurance coverage decision, so we cannot directly test whether the mandates induce new ASD diagnoses and changes in private insurance coverage. Second, in the case of Equation 3a, we can only examine whether the mandates are associated with increased ASD diagnosis among children who have already been screened into the survey (described below) based on having special health care needs, although it is possible that the mandates could also be associated with an increase in the total number of CSHCN, if newly diagnosed children whose ASD diagnoses were induced by mandates come from outside the existing special health care needs population. This is a limitation of this analysis.

III. Data and Variable Definitions

A. The NS-CSHCN

The NS-CSHCN is a national, cross-sectional, random digit dial (RDD) telephone survey of caregivers (primarily mothers) of CSHCN. The survey was conducted in 2001, 2005–2006, and in 2009–2010, and was available in English, Spanish, Mandarin, Cantonese, Vietnamese, and Korean. The data are representative of CSHCN both at the national and state levels. The survey is sponsored by the Maternal and Child Health Bureau and conducted by the National Center for Health Statistics' State and Local Area Integrated Telephone Survey (SLAITS) In this paper, we use data from the 2005–2006 survey (collected between April 2005 and February 2007) and the 2009–2010 survey (collected between July 2009 and March 2011). The 2001 survey did not include questions about ASD and thus cannot be used in this analysis. More detailed information about the survey is available at CDC, 2008 and CDC, 2013.

The NS-CSHCN is a two-stage survey with a complex sampling design. The first stage of the survey is a screener for special health care needs. The CSHCN screener includes five stem questions about the child's general health care needs, such as need for therapy, need for prescription drugs, and use of more health services than what is typical among children of the same age. Each stem question is followed by additional questions regarding whether the child's health care needs are due to a chronic health condition. CSHCN whose caregivers indicate that the child has at least one general health care need that is due to a chronic condition meet the criteria for having a special health care need and are screened into the sample. About 400,000 households with children participate in the screener in order to identify about 40,000 CSHCN in each survey wave. Each wave includes about 750 CSHCN in each state and in the District of Columbia (CDC, 2013). The large sample size of CSHCN for each state is especially helpful for the present study.

There were some changes in the survey design between the 2005–2006 and the 2009–2010 waves. In 2005–2006, an RDD sample of households with landlines was used, and the sample was stratified by state (including the District of Columbia) (CDC, 2008). In 2009–2010, the design was enhanced to include sampling of households with only cell phones, with stratification both by state and by landline vs. cell phone (CDC, 2013). In each survey wave (2009–2010 and 2005–2006), there were more than 40,000 completed interviews of caregivers of children who were identified as having special health care needs. In each wave, all children in each participating household were screened for special health care needs. In households with more than one child with special health care needs, a single child was randomly selected to complete the interview.

The second stage of the NS-CSHCN includes detailed information about the nature of the focal child's special health care needs, health care utilization, access to services, and out-of-pocket spending on health care. Note that only CSHCN (children who met criteria for having a special health care need) were included in the second stage of the survey; thus, it is possible that some children with ASDs, especially milder forms of the disorders, are not included in the second stage data used for this analysis. In fact, analyses of the 2007 National Survey of Children's Health (which uses the same CSHCN screener and same questions about ASD, but includes all children not just CSHCN) shows that about 5.5 percent of children with current ASD are not CSHCN based on the CSHCN screener (Pringle et al., 2012). In short, the NS-CSHCN does not capture the whole population of children with ASD, and this is a limitation of the study.

In 2005–2006, the weighted, overall, national response rate for the special health care needs interview was 56.1 percent (Blumberg et al., 2008). In 2009–2010, this same response rate was 43.7 percent for the landline sample, 15.2 percent for the cell phone sample, and 25.5 percent for the combined sample (CDC 2008, 2013). The differences in response rates by landline versus cell phone in the 2009–2010 survey are not considered to be the result of large differences in non-response bias because the response rates are sensitive to both assumed rates of eligibility among those whose eligibility is unobserved, as well as definitions of eligibility (CDC, 2013).[4] In the end, however, non-response bias and changes in non-response bias cannot be ruled out.

B. CSHCN Treatment and Comparison Groups

In all of the analyses in this paper, aside from when we examine the effect of mandates on private insurance coverage (Equation 3b above), the treatment and comparison groups are limited to CSHCN who are privately insured at the time of the interview. In the 2009–2010 survey, CSHCN are included in the treatment group if the caregiver responded affirmatively to the question “Has a doctor or health care professional ever told you that <<child name>> has autism, Asperger’s disorder, pervasive developmental disorder, or other autism spectrum disorder?”, and the caregiver indicates that the child currently has autism or an autism spectrum disorder. In the 2005–2006 survey, CSHCN are included in the treatment group if the caregiver responded affirmatively to the question “To the best of your knowledge, does <<child name>> currently have autism or autism spectrum disorder?”[5] In the DDD sample, the treatment group includes a total of 3,312 CSHCN with ASD from the pooled, 2005–2006 and 2009–2010 cross-sectional surveys (1,372 from the 2005–2006 survey, and 1,940 from the 2009–2010 survey).

We estimate the models using two alternative comparison groups of CSHCN: (1) CSHCN with developmental disabilities and psychiatric disorders other than ASD, including intellectual disability, Down syndrome, attention deficit disorder (ADD/ADHD), depression, anxiety or conduct disorder (n = 17,743 in the DDD sample); (2) CSHCN with psychiatric disorders other than ASD and/or chronic medical conditions (asthma, diabetes, heart condition, blood disorder, cystic fibrosis, cerebral palsy, muscular dystrophy, seizure disorder) (n = 34,156 in the DDD sample). Information about health conditions comes from caregiver reports about whether the child currently has the condition (in the 2005–2006 survey) and caregiver reports of lifetime diagnosis and currently having the condition (in the 2009–2010 data). In the 2005–2006 survey, caregivers are asked if the child has “emotional problems” or attention deficit disorder (ADD/ADHD), while in the 2009–2010 survey caregivers are asked specifically if the child has been diagnosed with and currently has depression, conduct disorder, ADD/ADHD, or anxiety. In this analysis, if a child has either emotional problems or any specific psychiatric disorder mentioned (depression, anxiety, conduct, ADD/ADHD), s/he would meet the criteria for both comparison groups.[6] Both comparison groups exclude CSHCN with ASD. For example, if a child with special health

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[4] Eligibility status was determined by residential status and whether a child aged 0 to 17 lived in the household; for the cell phone sample, respondents additionally had to meet the eligibility requirement of either not having a landline or not being likely to be reached through a landline. Next, children in eligible households were screened for special health care needs (CDC, 2013).

[5] State autism insurance mandates typically require private insurers to cover screening, diagnostic and treatment services for ASD. Ideally, then, our treatment group should include children with diagnosed and undiagnosed ASD because even children with undiagnosed ASD may benefit from mandates through increased health insurance coverage for screening and diagnostic services. However, it is difficult to identify undiagnosed children with ASD using a large secondary data set. Moreover, the focus of the mandates is treatment for children who have diagnosed ASDs. Thus, our treatment group is limited to children with diagnosed ASD.

[6] Between the two survey waves, there are some changes in the prevalence of psychiatric conditions and developmental disabilities among CSHCN in the sample comprised of the treatment group and Comparison Group 1. The prevalence of ASD among CSHCN increases from 12 percent in 2005–2006 to 20 percent in 2009–2010, and the prevalence of intellectual disability falls from 19 percent in 2005–2006 to 11 percent in 2009–2010. The prevalence of ADHD among CSHCN stays fairly stable between waves (68 percent in 2005–2006 vs. 66 percent in 2009–2010), and the prevalence of emotional problems increases from 42 percent in 2005–2006 to 50 percent in 2009–2010 (although the way emotional problems are described also changes). Note that CSHCN may have multiple diagnoses. We explore whether ASD mandates are associated with ASD diagnosis later in the paper.

care needs with ASD also has been diagnosed with intellectual disability, s/he would be included in the treatment group but not in the comparison group. The Treatment Group and both Comparison Groups are limited to CSHCN ages 2 to 17 years old; CSHCN under 2 years old are excluded because ASD diagnosis is typically not possible for infants.

C. Outcome Variables

In the NS-CSHCN, caregivers are asked specifically about out-of-pocket spending related to the child's health care needs. All respondents are asked "During the past 12 months, would you say the family paid more than $500, $250-$500, less than $250, or nothing for <<child name>>'s medical care?." If respondents report spending more than $500, they are asked "During the past 12 months, would you say the family paid more than $5000, $1,000-$5,000, or less than $1000, for <<child name>>'s medical care?." From these questions, we construct two dichotomous measures of out-of-pocket spending: (1) whether the family had no out-of-pocket expenses in the past 12 months; and (2) whether the family had out-of-pocket expenses of $750 or higher in the past 12 months.[7]

Caregivers are also asked a set of questions about the adequacy of their child's health insurance coverage. Specifically, survey respondents answer "never", "sometimes", "usually" and "always" to questions about whether health insurance coverage offers benefits and services that meet the child's needs, whether the costs not covered by health insurance are reasonable, and whether the health insurance allows the child to see needed providers. From these questions, we created the following three dichotomous variables indicating problems with insurance coverage: (3) Child's health insurance benefits and coverage never or sometimes meet his/her needs; (4) Costs not covered by child's health insurance never or sometimes are reasonable; (5) Child's health insurance never or sometimes allows child to see the health care providers he or she needs.

The NS-CSHCN includes questions about the impact of the child's health conditions on the family, and extensive questions about access to services and unmet need. From the questions on family burden, we create a dichotomous indicator of: (6) whether the child's health condition has caused financial problems for the family. This indicator is based on a question "Have {child's} health conditions caused financial problems for your family?." The access to care and unmet need questions start with some questions about unmet need for all kinds of services. In the 2005–2006 survey, there is a general question about whether in the last 12 months the child has delayed or gone without any kind of needed health care (including therapy, special education services, and mental health care). Then, if the caregiver reports delaying or forgoing care, s/he selects from an extensive list of reasons why health care was delayed or foregone, including issues related to costs. In the 2009–2010 survey, the format of this question is slightly different; all survey respondents are asked if they have had "difficulties or delays" rather than "delays/forgoing care" in obtaining any kinds of health services because of issues related to costs. Thus, the 2009–2010 question wording is somewhat broader (since the word difficulty is included in addition to the word delay) and

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[7] We also estimated ordered probit models in which the dependent variable was the midpoint of each of the six spending categories. There were no effects of mandates on out-of-pocket spending in these models, which is consistent with the findings presented in the paper based on the two dichotomous indicators of out-of-pocket spending.

may be expected to apply to more children. From these questions, we create a dichotomous indicator of: (7) In the past 12 months, child delayed or did not get any kind of needed health services because of costs.

Caregivers are also asked to provide information on whether the child received all the care s/he needed for different kinds of services. If a caregiver reports unmet need for a type of service, the caregiver then is asked to select from an extensive set of reasons why the child's needs were not met. From these questions, we created the following dichotomous indicators: (8) During the past 12 months, child did not get all prescription drugs that s/he needed due to costs or insurance issues; (9) During the past 12 months, child did not get all physical, occupational, or speech therapy that s/he needed due to costs or insurance issues; (10) During the past 12 months, child did not get all the specialty physician services (not including psychiatrists and dentists) that s/he needed due to costs or insurance issues; and (11) During the past 12 months, child did not get all the mental health care or counseling that s/he needed due to costs or insurance issues. The specific cost and insurance issues listed as reasons for unmet need are: "cost too much"; "no insurance"; "health plan problem; and "can't find a provider who accepts child's insurance." When estimating models in which lack of access to a particular type of service due to cost/insurance is the outcome of interest, we limit the samples to families reporting having a need for drugs, therapy, specialty physician, and mental health services in the past 12 months. We also estimated these models without limiting the samples to families with need, since need may be endogenous to ASD mandates. These findings were similar to those presented in the paper, and are not shown here.

D. Autism Mandates and Other Covariates

As of 2013, 31 states have mandates requiring at least some private insurers to include some level of coverage for ASD treatment. Using the month and year of the NS-CSHCN interview, and the month and the year in which the mandate went into effect, each respondent in our sample is matched to information regarding whether the state had an autism mandate in effect 12 months prior *to the month and year of the interview*. It is critical to match mandates by month and year, and not just by year, because the 2009–2010 survey data were collected between July 2009 and March 2011 and many states were passing mandates exactly during this time period.

We use a one- year lagged measure of ASD mandates in our specifications shown in the paper because the outcome measures pertain to the past 12 months. However, we also estimate the models using an alternative mandate variable capturing whether the state had an ASD mandate in effect at the time of the interview. The advantage of using a current measure of ASD mandate instead of a lagged measure is when using the current measure we can draw on a larger set of natural experiments, and include some of the most recent ASD mandates in our analysis. However, the disadvantage of using the current measure is that the outcome measures pertain to the past 12 months, and past 12 month outcomes may not have been subject to an ASD mandate that just went into effect in the state. Thus, the models estimated using a current measure of ASD mandate instead of a one-year lagged measure are discussed below, but the results are not shown. The results do not differ qualitatively when we use current versus a one year lag of ASD mandate; either way, we do not find consistent effects of mandates on the outcomes we study. Table 1 shows the states that have mandates in effect requiring some level of coverage for ASD between 2005 and 2011, which is our study period,[8] while Appendix Table 1 provides more detail about all autism mandates in effect as of 2013. As seen in the Appendix Table 1, several states passed autism mandates in 2011, but these mandates did not go into effect until 2012, which is outside our study period.[9] All state mandates include language that: (1) specifically requires private health plans[10] to offer some significant, specified level of coverage for treatment services for ASD, often specifically including Applied Behavioral Analysis (ABA), an intensive form of individualized therapy; (2) specifies an age range that is covered. Other than two states (Texas and Vermont), who enacted mandates that cover a narrow age range of children (children up to age 6), the mandates provide at least some coverage for children until late adolescence or early adulthood. However, the mandates vary in that some mandates apply to firms of all sizes, while others exclude small firms, and some mandates include language mandating parity between mental health and medical services, while other mandates do not require parity. Also, the existence of benefit limits, and the limits themselves when they exist, vary across states, and some states use more specific language than others regarding what services are mandated to be covered (see Appendix Table 1).

In the main models, we only include dichotomous indicators for individual years of child age as child-level covariates because we do not expect individual child characteristics to be correlated with passage of ASD mandates. However, we also estimated extended models which included richer information on child characteristics such as household size, race/ethnicity (indicators for non-Hispanic black, Hispanic, and all other groups combined vs. non-Hispanic white), parental education (highest educated parent’s education is more than high school, high school, or less than high school), and dummy indicators for child health and functioning. These findings are based on smaller sample sizes that those presented here since there is some missing data on some of these covariates. However, these results were similar to the results presented here so we do not show the extended models. There also may be unmeasured state-level trends that may be correlated with passage of a mandate and with outcomes. The use of comparison groups plus the use of state fixed effects and the interactions between the state and year fixed effects are expected to capture these potentially confounding variables.

IV. Results

Table 2 shows weighted descriptive statistics for the sample used to estimate the DDD models. This sample includes all states and is created using the Treatment Group (CSHCN with ASD) and Comparison Group 1 (CSHCN who have psychiatric disorders and developmental delays other than ASDs, including intellectual disability, Down syndrome,

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[8] Our tables rely on estimates with the mandate effective date lagged by one year, therefore relying on mandates in effect by 2010.

[9] Iowa and Kansas enacted mandates that apply to state employees only; we do not include those states as having passed a mandate in our study since these mandates were so narrow in scope.

[10] It is important to note that health plans offered by self-insured firms are exempt from state mandates because they are regulated under federal law. Some self-funded plans may elect to provide coverage for autism when a mandate is passed, but they are not subject to state regulations and thus not required to do so.

ADHD, depression, anxiety or conduct disorder). Column 1 in Table 1 shows means for the whole sample while Columns 2–3 show means by Treatment Group status. Columns 4–6 show means by Treatment Group and Survey Wave. Appendix Table 2 shows the same table for the sample created using the Treatment Group and Comparison Group 2.

About 37 percent of the CSHCN with ASD or other psychiatric disorders/developmental disabilities had ASD, 12 percent lived in a state with an effective ASD mandate 12 months prior to the interview, and 36 percent lived in a state that passed a mandate during the study period (based on the lagged mandate measure, meaning that that the study period essentially spans April 2004 to March 2010 even though the interviews were conducted between April 2005 and March 2011) (Table 2).[11] Based on the lagged mandate measure, the percentage of CSHCN with ASD or another psychiatric disorder/developmental disability living in a state which had an effective mandate for at least a year rises from 2–3 percent in the 2005–2006 survey to 18–22 percent in the 2009–2010 survey (Table 2). The average age of the CSHCN with ASD or another psychiatric disorder was about 11.5 years old.

Access problems related to cost and insurance and financial burden were common in this sample of privately insured CSHCN with ASD and other psychiatric disorders with 26 percent reporting financial problems because of the child’s health costs, 36 percent reporting that the costs covered by health insurance were never or sometimes reasonable, and 12 percent reporting delaying or forgoing the child’s care due to costs in the past 12 months (Table 2, Column 1). However, it striking that the families of CSHCN with ASD fared worse than those of CSHCN with other psychiatric/developmental conditions. About 47 percent of families of CSHCN with ASD reported that the costs covered by health insurance are never or sometimes reasonable compared to 34 percent among families of CSHCN with psychiatric conditions other than ASD (Table 2, Columns 2–3). In fact, compared to the Comparison Group, families of CSHCN with ASD reported worse access and higher financial burden in every area.

Table 2 does not show any consistent pattern over time in access to care and cost/insurance outcomes for the Treatment Group vs. the Comparison Group. In general, financial burden of care and access to care appears to be stable or getting somewhat worse over time for both groups, with perhaps a more consistent worsening pattern for the Treatment Group. Between the 2005–2006 and the 2009–2010 waves of the survey, there is a large increase in caregivers’ reports of delaying or forgoing services. However, this is true for both the Treatment and the Comparison Groups (although more striking for the Treatment Group) and is probably at least partially due to the change in the wording of the question across the two waves.

In Table 3, we show findings from models that were estimated to gauge whether ASD mandates were associated with the likelihood of CSHCN being diagnosed with ASD, and models in which we examine whether ASD mandates were associated with the likelihood of

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[11] Based on the current mandate measure, about 19 percent of the sample lived in a state with an effective mandate at the time of the interview, and 46 percent lived in a state that passed a mandate during the study period (results not shown). Based on the current mandate measure, the percentage of respondents living in a state with an effective mandate rises from 2–3 percent in the 2005–2006 survey to 34–35 percent in the 2009–2010 survey (results not shown).

CSHCN having private insurance. The dependent variables in these models are “Child currently diagnosed with ASD” (Panel A, Table 3) and “Child has private insurance” (Panel B, Table 3). In Panel A of Table 3, the samples are limited to privately insured CSHCN, while in Panel B of Table 3, the sample includes CSHCN of all insurance types.

In Panel A of Table 3, the results suggest that ASD mandates were associated with a reduction in the likelihood of current ASD diagnosis among CSHCN. This result exists regardless of whether Comparison Group 1 or Comparison Group 2 is used (Column 1 vs. Column 2 in Panel A, Table 3). Note that this model presumes that the denominator is fixed, or, in other words, that the mandate affected diagnosis of ASD among CSHCN who already had special health care needs, based on the screener administered during the survey. One possible interpretation of this finding is that ASD mandates improved access to diagnostic services among CSHCN (for example, access to pediatricians specializing in CSHCN with developmental delays), which resulted in fewer CSHCN being diagnosed (perhaps incorrectly) with ASD. The negative correlation between mandates and ASD diagnosis also may result from states with lower rates of ASD having an easier time passing ASD mandates. That is, opposition to ASD mandates may be stronger in states in which the prevalence of ASD initially was high. This was the case for mental health parity laws; states with lower rates of mental health services usage to start with were more likely than higher utilization states to pass mental health parity laws (Sturm & Pacula, 1999; Pacula & Sturm, 2000). To investigate this possibility, we re-estimated the models shown in Panel A of Table 3 replacing the mandate variable (which is measured in the past 12 months) with a 12 month lead of mandate. The lead mandate variable is an indicator of whether the respondent lives in a state in which a mandate is effective 12 months subsequent to the month and year of the interview. If the lead of mandate is associated with a reduction in ASD diagnosis, this finding would lend some support to the idea that states with preexisting lower levels of ASD diagnosis are more likely to pass mandates. However, the estimated coefficient on the lead of mandate was close to zero and not statistically significant in these models (results not shown). These results make it less likely that policy endogeneity explains the finding that mandates are associated with reductions in the probability of ASD diagnosis.

It is important to emphasize that the diagnosis of ASD is measured at any time in the past, and is not timed well with the mandates, which are measured in the past year. To the extent that ASD diagnosis is made when children are young, it is less likely that ASD mandates could change diagnosis patterns among older CSHCN. Thus, if the association between ASD mandate and ASD diagnosis is causal, we would expect to see that this relationship is strongest among the youngest CSHCN, since these children are most likely to have been diagnosed in the past year when the mandates went into effect. To explore this idea, we estimated these models by age group (2–5, 6–12, and 13–17), and found that the association between ASD mandates and ASD diagnosis among CSHCN actually is driven by the 6–12 age group, not the 2–5 age group (results not shown). However, in the 2009–2010 wave, among CSHCN aged 6–12 years old who currently have ASD, only 13 percent were diagnosed in the past year and the majority (63 percent) were diagnosed four or more years prior to the survey. It seems unlikely, then, that the association between ASD mandates and ASD diagnosis that we find for this age group reflected a true causal relationship, since only a small percentage of these CSHCN were diagnosed in the past year.[12]

In Panel B of Table 3, we examine whether ASD mandates are associated with the probability of having private insurance among CSHCN with ASD vs. CSHCN without ASD. In these models, the estimated coefficients on the interaction terms between mandate and ASD are not statistically different from zero. Based on these results, it seems unlikely that passage of ASD mandates has affected families' insurance coverage decisions. We thus proceed with the DD and DDD estimates, which are based on privately insured samples.

Table 4 summarizes findings from the DD and DDD regression models for outcomes related to financial burden and problems with health insurance. Each row shows results related to a different outcome. Only the estimated coefficients and T-statistics on the interaction between Treatment Group and Mandate (reflecting that the policy is in effect 12 months prior to interview) are shown in the table. This estimate captures the effect of the mandate on CSHCN with ASD, netting out other possibly confounding pre-post changes. In each row, columns 1–2 come from a model estimated using a sample limited to the Treatment Group and Comparison Group 1, while columns 3–4 are estimated from a model based on the Treatment Group and Comparison Group 2.

The findings in Table 4 show no measurable impact of ASD mandates on outcomes related to financial burden and adequacy of health insurance coverage. In almost all of the models, the estimated interaction term between ASD and mandate is not statistically different from zero. One exception is caregiver reports of health insurance never/sometimes meeting child's needs. In the DD and DDD models for this outcome based on a sample constructed using Comparison Group 1, the findings suggest that ASD mandates are associated with an *increase* in this adverse outcome. This result is not statistically significant when the broader comparison group, Comparison Group 2, is used. It is possible that ASD mandates raised awareness of and dissatisfaction with private insurance coverage, even in the absence of any effects on out-of-pocket spending and financial burden. In any case, the general pattern of findings in Table 4 does not support the existence of any beneficial effects of ASD mandates, and in many cases the mandate was associated with worse health insurance and costs outcomes, although these effects are not statistically significant at conventional levels. In sum, then, Table 4 indicates that ASD mandates have not affected health insurance adequacy and financial burden among families of CSHCN with ASDs.

In Table 5, we show the same specifications as in Table 4, but with unmet need due to cost and insurance as the outcomes of interest. Again, as in Table 4, we note that overall there is generally no consistent pattern of findings. ASD mandates are associated with a statistically significant increase in reports of not being able to access services in general in the DD models, but this effect does not persist in the DDD models. The ASD mandates were associated with statistically significant, lower levels of unmet need for specialty doctor services. This effect persists regardless of which Comparison Group is used. The size of the effect is perhaps unreasonably large (3–6 percentage points compared to a mean of 5 percent in Table 1 for the Treatment group in the first wave of data), but the direction of the effect makes sense, given that ASD mandates targeted types of treatment that may be provided by

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[12] Ideally, one would like to examine the association between past year ASD mandate and new diagnosis of ASD in the past year. In the 2005–2006 wave, however, we do not know the age of ASD diagnosis. This information is only available in the 2009–2010 wave.

specialized doctors. However, we do not emphasize this finding since the general pattern of findings regarding the effects of ASD mandates on access to care is inconsistent. In the case of mental health services, for example, the ASD mandates were associated with worse access to care, although these effects are not statistically significant at conventional levels.

We conducted several sensitivity checks of these findings. We re-estimated all models using an ASD measure indicating whether an ASD mandate was in effect in the month of the interview, instead of a one-year year lagged measure. Using a current measure increases our power, since many ASD mandates are recent and, if we can include the most recent mandates, we can draw on more natural experiments in our analysis. The findings are very similar to those presented here (results not shown). We still see beneficial effects of the ASD mandates on access to specialty provider services, but no consistent effect on the other outcomes. We also re-estimated the models including more extensive controls for child and family characteristics. These results also showed no effects of ASD mandates on outcomes (results not shown).

V. Discussion and Conclusions

Children with ASD typically require costly and extensive services beginning in early childhood, but many families lack adequate insurance coverage for and access to such care. State health insurance mandates for ASD have been viewed as a potential solution to this problem for children with private insurance coverage. That is, by mandating that private insurers provide coverage for specialized treatments, privately insured children are expected to have better access to services. The predicted direction of effects of mandates on out-of-pocket spending are conceptually ambiguous, however, since better insurance coverage both reduces the price of services and is likely to induces more utilization. This study provides some of the first empirical evidence about the effects of ASD mandates. In sum, based on the model used, the findings do not support the idea that state autism mandates are associated with out-of-pocket spending or access to care among families of privately insured CSHCN with ASD.

In many ways, the NS-CSHCN data are particularly well-suited for this study. The data include a large, national sample of CSHCN with ASD and conditions; the timing of the surveys is recent and corresponds to the period during which states were enacting mandates; and the questions in the surveys are relevant to the outcomes one would expect state mandates to affect. However, there are limitations as well. First, autism mandates are still very new, and, even though we use a one-year lag of the date the mandate is effective, it may take more time for this legislation to affect families' out-of-pocket spending and perceptions of access. Also, several large states, including California and New York, passed ASD mandates that became effective in 2012, but these changes are not captured by our study period, which ends in 2011. Second, we may lack power to detect certain types of effects, such as access problems related to particular forms of specialized health services use. Third, all data in the NS-CHSCN are reported by parents and not verified by providers, and the data are based on sample survey and as a result subject to potential non-response and coverage biases. Since this study draws on data from the 2005–2006 and the 2009–2010 surveys, there is differential coverage bias by survey year, since the later survey wave included both landlines and cell phones covering the population better than landlines only. Nevertheless, despite these issues, the general pattern of findings shows no support for the idea that ASD mandates alleviated access problems for families affected by ASD.

To our knowledge, no prior study has used a DDD type approach to examine the effects of ASD mandates on utilization of and access to services. Some studies, however, have estimated effects of state mental health parity laws on access to care among children. Mental health parity laws require insurance plans to have the same cost-sharing and limitations for mental health services as exist for medical services. These laws were passed mainly in the late 1990's. In some cases, these laws cover all psychiatric diagnoses and thus potentially pertain to children with ASD. In other cases, parity is limited to certain psychiatric diagnoses, which may or may not include ASD.

The evidence from the mental health parity literature is mixed. Barry & Busch (2006), using cross-sectional data from the 2000 CSHCN and an instrumental variables approach, report that state mental health parity laws are associated with lower out-of-pocket spending and less financial burden among families of children with mental health needs. However, using the 1997–2002 National Survey of America's Families and a DD approach, Barry & Busch (2008) find no association between mental health parity laws and use of mental health treatment among privately insured children. Other studies on effects of state mental health parity laws show no evidence on access to care and out-of-pocket spending among adults (Bao & Sturm, 2004; Pacula & Sturm, 2000). As others have documented, some reasons state parity laws may not improve access to mental health services are: these laws do not apply to workers in self-insured firms; parity laws may increase management of mental health care in a way that reduces access and offsets parity; and there is limited availability of mental health providers in some communities (RAND, 2000). In this sense, the findings of present study are in line with the broader literature on mental health parity in that state-level legislation related to insurance coverage seems to have, at best, limited effects on access to care.

This study does not address supply side factors, which may be important for privately insured families who need highly specialized mental health services for their children. It is possible that limited availability of appropriate providers in communities may be a more important barrier to access to care for children with ASDs than insurance coverage. If this is the case, ASD mandates may play a limited role in expanding access to services. However, states may need more experience with ASD mandates before we can draw firm policy conclusions regarding the effectiveness of mandates.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Table 1:

States with ASD health insurance mandates

2005 – 2007	IN
2008	IL, IN, SC, TX
2009	AZ, FL, IL, IN, LA, NM, PA, SC, TX, WI
2010	AZ, CO, CT, FL, IL, IN, LA, MT, NJ, NM, PA, SC, TX, WI
2011	AZ, CO, CT, FL, IL, IN, KY, LA, MA, ME, MO, MT, NH, NJ, NM, NV, PA, SC, TX, WI

Notes: Table lists states with ASD health insurance mandates that were in effect in that year. ASD stands for Autism Spectrum Disorder. Arkansas' legislation went into effect in October 2011 and Vermont's legislation went into effect in July 2011 – both are outside our study period, which ends in March 2011. In Texas and Vermont, the table shows legislation passed that covers children ages 2–6; subsequent legislation expanded coverage to older children as well, but in the case of Vermont this subsequent legislation also was passed after our study period.

Source: http://www.autismspeaks.org/advocacy/states, Accessed, 1/13.

Table 2:

Weighted Means for DDD Sample

Sample Includes Privately Insured CSHCN in Treatment (Tx) Group or Comparison Group 1 from All States

	(1) Tx + Comp 1	**(2) Tx=1**	**(3) Tx=0**	**(4) Tx=1 Wave=1**	**(5) Tx=1 Wave=2**	**(6) Tx=0 Wave=1**	**(7) Tx=0 Wave=2**
Treatment Group (Child has ASD)	0.37	1.00	0.00	1.00	1.00	0.00	0.00
State has ever passed an ASD mandate during study period	0.36	0.37	0.36	0.36	0.37	0.37	0.36
State ASD mandate is in effect 12 months prior to month and year of interview	0.12	0.12	0.12	0.02	0.18	0.03	0.22
Child's health problems caused financial problems for family	0.26	0.42***	0.23	0.38	0.44	0.22	0.24
Health insurance benefits and coverage never/sometimes meet child's needs	0.17	0.30***	0.14	0.30	0.29	0.15	0.13
Costs covered by health insurance never/ sometimes reasonable	0.36	0.47***	0.34	0.48	0.46	0.34	0.34
Health insurance never/sometimes covers needed providers	0.13	0.23***	0.11	0.25	0.23	0.11	0.11
Total out-of-pocket costs on child's medical care in past 12 months was $750 or more	0.51	0.55***	0.50	0.56	0.55	0.47	0.52
No out-of-pocket costs on child's medical care in past 12 months	0.09	0.09	0.09	0.09	0.09	0.08	0.09
Delayed or foregone any kind of health services due to cost in past 12 months	0.12	0.20***	0.10	0.07	0.28	0.06	0.16
Child not get needed specialty doctor due to cost or insurance coverage issues in past 12 months (sample limited to those needing specialty doctor)	0.04	0.05**	0.03	0.05	0.04	0.02	0.04
Child did not get needed therapy due to cost or insurance coverage issues in past 12 months (sample limited to those needing therapy)	0.09	0.12***	0.07	0.09	0.14	0.06	0.08
Child did not get needed prescription drugs due to cost or insurance coverage issues in past 12 months (sample limited to those needing drugs)	0.01	0.02	0.01	0.01	0.03	0.01	0.01
Child did not get needed mental health care due to cost or insurance coverage issues in past 12 months (sample limited to those needing mental health care)	0.08	0.11**	0.08	0.09	0.12	0.06	0.09
Child age in years	11.5 (0.08)	9.9*** (0.09)	11.8 (0.09)	9.8 (0.17)	10.0 (0.15)	11.8 (0.10)	11.9 (0.13)

Notes: Statistics are weighted using survey weights. Child age shows robust standard error clustered on state in parentheses. The symbols ***, ** and *** indicate statistically significant difference at the 1, 5 and 10 percent levels, respectively for treatment vs. control group based on a t-test. Wave=1 indicates the 2005–2006 survey, while Wave=2 indicates the 2009–2010 survey. Comparison Group 1 includes CSHCN with psychiatric conditions other than ASD. All variables except child age are dichotomous. In the regression models, we used dichotomous indicators for each child age 2 to 17, leaving out one age as the baseline. CSHCN stands for children with special health care needs. DDD stands for difference in difference in difference method.

Table 3:

Effects of ASD Mandates on ASD Diagnosis and on Private Insurance Status

	(1) Tx Group + Comparison Group 1 (CSHCN with other psychiatric disorders)	**(2) Tx Group + Comparison Group 2 (CSHCN with other psychiatric and/or chronic medical conditions)**
	Panel A: Dependent Variable: Child has Autism Spectrum Disorder (ASD)	
Estimated Coefficient on Mandate	−0.04 (−3.47)	−0.02 (−2.39)
n	21,055	37,468
	Panel B: Dependent Variable: Child has private insurance	
Estimated Coefficient on ASD*Mandate	0.002 (0.05)	0.01 (0.33)
n	33,842	56,591

Notes: Table presents coefficients and T-statistics (in parentheses) from ordinary least squares models that use sample weights and robust standard errors clustered on state. Table only shows estimated coefficients on Mandate (Panel A) and ASD*Mandate (Panel B). All outcomes are binary. Other covariates included in models in Panel A are: survey year fixed effects, state fixed effects, and dummy variables for each child age. Models in Panel A estimated on sample of privately insured children. Other covariates used in models in Panel B are: ASD*mandate, ASD, survey year fixed effects, state fixed effects, and dummy variables for each child age. Models estimated in Panel B based on sample which includes CSHCN of any insurance status. Tx Group is the Treatment Group. ASD stands for Autism Spectrum Disorder.

Table 4:

Effects of ASD Mandates on Financial Burden and Health Insurance Outcomes

	Tx Group + Comparison Group 1 (CSHCN with other psychiatric disorders)		**Tx Group + Comparison Group 2 (CSHCN with other psychiatric and/or chronic medical conditions)**	
	(1) DD Sample: Mandate States Only	**(2) DDD Sample: All States**	**(3) DD Sample: Mandate States Only**	**(4) DDD Sample: All States**
In past 12 months:				
	Estimated Coefficient on ASD*Mandate			
Child health caused financial problems	0.02 (0.26)	−0.06 (−0.59)	0.01 (0.09)	−0.06 (−0.68)
No out-of-pocket costs for child’s care	0.004 (0.17)	0.03 (1.08)	0.01 (0.48)	0.04 (1.23)
Out-of-pocket costs for child’s care $750+	−0.02 (−0.24)	−0.02 (−0.17)	−0.05 (−0.60)	−0.04 (−0.33)
Health insurance benefits and coverage never/sometimes meet child’s needs	0.07 (2.00)	0.08 (2.09)	0.04 (0.95)	0.07 (1.53)
Costs covered by health insurance never/sometimes reasonable	0.001 (0.02)	0.04 (0.50)	−0.03 (−0.59)	0.01 (0.21)
Health insurance never/ sometimes allows child to see needed providers	0.04 (0.67)	0.04 (0.64)	0.04 (0.70)	0.04 (0.52)
n	5,355	21,055	9,573	37,468

Notes: Table presents coefficients and T-statistics (in parentheses) from ordinary least squares models that use sample weights and robust standard errors clustered on state. Table only shows estimated coefficient on Mandate (DD models) and estimated coefficient on interaction term between ASD and Mandate (DDD models). Mandate States are states that ever passed an ASD mandate during our study period. All outcomes are binary. Other covariates included in DD models are: ASD indicator, survey year fixed effects, state fixed effects, and dummy variables for each child age. Other covariates included in DDD models are: ASD indicator, survey year fixed effects, state fixed effects, ASD*survey year fixed effects, ASD*state fixed effects, state fixed effects* year fixed effects, and dummy variables for each child age. Sample limited to CSHCN with private health insurance coverage. Tx Group is the Treatment Group (CSHCN with ASD). DD indicates double difference model, while DDD indicates triple difference model. ASD stands for Autism Spectrum Disorder.

Table 5:

Effects of ASD Mandates on Cost and Insurance-Related Access to Care

	Tx Group + Comparison Group 1 (CSHCN with other psychiatric disorders)		**Tx Group + Comparison Group 2 (CSHCN with other psychiatric and/or chronic medical conditions)**	
	(1) DD Sample: Mandate States Only	**(2) DDD Sample: All States**	**(3) DD Sample: Mandate States Only**	**(4) DDD Sample: All States**
In past 12 months:				
	Estimated Coefficient on ASD*Mandate			
Difficulty/delay accessing services due to cost	0.08 (2.69)	0.01 (0.14)	0.08 (2.57)	−0.02 (−0.39)
n	5,355	21,055	9,573	37,468
Among those needing services, child could NOT get all services needed due to cost or insurance:				
Specialty doctor	−0.03 (−2.28)	−0.05 (−1.88)	−0.04 (−1.76)	−0.06 (−1.98)
n	2,800	10,762	4,998	18,947
Prescription drugs	−0.004 (−0.44)	−0.01 (−0.75)	−0.01 (−1.21)	−0.02 (−1.18)
n	4,715	18,492	8,699	33,914
Therapy	−0.01 (−0.20)	0.004 (0.05)	−0.01 (−0.14)	−0.006 (−0.10)
n	1,540	5,948	2,004	7,707
Mental Health	0.13 (1.89)	0.07 (0.87)	0.13 (1.84)	0.07 (0.87)
n	2,238	9,153	2,405	9,747

Notes: Table presents coefficients and T-statistics (in parentheses) from ordinary least squares models that use sample weights and robust standard errors clustered on state. Table only shows estimated coefficient on interaction term between ASD and Mandate. Mandate States are states that ever passed an ASD mandate during our study period. All outcomes are binary. Other covariates included in DD models are: ASD indicator, survey year fixed effects, state fixed effects, and dummy variables for each child age. Other covariates included in DDD models are: ASD indicator, survey year fixed effects, state fixed effects, ASD*survey year fixed effects, ASD*state fixed effects, state fixed effects* year fixed effects, and dummy variables for each child age. Sample limited to CSHCN with private health insurance coverage. Tx Group is the Treatment Group (CSHCN with ASD). DD indicates double difference model, while DDD indicates triple difference model. Tx Group is the Treatment Group. ASD stands for Autism Spectrum Disorder.