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Are mental health insurance mandates effective? Evidence from suicides

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Summary

Many states in the US have passed laws mandating insurance companies to provide or offer some form of mental health benefits. These laws presumably lower the price of obtaining mental health services for many adults, and as a result, might improve health outcomes. This paper analyzes the effectiveness of mental health insurance mandates by examining the influence of mandates on adult suicides, which are strongly correlated with mental illness. Data on completed suicides in each state for the period 1981–2000 are analyzed. Ordinary least squares and two-stage least squares results show that mental health mandates are not effective in reducing suicide rates. Copyright © 2005 John Wiley & Sons, Ltd.

Keywords suicide; mandated benefits; mental health

Introduction

Mental illnesses are debilitating diseases affecting millions of people each year. These conditions constituted five of the top ten leading causes of disability worldwide in 1990, measured in years lived with a disability. Unipolar depression is the largest cause of disability [1]. Despite the severity of the burden of mental illness, many cases of mental disorders remain untreated. Estimates show that about 28% of the US adult population in any year has a diagnosable mental or addictive disorder, yet only 8% seeks treatment [2].

In response to the increasing scope of the problems associated with mental illness, coupled with improvements in the diagnosis and treatment of mental disorders, a number of states and the US federal government have taken steps to improve access to mental illness services in the form of mandated mental health benefits, including mental health parity laws that require mental health benefits to be provided at the same level as physical health benefits. These laws have the potential to lower the effective price of mental health services and increase utilization. However, it is possible these laws might raise the cost of providing insurance thereby reducing access.

Evaluating the effectiveness of mental health insurance mandates requires analysts to answer three major questions: (1) do mandates successfully lower the price of obtaining mental health services; (2) do mandates increase access to mental health services; and (3) do mandates contribute to improvements in mental health outcomes? Conclusive answers to these questions are elusive, primarily because work in this area suffers from significant data limitations. While existing research provides some insights into the first two questions, no research to date attempts to answer the third question.

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This paper examines whether or not mandates directly contribute to improvements in mental health. The answer to this question is crucial to US policymakers at both the state and federal levels as they consider implementing and expanding mental health insurance mandates. The results are also applicable to other countries around the world that rely on the private sector to provide health insurance to certain segments of the population. Even among the countries of the European Union where universal, state provided health care is the norm, the use of complementary and supplemental voluntary health insurance has grown over the past few decades [3]. As this coverage is frequently provided to groups through employers (as a fringe benefit for employees), this secondary market is subject to the same sort of government regulation common in the US.

This study provides evidence of the impact of mental health and substance abuse treatment mandates, including parity laws, on adult suicides, a measurable outcome of poor mental health. In considering the efficacy of mental health mandates in reducing suicides, instrumental variables are used to control for potential simultaneity between suicide rates and mandate adoption. The results indicate that passage of mental health mandates is exogenous to suicides, and these mandates are ineffective in reducing suicide rates.

In the sections that follow, background information is provided regarding the impetus for the mental health insurance mandate movement, as well as a discussion of prior analyses of the effects of mandates. We then discuss research design, data, and empirical results, concluding with directions for future research.

Background

Although a few states enacted mental health insurance mandates in the 1970s and 1980s, a nationwide push for mandates, especially the so-called mental health parity mandates, began in earnest in the early 1990s. Mental health parity laws require insurers to provide parity in coverage between mental health and physical health coverage. These laws typically prohibit insurance companies from offering plans that place greater financial burden on access to diagnostic or treatment services for mental health conditions than for physical health conditions [4]. Such laws are designed to lower the price of mental health services faced by insured individuals, improve access to treatment, and ultimately to improve mental health outcomes. Other types of laws include mandated mental health benefits and mandated mental health benefit offerings.

By 2002, forty-six states mandated some form of mental health benefit, but the specifics of those laws vary widely. Some require full parity in which insurers must provide mental health benefits at exactly the same terms applying to physical health benefits. Other mandates simply require that a minimum level of mental health coverage be provided or offered, with varying equivalence requirements and pricing restrictions. Further, some states define mental illness broadly, applying their mandates to virtually any illness listed in the American Psychiatric Association's *Diagnostic and Statistical Manual*, while other states limit the conditions covered by the laws to a few 'biologically based' illnesses, such as schizophrenia, bipolar disorder, and major depressive disorder. Some states have exemptions for small businesses and large cost increases. One particularly visible distinction is whether or not the laws cover treatment for substance abuse and addiction. Roughly half of the states with mandated mental health benefits explicitly include addiction treatment, while about a quarter explicitly exclude it from the mandate [4].

In addition to the success in passing mandates at the state level, mental health advocates argue that federal mental health parity legislation is necessary. Many employers are unaffected by state insurance regulations due to the federal pre-emption granted by the Employee Retirement Security Act (ERISA) of 1974. ERISA effectively pre-empts state regulation of self-funded health insurance plans. That is, ERISA disallows individual states from imposing health insurance mandates of any kind on any firm that self-insures. Self-insured plans are typical of large employers, and as a result, employees of large companies are not likely to benefit from state mandates regarding mental health benefits. These self-insured plans represent about one-third of workers with employment-based insurance [5].

The federal Mental Health Parity Act of 1996, which became effective in 1998 and is currently extended through the end of 2005, was passed to fill the regulatory gap created by the ERISA exemption. The federal parity mandate prohibits group health insurers who provide mental health

benefits from imposing annual and lifetime expenditure limits for mental health treatments that are stricter than those applying to physical health treatments. However, this law does not impose any conditions on deductibles, copayments, or days covered, nor does it include provisions for substance abuse treatment. More importantly, the law does not require employers to offer mental health coverage, leaving employers the option of dropping mental health benefits altogether. The law also contains two major exemptions. The first exempts small employers with 50 or fewer employees. In 2000, small firms employed approximately 28% of the labor force. The second exemption arises if the law results in a cost increase of at least 1% of medical costs [6].

Existing evidence on effects of mandates

The extent to which mental health mandates improve the welfare of individuals with mental illnesses is ambiguous. Although supporters of the mandates deem them necessary to solve apparent 'market failures' in the provision of mental health insurance, there is conflicting evidence on the issue of whether coverage mandates improve access to mental health services.

Shortly after a number of states enacted minimum mental health benefit laws, researchers began to evaluate the effectiveness of such laws on access to care. McGuire and Montgomery [7] examined the impact of the laws on hours of practice by fee-for-service psychiatrists and psychologists in 1978. Their findings suggest that mental health mandates increase service use, but these estimates are statistically insignificant. Using a panel of states during the 1970s, Frank [8] reaches a similar conclusion in his study on visits to psychiatrists. He finds that mental health mandates increase the demand for services by 12–22%, but again, these estimates are imprecise. Horgan [9] finds that mandated private insurance coverage increases the probability of using ambulatory mental health services in the specialty sector, while simply mandating the availability of benefits has no effect on use. She also finds that neither mandated private insurance coverage nor mandated availability of benefits have any effect on the number of visits among users who have out-of-pocket expenses for mental health treatment.

Opponents of insurance mandates in general often claim that mandates increase the cost of insurance, inducing employees or firms to drop health insurance altogether [10]. Gruber [11] presents evidence that this displacement effect of mandates is virtually non-existent. Using data from the May CPS supplements for 1979, 1983 and 1988, Gruber finds that state mandates to cover certain health services, including alcohol, drug abuse and mental illness, have no impact on the probability that an employee of a small firm is covered by health insurance. There is some evidence, however, that alcohol treatment mandates lower the probability that a small firm will offer insurance. Gruber explains that mandates in general might be ineffective since firms generally offer benefits that exceed the mandated minimums.

Kaestner and Simon [12] also examine the displacement effect of state health mandates on the private provision of health insurance benefits by small employers. Focusing on the total number of health mandates in a state, they find that such mandates have no impact on the prevalence of health insurance coverage for full- and part-time employees in small firms. A similar conclusion is reached when examining the joint effect of four high-cost mandates: drug treatment, alcohol treatment, mental health care and mental health parity.

Parity mandates, however, might generate different effects than minimum benefit mandates since they tie mental health benefits to physical health benefits. That is, parity mandates do not affect only the cost of providing insurance for mental health treatments, they also indirectly affect the cost of providing traditional health insurance. If a firm wishes to increase its physical health benefits, parity mandates require a concomitant increase in mental health benefits as well. This joint determination generates an ambiguity in the effect of mandates on access to mental health treatments.

Some researchers suggest that the costs of increased mental health benefits are at least partially offset by the benefits employers enjoy due to improved mental health among their workers. The financial offset argument claims that providing mental illness coverage reduces other costs borne by employers. England [13] makes this case with respect to depression, claiming that employers lost $24 billion due to lost work time and productivity in 1993 as a result of untreated depression among their employees. Olfson *et al.* [14] note that these indirect cost savings might be

particularly important with respect to treatments for alcoholism, citing evidence that early treatment of the disorder can eliminate many costs due to alcohol-induced long-term physical health disorders, such as cirrhosis, cardiomyopathy, and chronic hepatic encephalopathy.

In resolving this theoretical ambiguity, it is difficult to ascertain the causal effects of mandates on access to mental health services because adoption of the mandates appears to be endogenous to underlying state characteristics, which also affect access to care. For example, Sturm and Pacula [15] document that states with below average utilization rates of mental health services are more likely to pass mandates, and, even after adoption, those states continue to lag behind national averages. Recognizing this simultaneity, Pacula and Sturm [16] use a two-stage procedure on a sample of individuals over a one-year period to estimate the impact of parity laws on mental health service utilization. They find no difference in the level of mental health service utilization among people living in states with parity laws compared to those living in states without parity laws. They speculate that this finding is generated by an insurance displacement effect for high-risk individuals. A major problem with such individual level data is that details of the respondent's employment situation and/or health insurance coverage are often unknown. This information is vital given that many insurance plans are exempt from state mandates and the lack of such information can bias results.

Sturm [17] uses data from the Health Tracking Initiative, which is designed to track changes in health care over time, to analyze the effect of parity laws on insurance coverage for individuals with mental health disorders. Using a difference-in-difference estimation strategy, this study finds that mentally ill individuals living in states with parity laws are more likely to lose insurance coverage, although the benefits for those retaining coverage is generous and access to care is easier. These estimates, however, are small in magnitude and statistically insignificant.

The presumption against the efficacy of mandates is strengthened by results suggesting that access to mental health services has increased even in the absence of mandates. Zuvekas *et al.* [18] find that while treatment prevalence increased by 50% in one employer group during the three year period after mental health parity mandates were enacted, a similar increase occurred in employer groups that were not subject to the mandate. Research on the effects of the federal mental health parity law has shown very few changes in plans as a result. The Substance Abuse and Mental Health Services Administration found that almost half of all eligible employers were already in compliance with the act prior to its effective date. Sixty-eight percent of the plans reported no change in benefits as a result of the law, and almost none chose to drop mental health coverage [19].

Dissimilarities in treatments between mental illness and physical illness also induce some limitations on the effect of parity laws in improving access to mental health services. Frank *et al.* [20] point out that many important aspects of mental health treatments have no counterpart in standard medical care, leaving them unaffected by parity laws. For example, many health insurance plans do not cover residential treatment programs or day-hospital care. In some cases, these components of treatment might be necessary for effective mental health treatment. A General Accounting Office survey indicates that many employers compensate for the changes in limits by imposing restrictions on aspects of mental health treatment not covered in the federal parity mandate [21].

It is an open question then as to whether mental health insurance mandates improve the welfare of those with mental illnesses. Direct evidence about the effect of mandates on the benefits provided to employees does not resolve the questions about the efficacy of mental health mandated benefits and parity laws.

Empirical model and data

To study the effectiveness of mental health mandates, a valid outcome measure is needed. Previous studies examine the impact of mental health parity laws on mental health service utilization [16,18] and insurance coverage [17], but none has looked directly at mental health outcomes. Utilization studies, while obviously important, are limited to examining survey data and will be affected by the sampling properties of the underlying survey.

We use a measurable outcome of mental health services, suicide, for which population data are available. Suicide is a useful outcome for a number of reasons. First, suicide is strongly correlated with mental illness. Researchers believe that almost all

individuals who commit suicide have a diagnosable mental disorder [22]. It has been estimated that two-thirds of people who commit suicide have a depressive illness; 5% suffer from schizophrenia; and 10% meet the criteria for other mental illnesses including borderline personality disorder. However, only half of people who die by suicide receive any mental health treatment in their lifetimes [23,24].

Second, parity legislation is often intended primarily to benefit the most severely ill patients [17]. For example, the federal law only affects annual and lifetime dollar limits, which are likely to be reached only by the severely ill. The risk of suicide is highly correlated with the intensity of treatment. Simon and Von Korff [25] find that among insured patients receiving treatment for depression, the highest risk of suicide was among those receiving inpatient treatment and medication. The lowest risk was found among individuals receiving outpatient treatment without medication.

Lastly, suicide is related to both substance use and mental illness. Since many of the mental health mandates include both substance abuse and mental health treatment, a desirable health outcome is related to both substance use and mental illness. Suicide meets this criterion. Alcohol abuse disorders are found in approximately 25% of completed suicides cases, and 20–25% of suicide victims are intoxicated at the time of death [26,27].

For the conclusions of this study to be useful, the demand for treatment must be affected by parity laws and treatment itself must affect the suicide rate. Previous research in economics has shown that the treatment of mental illness is responsive to price, and while the elasticity of demand is fairly inelastic, it has been estimated to be more price responsive than general health (see Frank and McGuire [28] for a review of the literature). The answer to the question of whether treatment is successful in lowering suicides is much more elusive. It is nearly impossible to estimate how many suicides are avoided through the provision of mental health services, although advances in psychopharmacology have often been credited with improving mental health outcomes and suicide rates. For example, a recent study of suicides in Australia found a strong, negative correlation between suicides and sales of antidepressants [29]. The reduction in suicide rates might be a result of the use of the drugs, or it might reflect increased diagnosis and treatment of depression by psychiatrists or general practitioners, since the prescription of antidepressants is typically accompanied by other interventions such as counseling that may also reduce suicides.

Each state's suicide rate for adults ages 25–64 is used as the measure of the mental health status of each state's population. Data on completed suicides come from the National Center for Health Statistics's Compressed Mortality File, which contains information on all completed suicides over time. These data are collected from death certificates filed in each state and include the state of residence, age, race, and gender of each individual.

Focusing on the suicide rates as a measure of mental health, the empirical equation takes the following form:

$$\begin{aligned}\text{suicide rate}_{it} = {} & \alpha_1 \text{ mandate}_{it} + \alpha_2 \text{ psych}_{it} \\ & + \alpha_3 \text{ large firms}_{it} + \alpha_4 \text{ uninsured}_{it} \\ & + \alpha_5 \text{ medicaid}_{it} + \alpha_6 \text{ medicare}_{it} \\ & + \Theta \mathrm{X} + \lambda_i + \tau_t + \varepsilon_{it}\end{aligned}$$

where the dependent variable is the adult suicide rate in state i during year t. The primary covariate of interest is the mental health mandate variable, which is an indicator taking the value of one if state i has a mandate during year t and zero otherwise. As described below, four different mandate categories are examined. Next, the per capita number of psychiatrists is included, as are the fraction of state i's workforce employed in large firms during year t (large firms), the fraction of state i's population under age 65 without insurance during year t (uninsured), the fraction of state i's population under age 65 on Medicaid during year t (medicaid), and the fraction of state i's population under age 65 on Medicare during year t (medicare). The vector X represents other state-specific characteristics that might be related to suicide rates. Time invariant state effects (λ) are included, as well as year effects (τ) that are common to all states during time t.

There exist tremendous differences in the scope and provisions of mental health insurance mandates across states and time. Using categories created by the National Conference of State Legislatures and consulting the state statutes, the state laws are grouped into four mental health mandate categories [4]. The first mental health mandate is a very broad category termed 'any mental health mandate' and includes all states that have some type of mandate in effect. The laws

could apply to all insurance plans or only to plans that offer mental health benefits. It includes those laws requiring that mental health benefits be provided on parity with physical health benefits and those laws that simply require a minimum level of mental health coverage be provided or merely offered. The second category represents laws mandating that all health insurance plans provide mental health benefits. Termed 'required mental health benefit,' this category is different than the first in that firms must provide benefits. This measure includes the states with parity laws and the many states and time periods for which the mandated benefits are not necessarily on parity with physical health. The third indicator is termed 'partial parity law' and represents those state laws that require the provision of mental health benefits on parity with physical health. Note that according to this definition, parity might apply to cost sharing, days, and/or lifetime and annual limits.[a] The last category, 'full parity,' contains those laws mandating parity in all respects.[b]

We caution that it is difficult to categorize the various mental health insurance mandates into specific groupings in any consistent way, given the varying language used in the statutes. Even in cases where essentially the same wording is used, the interpretation of each statute is conditional on existing judicial precedent and the policies of regulatory agencies within the state. If we abstract away these institutional differences and focus on the plain language meaning of the statutes, it is still generally not possible to categorize the mandates in a principled way. For example, although there is a temptation to treat mandatory benefit statutes differently from mandatory offering statutes, in many cases the difference is merely nominal. That is, there is very little practical difference between a mandatory offer and a mandatory benefit as long as the pricing restrictions and benefit levels are equivalent, since under each regime a consumer will be covered for the stipulated services if he chooses to elect them. With that in mind, in many ways, the general category of mandates is the least arbitrary, though it is unclear whether parsing the mandates would help us achieve greater precision in the estimates. For this reason, we rely on multiple groupings to examine the robustness of our estimates.

The percent uninsured, the percent on Medicaid, and the percent on Medicare are included in all models to help mitigate a potential bias resulting from heterogeneity in coverage. The uninsured are not covered by the mental health mandates imposed on insurance companies, nor are other sub-populations such as people on Medicare and Medicaid.[c] The dependent variable is limited to suicides committed by individuals under the age of 65 to eliminate any effect of the elderly Medicare population on the results. Since some disabled people under the age of 65 receive Medicare benefits, the percentage of the under 65 population receiving Medicare is included in all models. Further, the ERISA pre-emption exempts all self-insured employers and their employees from the provisions of the state laws. To account for the effect of ERISA pre-emption, the percent of a state's workforce that is employed by large firms (over 500 employees) that are likely to fall under ERISA is included. Consistent data (cross sectional by state or time series within given states) on ERISA coverage are not available, however, large employers are much more likely to self-insure than smaller companies [5], therefore, the percentage of employees in large firms may serve as a valid measure of scope of the ERISA exemption.

It is important to note that despite the lack of coverage among some subpopulations, we consider suicide to be a useful outcome to study because the data encompass the entire US population. That is, the dependent variable contains every death in the United States classified as a suicide during the period from 1981 to 2000, and therefore includes both covered and uncovered individuals. Over the time period under consideration, on average, 16% of the under 65 population is uninsured and 9% are on Medicaid. Large firms employ about one-third of the workforce. Including the aforementioned variables to control for heterogeneity in coverage will help us detect the effects of mandated benefits on the covered individuals.

Next, the number of psychiatrists per capita is included in all models. This variable is important to include because it is likely to be correlated both with the suicide rate and the mandated benefits. The number of psychiatrists might affect suicides by influencing the full price of receiving mental health treatment through the availability of services, and it might influence the passage of mental health mandates through a strong lobbying effort. We caution that this variable could be endogenous if the observed level reflects the overall mental health status of the state population, with more psychiatrists demanded in states with higher rates of mental illness. However, its inclusion helps

to reduce the correlation of the mandates with the error term in the suicide equation, particularly in the OLS equations. The endogeneity of mandates is discussed further below.

Lastly, a number of other state-level variables are used as covariates to represent the demographic and socio-economic status of each state's population. These variables include the female labor force participation rate, the unemployment rate, real income per capita, the percentage of the population living in rural areas, the percentage of the population 25 years and over that has obtained a bachelor's degree, and the real (1982–1984 dollars) state excise tax on beer. Previous research has found many of these state characteristics to be important determinants of suicide rates [22,30,31]. Descriptive statistics and sources for all variables are presented in Table 1.

Estimation issues

A simple population weighted OLS estimation of suicide rates on parity laws and state characteristics provides a baseline estimate of the effectiveness of the laws. This specification might prove to be biased due to simultaneity between parity adoption and suicide rates. Sturm and Pacula [15] find that parity legislation is more likely to be passed in states where mental heath service use is low, indicating a potential reverse causality from mental health outcomes to legislation. It is possible that states with high suicide rates are more likely to pass parity legislation in response to the poor mental health status of the population. Note that this proposition depends on the factors influencing legislators' decisions to enact such mandates. Suicides are fairly rare events and are typically not publicized for fear of encouraging copycat deaths. As a result, legislators might not be influenced by the suicide rate *per se* in passing mental health legislation. Nevertheless, two-stage least squares (TSLS) will be used to test for and correct for the potential endogeneity in the parity laws. The instruments used include variables relating to politics and policy.

For the TSLS specifications, we include the instruments 'Both Democratic', 'State Democrats', and 'Malpractice Cap'. The first two instruments capture the legislative regularities observed in the passage of mental health mandates, where Democratic legislatures are more likely to pass mandates.[d] The Both Democratic variable is an indicator taking the value of one if both houses of a state's legislature have Democratic majorities. The State Democrats variable measures the percentage of seats held by Democrats in a state's upper legislative house, representing the likelihood that enough votes exist to override any gubernatorial veto of a mandate. The Malpractice Cap variable indicates whether a state has enacted a cap on total damages that can be awarded in a medical malpractice case. This variable, presumably, captures the political power of physicians in the state, as doctors generally support care mandates and malpractice caps. None of these variables is directly related to suicides and they serve well as instruments for mandate adoption.

Results

Mandated benefit laws

Figure 1 shows the US suicide rate for all adults ages 25–64. This figure shows a distinct downward trend over time in the suicide rate. Figure 2 shows the suicide rates over time in four states. The rates in Maryland and Minnesota, which have mental health mandated benefits on parity with physical health, are compared to the rates in Iowa and Michigan, which had not enacted any mental health mandated benefits as of 2000. The laws in Maryland and Minnesota are considered to be very comprehensive. The laws in these states apply to all types of mental illnesses, have no small business or cost increase exemptions, and include substance abuse treatment. Figure 2 shows that both Maryland and Minnesota experienced downward trends in the suicide rates after the enactment of the mental health parity laws, however, downward trends also existed during certain periods prior to the laws as well. Indeed, Michigan, which has no mental health benefit laws, experienced a downward trend throughout the entire 1981–2000 period. Based on this simple picture, there is no suggestion that any decrease in the suicide rate can be attributed to the enactment of mental health parity laws. Thus, we proceed with a more formal, multivariate analysis.

The results in Table 2 show the effect of the adoption of any mental health insurance mandate (columns 1–3) and required mental health benefits

Table 1. Summary statistics of selected variables

Variable	Definition	Mean	Std Dev.	Source
Adult suicide rate	Number of adult suicides ages 25–64, per 100 000 population ages 25–64	16.41	4.16	NCHS
Any mental health mandate	Indicator = 1 if state has some form of a mental health insurance mandate in place, including parity mandate, benefit mandate, or offering mandate	0.27	0.44	NCSL and state statutes
Required mental health benefit	Indicator = 1 if state mandates health insurance plans to provide mental health benefits. May or may not be on parity with physical health benefits	0.11	0.31	NCSL and state statutes
Partial parity	Indicator = 1 if state mandates health insurance plans to provide mental health benefits on parity with physical health in any way.	0.06	0.24	NCSL and state statutes
Full parity	Indicator = 1 if state mandates health insurance plans to provide mental health benefits on parity with physical health in all respects (i.e. days, limits, and cost sharing).	0.06	0.23	NCSL and state statutes
Labor force participation	Labor force participation rate of women	58.26	5.20	BLS
Unemployment	Unemployment rate	6.05	2.20	BLS
Real income	Per capita income adjusted for inflation	140.32	24.20	BEA
Percent rural	Percent of state population living in rural areas	31.07	14.59	Census
College degree	Percent of state population ages 25 years and older that has graduated from a 4-year college	20.38	4.65	Census
Percent black	Percent of state population black	9.64	9.22	Census
Beer tax	State excise tax on beer	0.51	0.19	Beer Institute
Psychiatrists	Number of psychiatrists per 100 000 population	21.46	9.77	AMA
Percent large employers	Percent of state workforce in firms with 500 + employees	33.08	14.88	SBA
Percent uninsured	Percent of state population under age 65 with no health insurance	16.34	4.73	CPS
Percent Medicaid	Percent of state population under age 65 with Medicaid	8.73	3.47	CPS
Percent Medicare	Percent of state population under age 65 with Medicare	1.64	0.70	CPS
State Democrats	Percent of state upper house held by Democrats	0.56	0.18	STAT AB
Both Democratic	Indicator = 1 if Democratic majority in both state houses	0.50	0.50	STAT AB
Malpractice Cap	Indicator = 1 if state caps total medical malpractice damage awards	0.06	0.23	ATRA
Victims' Fund	Indicator = 1 if state runs no-fault compensation fund for adverse medical outcomes	0.07	0.25	ATRA

AMA: American Medical Association; ATRA: American Tort Reform Association; BLS: Bureau of Labor Statistics, US Department of Labor; BEA: Bureau of Economic Analysis, US Department of Commerce; Census: US Bureau of the Census; CPS: Current Population Survey, BLS and Bureau of the Census; NCHS: National Center for Health Statistics, Centers for Disease Control; NCSL: National Conference of State Legislatures; STAT AB: Statistical Abstract; SBA: U.S. Small Business Administration.

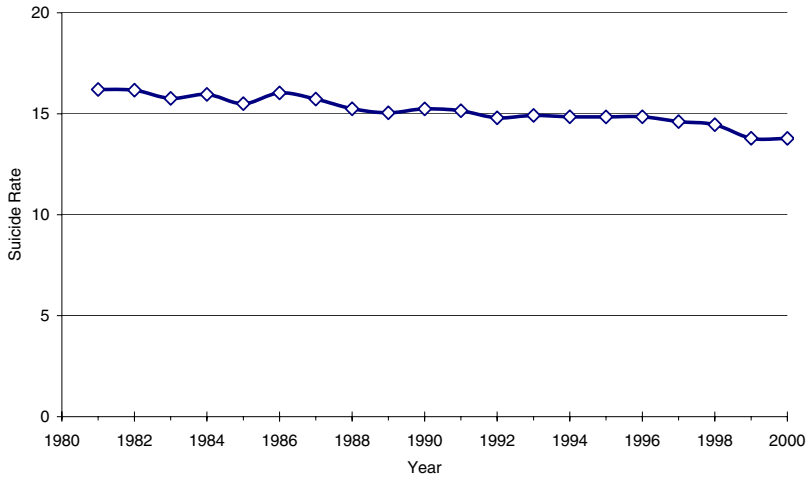

Figure 1. US suicide rate, adults ages 25–64

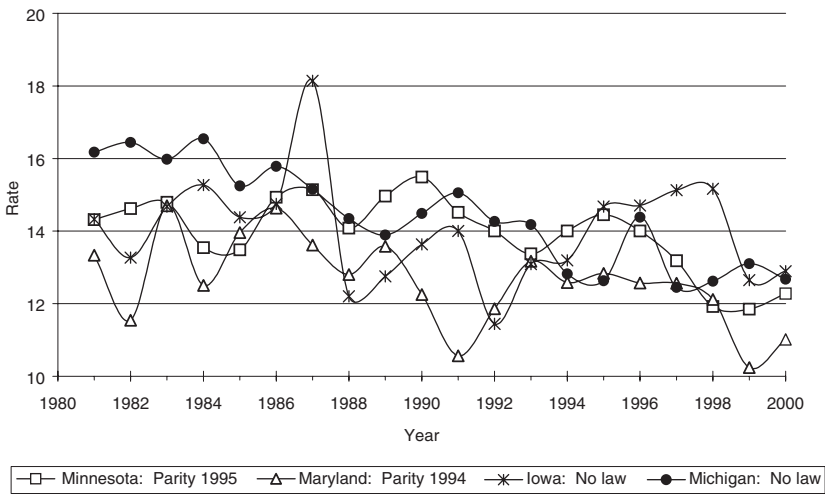

Figure 2. Suicide rates, selected states, adults ages 25–64

(columns 4–6). In the OLS estimates presented in column 1, the effect of any mandate on the suicide rate is positive but not statistically significant. In column 2, we allow for a specification including state specific trends, and observe a switch in the sign of the mandate coefficient, but it remains insignificant.

Once the endogeneity of mandate adoption is accounted for through the use of instrumental variables, the results presented in column 3 suggests that mental health mandates are negatively associated with the suicide rate, but the TSLS coefficients is not statistically significant at the 5% level. The instruments prove to be reliable, generating *F*-statistics for joint significance in the first stage greater than 36, implying that the set of instruments are highly predictive of mandate adoption. The overidentification statistic suggests that the instruments are orthogonal to suicide rates.

In the models shown in columns 4–6 of Table 2, the mandate indicator takes the value of one when a mental health benefit must be provided (the required mental health benefit indicator). Although both OLS estimates of the mandate coefficient are positive, they are small and statis-

Table 2. OLS and TSLS regressions adult suicides and mental health benefits

	OLS (1)	OLS (2)	TSLS (3)	OLS (4)	OLS (5)	TSLS (6)
Any mental health mandate	0.011	−0.104	−0.739			
	(0.08)	(−0.71)	(−1.70)			
Required mental health benefit				0.118	0.221	−0.245
				(0.60)	(1.02)	(−0.26)
Labor force participation	0.164	0.043	0.172	0.165	0.047	0.162
	(5.34)	(1.29)	(5.47)	(5.38)	(1.41)	(5.08)
Unemployment	0.121	0.144	0.119	0.119	0.149	0.123
	(2.91)	(3.02)	(2.82)	(2.87)	(3.15)	(2.88)
Real income	−0.009	−0.021	−0.010	−0.010	−0.022	−0.009
	(−1.03)	(−1.72)	(−1.05)	(−1.06)	(−1.79)	(−0.93)
Percent rural	0.033	0.166	0.036	0.031	0.168	0.036
	(0.91)	(2.25)	(0.98)	(0.87)	(2.29)	(0.95)
College degree	−0.081	−0.076	−0.073	−0.081	−0.077	−0.080
	(−2.10)	(−1.97)	(−1.85)	(−2.11)	(−2.00)	(−2.07)
Percent black	0.315	0.351	0.374	0.314	0.345	0.321
	(3.03)	(2.07)	(3.39)	(3.03)	(2.03)	(3.05)
Beer tax	0.525	1.952	0.286	0.467	1.973	0.635
	(0.60)	(1.54)	(0.32)	(0.53)	(1.56)	(0.65)
Psychiatrists	0.294	0.024	0.294	0.294	0.032	0.294
	(8.61)	(0.47)	(8.49)	(8.60)	(0.64)	(8.60)
Percent large employers	−0.016	−0.054	−0.008	−0.018	−0.050	−0.014
	(−0.79)	(−1.62)	(−0.35)	(−0.84)	(−1.49)	(−0.59)
Percent uninsured	−0.067	0.012	−0.066	−0.066	0.013	−0.069
	(−2.88)	(0.55)	(−2.79)	(−2.85)	(0.56)	(−2.85)
Percent Medicaid	0.059	0.031	0.057	0.059	0.031	0.057
	(2.29)	(1.23)	(2.19)	(2.32)	(1.25)	(2.16)
Percent Medicare	0.057	−0.029	0.064	0.056	−0.028	0.060
	(0.50)	(−0.29)	(0.56)	(0.49)	(−0.27)	(0.52)
State-specific trends	No	Yes	No	No	Yes	No
R-squared	0.903	0.934	0.900	0.903	0.934	0.902
Overidentification test			0.365			3.536
			[0.833]			[0.171]
Hausman test			3.449			0.160
			[0.064]			[0.689]
F-test on instrument(s)			36.350			14.330
			[0.000]			[0.000]

t-statistics in parentheses, *p*-values in brackets, and intercept not shown. All models include state and year dummies. $N = 1000$. The instruments in the TSLS specifications are State Democrats, Both Democratic, and Malpractice Cap.

tically insignificant. The TSLS estimate shown in column 6 is negative, but again, it is not statistically significant. Again, the TSLS result is trustworthy as implied by the large first stage *F*-statistic and the overidentification statistic again supports orthogonality.

Table 3 presents regression results where the mandate indicator takes the value of one only in instances where mental health benefits must be provided on parity with physical health. Columns 1–3 include the partial parity indicator, while columns 4–6 focus on full parity. The models include the same covariates and instruments as those in the previous table. Although the OLS results consistently suggest a negative effect of parity laws on suicide, the coefficients are small and are not statistically significant. When we correct for the potential endogeneity of adoption, the coefficients become even smaller in magnitude, suggesting that there is no systematic relationship between parity adoption and suicide. Again our instruments prove to be quite strong with large

Table 3. OLS and TSLS regressions adult suicides and mental health parity

	OLS (1)	OLS (2)	TSLS (3)	OLS (4)	OLS (5)	TSLS (6)
Partial parity	−0.308	−0.083	−0.145			
	(−1.51)	(−0.37)	(−0.17)			
Full parity				−0.334	−0.115	−0.212
				(−1.49)	(−0.46)	(−0.27)
Labor force participation	0.158	0.043	0.161	0.158	0.042	0.160
	(5.14)	(1.32)	(4.72)	(5.11)	(1.28)	(4.70)
Unemployment	0.123	0.146	0.122	0.124	0.146	0.123
	(2.96)	(3.06)	(2.91)	(3.00)	(3.08)	(2.90)
Real income	−0.008	−0.020	−0.008	−0.008	−0.020	−0.008
	(−0.85)	(−1.65)	(−0.85)	(−0.85)	(−1.62)	(−0.85)
Percent rural	0.034	0.164	0.033	0.042	0.167	0.038
	(0.96)	(2.23)	(0.93)	(1.15)	(2.27)	(0.92)
College degree	−0.078	−0.075	−0.079	−0.080	−0.075	−0.080
	(−2.02)	(−1.95)	(−2.02)	(−2.07)	(−1.94)	(−2.08)
Percent black	0.321	0.354	0.319	0.322	0.351	0.320
	(3.11)	(2.09)	(3.05)	(3.11)	(2.07)	(3.07)
Beer tax	0.596	1.985	0.557	0.574	1.991	0.555
	(0.68)	(1.57)	(0.62)	(0.66)	(1.58)	(0.63)
Psychiatrists	0.297	0.027	0.295	0.294	0.027	0.294
	(8.70)	(0.53)	(8.40)	(8.62)	(0.55)	(8.62)
Percent large employers	−0.015	−0.054	−0.016	−0.013	−0.054	−0.014
	(−0.71)	(−1.60)	(−0.74)	(−0.62)	(−1.62)	(−0.64)
Percent uninsured	−0.067	0.012	−0.067	−0.068	0.012	−0.068
	(−2.89)	(0.52)	(−2.89)	(−2.92)	(0.52)	(−2.90)
Percent Medicaid	0.060	0.032	0.059	0.058	0.031	0.058
	(2.36)	(1.26)	(2.29)	(2.26)	(1.24)	(2.26)
Percent Medicare	0.061	−0.029	0.059	0.063	−0.028	0.061
	(0.54)	(−0.28)	(0.52)	(0.56)	(−0.28)	(0.53)
State-specific trends	No	Yes	No	No	Yes	No
R-squared	0.903	0.934	0.903	0.903	0.934	0.903
Overidentification test			3.597			3.553
			[0.166]			[0.169]
Hausman test			0.040			0.026
			[0.841]			[0.872]
F-test on instrument(s)			19.390			26.890
			[0.000]			[0.000]

t-statistics in parentheses, *p*-values in brackets, and intercept not shown. All models include state and year dummies. $N = 1000$. The instruments in the TSLS specifications are State Democrats, Both Democratic, and Malpractice Cap. The mandates categorized as partial parity include laws that mandate parity between mental health coverage and physical health treatment in any way. Full parity laws require parity in all respects (i.e. days, limits, and cost sharing).

first stage *F*-statistics and large *p* values for our overidentification tests.

The measures of the mental health mandates used in Tables 2 and 3 are dichotomous indicators representing the presence or absence of certain mandates. An alternative way to present these results is to treat the mandates as mutually exclusive categories. The models shown in Table 4 include three indicators of the different types of mandates. As discussed above, we caution that these groupings are somewhat arbitrary and that the actual influence of the laws will depend tremendously on the details of the laws and the policies of regulatory agencies within the state. Subject to this caveat, mandate 1 represents states with mandated offerings only, mandate 2 repre-

Table 4. OLS and TSLS regressions adult suicides and mental health mandates categories

	OLS (1)	OLS (2)	TSLS (3)
Mandate 1	−0.089	−0.306	−0.642
	(−0.56)	(−1.72)	(−1.10)
Mandate 2	0.961	0.716	−6.513
	(2.96)	(2.06)	(−1.50)
Mandate 3	−0.173	0.009	−1.057
	(−0.79)	(0.04)	(−0.82)
Labor force participation	0.154	0.048	0.218
	(4.98)	(1.45)	(4.53)
Unemployment	0.116	0.131	0.150
	(2.80)	(2.74)	(2.51)
Real income	−0.006	−0.025	−0.023
	(−0.68)	(−2.04)	(−1.63)
Percent rural	0.027	0.152	0.075
	(0.75)	(2.06)	(1.33)
College degree	−0.072	−0.074	−0.109
	(−1.88)	(−1.92)	(−2.02)
Percent black	0.324	0.347	0.378
	(3.13)	(2.05)	(2.77)
Beer tax	0.280	1.523	1.723
	(0.32)	(1.20)	(1.00)
Psychiatrists	0.303	0.022	0.252
	(8.90)	(0.44)	(4.97)
Percent large employers	−0.021	−0.057	0.028
	(−1.02)	(−1.69)	(0.71)
Percent uninsured	−0.061	0.014	−0.100
	(−2.62)	(0.62)	(−2.53)
Percent Medicaid	0.072	0.033	−0.013
	(2.79)	(1.32)	(−0.22)
Percent Medicare	0.062	−0.028	0.055
	(0.54)	(−0.27)	(0.39)
State specific trend	No	Yes	No
R-squared	0.904	0.935	0.847
Over-Identification Test			0.116
			[0.733]
Hausman test			3.167
			[0.024]
F-test on instruments for mandate 1			31.290
			[0.000]
F-test on instruments for mandate 2			3.750
			[0.005]
F-test on instruments for mandate 3			18.210
			[0.000]

t-statistics in parentheses, *p*-values in brackets, and intercept not shown. All models include state and year dummies. $N = 1000$. The instruments in the TSLS specification are State Democrats, Both Democratic, Malpractice Cap, and Victims' Fund. Mandate 1 represents states with mandated offerings only. Mandate 2 represents states with mandated benefits that are not on parity with physical health. Mandate 3 represents states with mandated benefits that are on parity with physical health. The omitted category represents states with no mandates.

sents states with mandated benefits that are not required to be on parity with physical health, and mandate 3 represents states with mandated benefits that are on parity with physical health.[e] The omitted category represents states with no mandates.

All three available instruments are used in order to achieve identification. To allow us to perform an overidentification test, we also include an indicator representing whether or not a state has established a victims' compensation fund. These

funds represent an additional medical malpractice reform advocated by physicians since they move malpractice claims out of litigation and into a no-fault system. The rationale for including this as an instrument is similar to that for including malpractice caps.

The OLS results suggest that while mandated offerings might have a negative effect on suicide rates, the effect is not statistically significant. Mandated benefits, however, appear to worsen suicide rates, and the effect is statistically significant at the 5% level, possibly suggesting displacement. While parity mandates do not generate statistically significant coefficients, the sign of the coefficient is sensitive to whether or not state specific trends are included. In the TSLS specification, the effects of the three mandates are negative and not statistically significant. Once again, our instruments perform well, yielding large first stage *F*-statistics, and the overidentification test indicates that the instruments are not directly related to suicide rates.

Taken as a whole, our results suggest that mental health mandates have not improved mental health. Our findings do not appear to be the result of any simultaneity bias, given the performance of our instrumental variables technique and the strong instruments we identify.

State characteristics

Overall, mandated benefit laws appear to have no influence on adult suicide rates. The results in Tables 2–4 do show that some of the other state characteristics may help explain some of the variation in suicide rates across the full sample period. For example, labor market characteristics and economic conditions may predict suicide rates. Higher rates of female labor force participation are positively associated with suicides, as are higher unemployment rates. Per capita income, however, appears to have little effect as the magnitude of the coefficients are small and are statistically insignificant at the 5% level in Tables 2 and 3. In addition, states with larger percentages of the population with college degrees tend to have lower suicide rates.

The number of psychiatrists per 100 000 population is positively associated with the suicide rate, although significance is sensitive to the inclusion of state specific trends. As discussed above, the interpretation of this result must be taken with caution as it is likely that the observed numbers of psychiatrists reflects the overall mental health status of the state population. Next, larger percentages of the population without health insurance are associated with lower suicide rates in models without state trends. The negative effect of uninsurance on suicide rates might arise if self-selection is present and people who do not buy insurance are a relatively healthy group. For example, self-employed individuals are much more likely than wage-earners to be uninsured, yet Perry and Rosen [33,34] find no discernible differences between these two groups with regard to physical health status, mental health status, and service utilization. Lastly, larger percentages of the population on Medicaid are associated with higher suicide rates in models without state trends. A positive effect may arise if the program fails to provide the level of access to care necessary to prevent suicides among this population, however, it is also likely that this effect may simply reflect a time-varying state level characteristic such as lower levels of income among the state population.

Conclusion

This paper examines the potential for mental health insurance mandates to improve the mental health of the population as represented by the adult suicide rate. Using three different measures of mental health mandates, the results suggest that mandates do little to reduce the adult suicide rate in the United States. One of the primary difficulties in estimating the effects of mandated benefit laws on health outcomes is the potential endogeneity of the laws. Previous research has shown that mental health parity laws are more likely to be enacted in states with lower mental health utilization and presumably better mental health status. Our research tests for such endogeneity, but finds little support for this claim when suicide rates are considered.

Using OLS and TSLS, the estimates employing the most general definition of what constitutes a mental health insurance mandate provide the most convincing and most robust results. Indeed, there appears to be no statistically significant relationship between mandate adoption and adult suicides. Partitioning the mandates into different categories provides a check on the robustness of

this result. Mandated offering laws and parity laws, which represent the majority of the different types of state laws, drive the overall results and each appear to have no effect on suicide rates. However, the presence of mandated benefits that are not on parity with physical health benefits might increase the suicide rate. This result is consistent with a displacement effect of mandates.

This study contributes to the growing consensus in the literature that mental health mandates do not accomplish their desired goals. A next step for researchers is to examine why these laws are not achieving improvements in mental health utilization or outcomes. This research points to a number of possibilities. The design of the laws themselves might ensure no impact. In states like Arizona and Kentucky, where minimum mental health benefits are required only if the plan provides any mental health benefits, firms and insurance companies have the incentive and the option to drop benefits if they are too costly. Similarly, cost increase exemptions and small employer exemptions in a number of the state laws might prevent any of the mandates from being binding. The design of the laws notwithstanding, it is also unclear what effect the mandates have on the cost of providing mental and even physical health insurance. Rising premiums might encourage employers to raise employee contributions or to drop coverage altogether. These questions are beyond the scope of this study, but are nonetheless important questions in determining whether mandated mental health benefits improve the mental health of the population.

When drawing conclusions from this study, one must be cognizant of confounding issues. First, as some forms of mental health treatment such as psychotherapy may take any time from weeks to years to be effective, there may exist a long lag time between the enactment of the laws and observed improvements in mental health outcomes. Second, suicides represent the most severe cases of mental illness, and while suicides impose significant costs on individuals and society, they are a small part of the overall mental health of the population. Indeed, most people with mental health problems will not commit suicide. Future research should focus on an evaluation of other outcomes measures such as DSM diagnoses collected using the Composite International Diagnostic Interview and quality of life measures.

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Notes

a. Other studies and sources of the laws use different definitions for 'parity' states. For example, Sturm and Pacula [15] include in the group of parity states those requiring parity, without necessarily mandating benefits.
b. We also examined an additional category of laws representing substance abuse treatment mandates. Our characterization of these laws is incomplete, however, since a number of states have substance abuse treatment laws, which are separate from their mental health benefits laws. Analyzing the impact of these laws is beyond the scope of this paper, but is a subject for future research.
c. Medicare provides both inpatient and outpatient mental health benefits. Medicaid also provides mental health services, but to varying degrees based on the state.
d. Levinson and Druss [32, p. 140] note that the primary opponents of parity legislation are business interests, which are generally assumed to have relatively greater influence on Republicans. They go on to note that 'conservative' legislators tend to focus on the cost increases that mental health mandates are likely to generate, leading them to oppose mandated benefits.
e. Including the exclusive category of full parity does not change our results. We chose against presenting this specification since only four states adopted full parity in our sample.

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