Subsidizing Addiction: Do State Health Insurance Mandates Increase Alcohol Consumption?

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ABSTRACT

A model of addiction in which individuals are forward looking implies that as the availability of addiction treatment options grows, individuals will consume more of an addictive good. We test this implication using cross-state variation in the adoption of mental health parity mandates that include substance abuse treatments. We examine the effects of these mandates on the consumption of alcohol and find that parity legislation leads to an increase in alcohol consumption. To account for the possible endogeneity of the adoption of mental health parity mandates, we perform an instrumental variables analysis and find that the ordinary least squares estimation significantly underestimates the insurance effect on alcohol consumption.

1. INTRODUCTION

To combat the large and seemingly growing problem of mental illness in the United States, most states enacted mental health parity legislation in the 1980s and 1990s.[1] The enacted legislation at the state level man-

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1. Actually, policymakers and scholars worldwide have increased the attention paid to the effects of mental illness. The Global Burden of Disease study conducted by the World Health Organization, the World Bank, and Harvard University estimates that mental illness accounts for more than 15 percent of the burden of disease in the developed world. This fraction is greater than the share of disease that is attributable to all forms of cancer

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dates that treatments for mental illness be covered by insurance plans at terms similar to those applying to physical illness. Although the specifics of the mandates vary from state to state, the strongest mental health parity laws require that health plans set the same deductibles and copayments, as well as annual expense and visit limits, for mental health patients as for patients with physical health conditions.[2]

In this paper, we study whether the availability of addiction treatments, which lower the cost of the addiction itself, affects an individual's choice regarding current consumption of an addictive good. We use the adoption of state parity laws to test the hypothesis regarding the effect of subsidies on addictive behavior, focusing on alcohol consumption, comparing the changes in drinking from adopting states' prelaw baseline to the contemporaneous changes in drinking in states that do not adopt parity laws.

We find that drinking does rise after parity laws are passed. Since unobserved variables might simultaneously determine changes in drinking behavior and the adoption of the parity laws, we control for the potential endogeneity of parity adoption through instrumental variables analysis. We show that failing to control for this simultaneity biases downward the effect of parity mandates on drinking. The empirical results suggest that individuals react rationally to changes in incentives, providing support for models that imply that individuals do consider the costs of their behavior when deciding to consume addictive goods. From a public policy perspective, our results imply that providing insurance coverage for mental disorders in general, and addiction in particular, has unintended consequences. Unintended consequences may arise owing to moral hazards and offsetting behaviors. In particular, parity mandates might induce individuals to alter their behavior in such a way as to increase the demand for mental health treatments.

In Section 2 of this paper, we provide some background on mental health parity laws. In Section 3, we briefly discuss the implications of both the rational addiction model of Gary Becker, Michael Grossman, and Kevin Murphy and the hyperbolic discounting model of Jonathan

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combined (Murray and Lopez 1996). The Global Burden of Disease study highlights alcoholism as one form of mental illness and finds that in the developed world, alcohol use is the leading cause of disability among men and the tenth leading cause among women.

2. The mandates also vary in terms of what illnesses are covered under mental health parity, with some mandates including any disorder listed in the American Psychiatric Association's Diagnostic and Statistical Manual, while others cover only specified diseases. Further, many states provide exemptions for small businesses or those for whom the mandated coverage terms would lead to a specified cost increase.

Gruber and Botond Köszegi for the provision of addiction insurance. In Section 4, we present the empirical model that tests the insured addiction model. Section 5 presents results, and Section 6 concludes.

2. MENTAL HEALTH PARITY BACKGROUND

Medical insurance plans tend to provide less coverage for mental illnesses than for physical illnesses. Buck and Umland (1997), for example, find that while health care costs per employee grew from 1989 to 1995, mental health care costs decreased in absolute terms and as a fraction of employers' total medical plan expenses. Jensen et al. (1998) find that while the proportion of employees with mental health care coverage increased over the period 1991–95, coverage came with significant limitations for most. Buck et al. (1999) report that restrictions on mental health coverage were substantial for most individuals as of 1997.

Market failures might provide an explanation for the difference in terms between mental health and physical health coverage. That is, there is empirical evidence that both moral hazard and adverse-selection problems are more acute for mental health insurance than for physical health insurance. For example, researchers involved in the Rand Health Insurance Experiment estimated that the response to reduced cost sharing for mental health services is nearly twice as large as that observed in general medical care (Newhouse and the Insurance Experiment Group 1993).

Similarly, mental health disorders appear to lead to substantial adverse-selection problems, as indicated by the experience of the Federal Employees Health Benefit Program in the 1970s. In that case, one of the available providers (Aetna) offered a parity benefit while the other (Blue Cross) did not. Aetna immediately attracted a higher risk pool of enrollees, which resulted in financial losses on the coverage. Aetna eventually dropped the parity option (McGuire 1981).

While parity mandates may give rise to moral hazard and adverse selection, some work points to evidence that the direct costs of parity mandates to employers are considerably lower than had been presumed, since these costs may be offset by improvements in worker health and in productivity gains. Sturm (1997), for example, estimates that the cost figures used during the federal government's 1996 analysis of mental health parity were overstated by a factor of four to eight. According to his analysis, removing annual limits on mental health care expenses would cost an insurance plan an extra $1 per enrollee per year on av-

erage. The Congressional Budget Office (2001) estimates that implementation of the Senate's version of mental health parity would increase premiums for group health plans by an average of only .9 percent. Results presented in Gruber (1994) suggest that insurance mandates might do little to improve access to treatment.[3] These results imply that cost increases associated with parity laws are likely to be low.

Other work suggests that mandatory provision of mental illness coverage reduces other costs borne by employers. England (1999), for example, claims that employers lost $24 billion in 1993 owing to lost work time and productivity as a result of untreated depression among their employees. Olfson, Sing, and Schlesinger (1999) note that the indirect cost savings that occur when mental illness is covered by insurance might be particularly important with respect to treatments for alcoholism. They cite evidence that early treatment of the disorder can eliminate many of the health costs that are associated with alcoholism, such as cirrhosis, cardiomyopathy, and chronic hepatic encephalopathy.[4]

While academic work on health parity laws has studied the costs and benefits of mental health parity, it has not examined the potential increase in indirect costs due to moral hazard. Studies have not examined the possibility that parity mandates might induce individuals to alter their behavior in such a way as to increase the demand for mental health treatments. This paper addresses that issue.

Our determination of whether a state has a mental health parity law is based on information provided by the National Conference of State Legislatures, as well as an independent analysis of state insurance statutes and regulations. Our search of the states' statutes resulted in a somewhat different classifications than those provided by a number of mental health advocacy groups such as the National Alliance for the Mentally Ill and the National Mental Health Association. Although much previous research, such as Sturm and Pacula (1999), relies on the classifications provided by these advocacy groups, there appear to be inconsistencies among the various classifications, as well as with the original statutory

3. Klick and Markowitz (forthcoming) present indirect evidence of this for mental health mandates in particular.

4. Other costs associated with alcohol consumption include an increase in suicide (Chatterji et al. 2004), poor labor market outcomes (Mullahy and Sindelar 1993, 1996), higher assault rates (Markowitz 2005), domestic violence (Markowitz 2000), higher incidence of sexually transmitted diseases (Klick and Stratmann 2003), and an increase in automobile fatalities (Levitt and Porter 2001).

language passed by the state legislatures themselves.[5] Even though our primary results are robust to using any of the classifications, we believe that our reliance on the original statutes has resulted in a more accurate coding of the various laws and that this improvement in accuracy has also improved the precision of our estimates.

While most states have passed some form of parity mandate, there is a wide variation with respect to the timing of the parity adoption. Thus, it is a natural question to ask what determines whether and when a state will adopt a parity mandate. Sturm and Pacula (1999), for example, indicate that states with relatively low utilization rates of mental health services were more likely to pass mandates. Looking specifically at mandates that explicitly include coverage for substance abuse, it appears that there are also significant political determinants involved in the adoption of mental health parity laws.

Table 1 describes the states that have adopted mental health parity legislation. In this paper we analyze data from the 1988–98 period, during which 10 states adopted parity mandates that explicitly include substance abuse and three states adopted laws that explicitly exclude substance abuse.

5. For example, Sturm and Pacula (1999, p. 186) present a chart describing the National Alliance for the Mentally Ill's classification of state parity laws, in which Tennessee's law is said to exclude substance abuse. While Tennessee's statutory code (Tenn. Code Ann., sec. 56-7-2601(a)) does appear to allow insurance plans to limit coverage for substance abuse ("All other provisions of the laws of the state of Tennessee notwithstanding, any individual, franchise, blanket or group policy of insurance issued pursuant to this title which provides hospital expense and surgical expense insurance and which is entered into, delivered, issued for delivery, or renewed [excepting individual insurance policy renewal] by agreement or otherwise, commencing on July 1, 1974, shall provide benefits for expense of residents of the state of Tennessee covered under any such policy or plan, arising from psychiatric disorders, mental or nervous conditions [as described and defined in the Diagnostic Standard Manual of the American Psychiatric Association], alcoholism, drug dependence [both defined as mental illness in sec. 33-1-101], or the medical complication of mental illness or mental retardation, *unless the policy or plan of insurance specifically excludes or reduces the above benefits*" [emphasis added]), the last line of the subsection ("the provisions of this subsection shall not apply to group policies or plans to which sec. 56-7-2360 applies") implies that this possibility is precluded by the state's parity statute.

Table 1. Mental Health Parity Laws

Law Explicitly Includes Substance Abuse	Law Does Not Explicitly Exclude Substance Abuse	Law Explicitly Excludes Substance Abuse
Connecticut (2000)	Alabama (2001)	Arizona (1998)
Georgia (1998)	Arkansas (1997)	Colorado (1992)
Kansas (1998)	California (1974)	Texas (1997)
Louisiana (1982)	Delaware (1999)	
Maryland (1994)	Florida (1992)	
Michigan (2001)	Hawaii (1988)	
Minnesota (1995)	Illinois (1991)	
Mississippi (1975)	Indiana (2000)	
Missouri (1997)	Kentucky (1987)	
Montana (1997)	Maine (1996)	
New York (1998)	Massachusetts (1996)	
North Dakota (1995)	Nebraska (2000)	
Ohio (1985)	Nevada (2000)	
Oregon (2000)	New Hampshire (1993)	
Rhode Island (2001)	New Jersey (1999)	
South Carolina (1994)	New Mexico (2000)	
Vermont (1998)	Oklahoma (2000)	
Virginia (2000)	Pennsylvania (1999)	
	Rhode Island (1995)	
	South Dakota (1998)	
	Tennessee (2000)	
	Utah (2001)	
	Washington (1987)	
	West Virginia (1998)	

Note. The year of adoption is in parentheses.

3. INSURED ADDICTION

Becker and Murphy (1988) analyze the implications of rational choice in the presence of addictive goods.[6] They show that an individual might rationally choose to consume an addictive good if the present value of doing so is sufficiently high as to outweigh the expected costs of addiction. Their model represents a distinct departure from a myopic view of addiction (see, for example, Pollak 1970) in which the individual does not fully consider the future costs of his present consumption.[7]

6. Becker and Murphy's (1988) model has important antecedents in the literature, including Ryder and Heal (1973), Stigler and Becker (1977), Boyer (1978, 1983), and Iannaccone (1986).

7. Arcidiacono, Sieg, and Sloan (2001) present a dynamic discrete-choice model that allows myopia as a special case of a general forward-looking model. They use their model to forecast drinking and smoking rates in a different sample, showing that the forward-looking model dominates myopia as a descriptive model.

A long line of empirical testing of the rational addiction literature was begun by Becker, Grossman, and Murphy (1994).[8] In that paper, the dynamic rational addiction model was adapted to allow for empirical testing of the theory using variation in the past and future prices of cigarettes to explain current cigarette consumption. The model has since been applied in several studies to explain consumption patterns of numerous addictive goods including cocaine (Grossman and Chaloupka 1998), gambling (Mobilia 1993), and alcohol (Grossman, Chaloupka, and Sirtalan 1998), all of which found support for the key hypotheses of the rational addiction model.[9]

In the Becker, Grossman, and Murphy framework, the effect of including insurance covering addiction treatment is obvious. Addiction insurance effectively lowers the future cost of current consumption of an addictive good. Included in an individual's expectations about the cost of becoming addicted are things such as increased difficulty in holding a job or maintaining a family, maintaining a threshold level of consumption in the face of unexpected price increases, or health costs associated with long-term consumption. Subsidized addiction treatment lowers the expected future cost of current consumption since treatment will make it easier to avoid these other costs in the event that an addiction develops.

A recent challenger to the rational addiction model has been proposed by Gruber and Köszegi (2001), who assume time-inconsistent preferences, which is a departure from the standard rational addiction model. A key feature of time-inconsistent preferences in the addiction context, according to Gruber and Köszegi, is systematically overestimating the ability to quit or reduce consumption in the future. This failure to accurately price the costs of addiction causes the individual to consume too much of the addictive good in the current period, discounting future costs of addiction because of a belief that he or she will be able to overcome the addiction relatively easily. In a sense, the current self imposes an "internality" on the future self through the mistaken expectations regarding the efficacy of treatment. The presence of addiction insurance will reinforce that belief. Thus, as long as the individual is

8. A few earlier papers (Chaloupka 1991; Keeler et al. 1993) had used the model to examine cigarette addiction, although they had slightly less effect on subsequent literature.

9. Chaloupka and Warner (2000) provide an overview of the empirical literature on rational addiction. Pacula and Chaloupka (2001) show that consumption decisions for addictive goods are affected by changes in nominal prices and implicit prices (such as penalties for consuming illegal substances).

forward looking, the expectation of addiction insurance subsidies will increase current consumption of an addictive good, regardless of whether time-consistent or time-inconsistent preferences are assumed.[10]

4. EMPIRICAL TEST

The best test of the insured addiction model would be generated from an exogenous assignment of insurance to some group of individuals, who would constitute the treatment group; those individuals without this assignment would constitute the control group. If individuals self-select on the basis of insurance status, as is typical in most publicly available data, unobservable characteristics that influence the decision to purchase insurance might also influence consumption decisions. This would not allow us to isolate the causal effect of future insurance coverage on current consumption of addictive goods.

States that adopt a mental health parity law, however, provide a quasi experiment if these laws provide insured individuals in that state with an exogenous increase in insurance coverage (that is, effectively cheaper treatment opportunities).[11] We use this shock to identify the effect of cheaper treatment options in the future on the decision to consume addictive goods currently. Since we focus on alcohol addiction, we analyze the effect of mental health parity mandates that include coverage for addiction treatments on alcohol consumption. Extending the models of addiction described above to include a treatment option leads to a prediction of a positive relationship between adoption of the mandates and alcohol consumption.

However, there is the possibility that the parity laws were passed because voters had preferences for more (or less) current drinking and for having alcohol addiction treatment made cheaper to individuals by having it covered by medical insurance. We will address this possible endogeneity of the laws with respect to drinking decisions later in this paper.

10. It is interesting to note that Gruber and Köszegi's (2001) model and results also imply forward-looking behavior in an individual's decision to consume addictive goods.

11. For those individuals who already received mental health benefits, the mandates have the effect of making coverage more certain, since employers or insurers no longer have the option of dropping such coverage. Further, if the individual was forced to switch insurers (for example, in the case of changing jobs), the coverage will still be available. For those with coverage, the mandates most likely would have eased some restrictions those individuals faced in their coverage.

Using a panel of per capita beer consumption[12] for each state for the period 1988–98[13] as the dependent variable, we use weighted least squares estimation[14] to examine the effect of the parity legislation on consumption of the addictive good. Although our primary results are robust for wine and spirits, we focus on beer consumption as our measure of drinking because of evidence that beer is the primary choice of individuals on the verge of developing an alcohol addiction, at least in recent years.[15] Further, previous researchers have developed more consistent measures of state beer taxes than they have for either wine or spirits. In addition, we control for a number of covariates that may be important for explaining alcohol consumption.

The parity indicator is an indicator variable that takes the value of one if a state has adopted a mental health parity mandate for a given year. We focus on those states whose mental health parity laws explicitly cover treatment for addiction or substance abuse. Our control group includes states that have not adopted a mental health parity law, states whose parity laws do not mention substance abuse and addiction, and states whose mental health parity laws explicitly exclude alcohol addiction. In this set of regressions, we predict that the adoption of the parity law that includes mandatory treatment for alcohol addiction leads to a positive and statistically significant increase in alcohol consumption. We also provide separate estimates in which we use the states that adopted a parity mandate but explicitly excluded the coverage of substance abuse as a separate control group. In this set of regressions, we predict that adoption of the parity laws that include mandatory coverage for treatments of alcohol addiction leads to a positive and statistically significant

12. The per capita beer consumption variable is measured in gallons of ethanol consumed per person per year. The figures are from are sales data, as opposed to self-reported consumption data. Beer generally contains 4 percent alcohol by volume, so a standard 12-ounce beer represents .48 ounces, or .00375 gallons, of ethanol. Stated differently, approximately 267 standard beers contain a gallon of ethanol.

13. We chose this period on the basis of two factors: all of the states had raised their minimum legal drinking age to 21 by 1988 (DiNardo and Lemieux 2001), and data on per capita alcohol sales are currently not available after 1998.

14. Since the dependent variable is a per capita figure, we weight each observation by state population.

15. For example, Miller and Cervantes (1997) find that in a sample of problem drinkers, beer was more commonly the alcohol of choice for men than was wine or spirits. Using a larger sample and regression techniques, Jensen et al. (2002) found that among moderate drinkers, those preferring beer were more likely to become heavy drinkers than those preferring wine or spirits. This result held for both men and women but was more pronounced for men.

increase in alcohol consumption but that the point estimate on the parity laws that exclude alcohol addiction from mandatory treatment coverage will not be statistically different from zero.

For covariates, the theoretical models predict that past and future consumption influences current consumption. In some of our specifications, we substitute current and future prices for current and future consumption because the effect of alcohol consumption in adjacent periods on current-period alcohol consumption should be entirely captured by changes in alcohol prices (Becker, Grossman, and Murphy 1994). However, as pointed out by Gruber and Köszegi (2001), future prices should have an effect only when changes are correctly forecasted.

In all regressions, we include current alcohol prices in the alcohol consumption equation. As previous work has done, we use real changes in state alcohol tax rates as a measure for beer prices.[16] We predict a negative relationship between current price and current consumption and a positive relationship between current consumption and past and future consumption, which captures the addictive nature of alcohol consumption. Given questions about individuals' abilities to forecast tax changes, however, we do not expect the past and future price terms to generate statistically significant coefficients.

Also, even if individuals are good at forecasting tax changes, since we are using data aggregated at the state level, as opposed to micro data, it is not clear that we will find the predicted pattern in the aggregated data. Since state data are averaged over individuals who are on paths to increasing or decreasing consumption, the aggregates may not reveal the pattern that we expect to see at the individual level. Moreover, the predicted pattern may also be difficult to find owing to migration to and from the state over time. Although these variables are not central to our analysis, we will include them, as previous work has found that consumption in adjacent periods is important in explaining current consumption.

We also control for income, predicting a positive relationship between income and alcohol consumption (that is, alcohol is a normal good). In addition, we control for various demographic factors that influence per capita drinking rates such as age measures, education, percentage of the population living in rural areas, religion, and race variables. We also control for state unemployment and the availability of counseling ser-

16. Note, however, that Young and Bielinska-Kwapisz (2002) demonstrate that taxes might not be terribly strong predictors of alcohol prices in the short term.

vices in the state. We use the per capita number of psychiatrists in the state and per capita spending on mental health services to capture this availability effect.

Since parity legislation affects only those who are insured already, we might not expect to see any change in behavior among the uninsured.[17] To control for this, we include a variable that represents the fraction of the state's population that is not covered by an insurance plan. Also, since individuals covered by Medicaid and Medicare are not affected by the mandates, we also include controls for the percentage of state population covered by each of those programs. Finally, even some individuals who are insured by private plans will not be covered by the mandates owing to preemption provided by the Employment Retirement Income Security Act (ERISA), which precludes states from mandating benefits for employees in firms that self-insure. While there are no comprehensive data on what percentage of each state's workforce is not affected by ERISA, a good proxy is the percentage of the workforce employed by relatively small firms, which are less likely to be able to self-insure. To capture this effect, we include a variable that measures the percentage of the state's workforce employed by firms with between one and four employees.[18]

More formally, our empirical models are

$$E_{it} = a\mathrm{MHP}_{it} + dP_{it} + jP_{it-1} + gP_{t+1} + \mathbf{QC}_{it} + u_i + t_t + e_{it}$$

and

$$E_{it} = a\mathrm{MHP}_{it} + b\mathrm{MHPEA}_{it} + dP_{it} + jP_{it-1} + gP_{t+1} + \mathbf{QC}_{it} + u_i + t_t + e_{it},$$

which we estimate with weighted least squares regressions, where each observation is weighted by state population. The variable E_{it} measures per capita beer consumption in state i during year t, MHP_{it} is the status of the parity indicator in state i during year t, MHPEA_{it} is an indicator for whether the state has a parity law that explicitly excludes addiction treatment, P_{it} is state i's beer tax in year t, $\mathbf{QC}_{it}$ is a vector of state variables, u_i is a time-invariant state fixed effect term, t_t is a year fixed effect term, and e_{it} is a stochastic error term. As indicated above, consumption in adjacent time periods is likely to be endogenous to current

17. However, this need not be true if the uninsured expect to become insured in the future.

18. All results are qualitatively similar if we use higher cutoffs such as 9, 19, and 99.

consumption, so we use past and future prices to proxy for the past and future consumption variables, predicting negative signs on each.

Descriptive statistics and sources for these data are included in Table 2. The mean beer consumption per capita (population aged 14 years and older) is 1.320 gallons of ethanol per year, which corresponds to about 352 standard 12-ounce beers per year. Three percent of our state-year observations are subject to a mandatory state health parity law that includes coverage of alcohol addiction, and approximately 3 percent of our observations are subject to health parity laws that specifically exclude coverage of alcohol addiction.

5. RESULTS

Table 3 presents the weighted least squares estimates of our insured addiction model. In Table 3, columns 1–3, we present specifications in which states that have parity laws that include addiction treatments are the treatment group and all other states are implicitly the control group; this control includes states that have a parity law but do not mandate addiction treatment. Columns 4–6 include states with parity laws that exclude addiction treatment as a separate control group. Regardless of the specification, our parity coefficient is positive, but it is not statistically significant. The point estimate suggests that adoption of parity laws covering addiction treatments increases per capita beer consumption by about .02 gallons of ethanol. This increase is equivalent to an additional five beers per person annually.

Once we introduce states with parity laws that exclude addiction treatment as a separate control variable, we get effectively the same coefficient on our indicator of parity laws including addiction treatment. As predicted, the point estimates on the parity laws that excluded alcohol addiction from mandatory treatment are not significantly different from zero, except in the specification that includes no other control variables.

While the positive coefficients on the parity indicator lend support to the insured rational addiction model, the lack of statistical significance limits our ability to draw strong inferences from the data. There is the possibility that the adoption of parity mandates is endogenous in the alcohol consumption equation.[19] In this case, the point estimates on the

19. For a good review of the literature on the endogeneity of political institutions, see Besley and Case (2003).

parity laws are biased, and the adoption of parity laws no longer serves as a good measure for increased insurance coverage.

The coefficient on the parity laws may have an upward or downward bias. If adoption of the measure is positively influenced by expected increases in drinking rates, states will adopt mandatory treatment laws when they expect increases in alcohol addiction. In this example, state governments act proactively by ensuring coverage when they expect an increase in drinking problems, and the point estimate has an upward bias. Also, voters may push for treatment insurance coverage when their preferences change toward consuming more alcohol. Endogeneity of this kind also biases the parity coefficients upward.

Alternatively, voters with a preference for little or no alcohol consumption in the state might wish to further reduce alcohol consumption and possible addiction by passage of parity laws. Legislators may be induced to pass mandatory mental health insurance in such states since these states have little alcohol consumption, and thus little demand for treatment to begin with; parity laws in these situations are unlikely to impose very large costs on employers. In this context, the ordinary least squares (OLS) point estimates of the effect of parity laws are biased downward.

To allow for the possibility of endogenous parity laws, we perform an instrumental variables analysis in which we instrument the parity mandate indicator with variables that are unlikely to be related to beer consumption.[20] For the identification strategy to be successful, we must select instruments that affect the adoption of parity mandates but do not affect beer consumption (except through their effect on parity adoption).[21]

For our instruments, we choose an indicator variable that captures whether the state has enacted a mandate requiring insurers to cover diabetes treatments, an indicator variable that captures whether the state

20. The parity mandate indicator is estimated in the first stage as a linear probability model. Although it might seem as though it would be better to estimate the indicator using a probit model, this would require calculating a maximum-likelihood function that included the state and year fixed effects, which would be computationally difficult. The other option of demeaning all of the variables, to allow us to ignore the fixed effects terms, would bias the standard error estimates. Using the linear probability model in the first stage avoids these problems and allows us to estimate the causal effect of the treatment consistently and efficiently (Angrist 2000). For an earlier application of the linear probability model for endogenous regressors, see Heckman and MaCurdy (1985).

21. For a good discussion of instrumental variables techniques, as well as the conditions required for having a good instrument, see Angrist and Krueger (2001).

Table 2. Summary Statistics

Variable	Description	Mean	SD	Source
Beer Consumption	Amount of beer purchased (in gallons of ethanol) per person aged 14 years and older	1.320	.219	NIH (2005)
Parity with Alcohol	Indicator = 1 if state has MHP mandate that includes substance abuse treatment	.029	.169	NCSL (2005)
Parity Excluding Alcohol	Indicator = 1 if state has MHP mandate that explicitly excludes substance abuse treatment	.025	.155	NCSL (2005)
Mental Health Spending	Spending by state mental health agency per capita	48.322	21.662	NASMHPD (1992, 1996, 1999)
Psychiatrists	Number of physicians listing psychiatry as specialty per 100,000 people in state	22.259	9.726	AMA (1988–98)
Beer Tax	Federal and state tax per gallon of beer in real 1982 dollars	.521	.182	Beer Institute (various years)
Personal Income	Personal income per capita in real 1982 dollars (1,000s)	14.794	2.386	BEA (1988–98)
Unemployment	State unemployment rate	5.498	1.555	BLS (1988–98)
Uninsured	Percentage of state population without insurance	13.794	4.155	U.S. Census Bureau (1988–98)
Rural	Percentage of state population living in rural areas	30.747	14.605	U.S. Census Bureau (1988–98)
Small Business	Percentage of state workforce employed by firms with one to four employees	6.239	1.521	SBA (1988–98)

Secondary Education	Percentage of state population with high school education	78.679	6.107	U.S. Census Bureau (1988–98)
Medicaid	Percentage of state population in Medicaid program	9.457	3.473	CPS (1988–98)
Medicare	Percentage of state population in Medicare program	13.652	2.207	CPS (1988–98)
Population 15 to 19	Percentage of state population aged 15–19	7.258	.777	U.S. Census Bureau (1988–98)
Population 20 to 29	Percentage of state population aged 20–29	14.965	1.694	U.S. Census Bureau (1988–98)
Religion	Percentage of state population affiliated with major Christian church	51.316	11.980	Jones et al. (2002)
Black Population	Percentage of state population that is black	10.858	12.038	U.S. Census Bureau (1988–98)
Medmal Cap	Indicator = 1 if state has passed a cap on total awards in medical malpractice cases	.065	.247	ATRA (2005)
Diabetes Mandate	Indicator = 1 if state has passed a mandate requiring insurers to cover diabetes treatments	.155	.362	NCSL (2004)
Doctors	Number of physicians per 100,000 people in state excluding psychiatrists	379.196	70.833	AMA (1988–98)

Note. MHP = mental health parity; NIH = National Institutes of Health; NCSL = National Conference of State Legislators; NASMHPD = National Association of State Mental Health Program Directors; AMA = American Medical Association; BEA = Bureau of Economic Analysis; BLS = Bureau of Labor Statistics; SBA = Small Business Administration; CPS = Current Population Survey; ATRA = American Tort Reform Association.

Table 3. Weighted Least Squares Estimation Relating Parity to Beer Consumption

Variable	(1)	(2)	(3)	(4)	(5)	(6)
Parity with Alcohol	.002	.023	.023	.004	.023	.023
	(.017)	(.013)	(.013)	(.017)	(.013)	(.013)
Parity Excluding Alcohol	. . .	. . .	. . .	.042	−.007	−.006
				(.013)	(.010)	(.010)
Beer Tax	. . .	−.234	−.395	. . .	−.234	−.394
		(.053)	(.174)		(.053)	(.174)
Beer Tax$_{t-1}$	. . .	. . .	.045	. . .	. . .	.044
			(.109)			(.109)
Beer Tax$_{t+1}$	. . .	. . .	.139	. . .	. . .	.139
			(.137)			(.137)
Personal Income	. . .	.032	.031	. . .	.032	.032
		(.006)	(.006)		(.006)	(.006)
Uninsured	. . .	−.000	−.000	. . .	−.000	−.000
		(.001)	(.001)		(.001)	(.001)
Secondary Education	. . .	.005	.005	. . .	.005	.005
		(.002)	(.002)		(.002)	(.002)
Population 15 to 19		.003	.003	. . .	.002	.002
		(.011)	(.011)		(.011)	(.011)
Population 20 to 29	. . .	.006	.006	. . .	.006	.006
		(.005)	(.005)		(.005)	(.005)
Black Population	. . .	−.016	−.016	. . .	−.016	−.016
		(.007)	(.007)		(.007)	(.007)
Unemployment	. . .	.001	.001	. . .	.001	.001
		(.002)	(.002)		(.002)	(.002)
Rural	. . .	.003	.003	. . .	.004	.003
		(.002)	(.002)		(.002)	(.002)
Small Business	. . .	−.053	−.053	. . .	−.054	−.054
		(.008)	(.008)		(.009)	(.009)
Medicaid	. . .	.001	.001	. . .	.001	.001
		(.001)	(.001)		(.001)	(.001)
Medicare	. . .	.017	.018	. . .	.017	.018
		(.008)	(.008)		(.008)	(.008)
Psychiatrists	. . .	.000	.000	. . .	.000	.000
		(.002)	(.002)		(.002)	(.002)
Mental Health Spending	. . .	.002	.002	. . .	.002	.002
		(.003)	(.003)		(.003)	(.003)
Religion	. . .	−.007	−.007	. . .	−.007	−.007
		(.001)	(.002)		(.001)	(.002)
Adjusted R^2	.941	.975	.975	.942	.975	.975
Observations	612	599	599	612	599	599

Note. The dependent variable is per capita (person aged 14 years and older) beer sales by state measured in gallons of ethanol. One gallon of ethanol equals approximately 267 standard (that is, 12 ounces; 4% alcohol by volume) beers. Population weights are used. State and year effects are included for all equations. Standard errors are in parentheses below coefficient estimates.

has enacted caps on medical malpractice damage awards, and the number of physicians in the state (excluding psychiatrists) per capita. The first two instruments are intended to capture the general regulatory and legislative environment faced by insurers. If a given state has passed an insurance mandate with respect to diabetes treatments, it would seem likely that it is also willing to mandate coverage in the mental health area. The argument with respect to medical malpractice reform is slightly

less direct. Our assumption is that voters tend to view the insurance industry as a whole and do not differentiate between property and casualty insurers (who write malpractice policies) and health insurers (who would need to cover mental health treatments). Thus, this instrument picks up whether voters view the insurance industry positively or negatively.[22] Also, to some extent, both of these instruments likely capture the effects of any political contribution limits a state places on corporations. If the state limits corporations from making political donations, we should expect that insurance mandates are more likely to be passed and medical malpractice reform are less likely to be passed.

Our last instrument, physicians per capita, attempts to capture the Sturm and Pacula (1999) finding that states whose residents have relatively poor access to mental health services are more likely to pass mental health mandates. Since availability of mental health treatment is likely to be correlated with the number of medical professionals in a state, we believe that this instrument will prove to be powerful. We exclude psychiatrists from our physicians variable given that an increased presence of psychiatrists in a state might directly affect drinking rates in the state.[23]

As shown in Table 4 and the Appendix, our instruments uniformly capture a statistically significant part of the variation in parity laws, since the first-stage *F*-statistics indicate that the instruments are individually and jointly statistically significant and the correlations run in the directions predicted above. For the mandates that include addiction coverage, we find first-stage *F*-statistics of about 20, which is far above the standard cutoff for considering instruments to be good predictors of the endogenous regressors (Staiger and Stock 1997).[24]

22. We find qualitatively similar results if we drop the medical malpractice reform instrument. We choose to include it in the regressions we present here in order to be able to perform the test of overidentifying restrictions for the specifications that include two parity indicators.

23. There is still the concern that individuals seek treatment for depression from their family doctors as well, which could then have an effect on the individuals' consumption of alcohol. We find that we get very similar results if we use the number of doctors in a specific specialty, using those specialties that are unlikely to counsel patients regarding depression (for example, obstetricians, surgeons, and so on) as our instrument. To further rule out the potential that our instruments affect drinking directly, we present the results of a test of overidentifying restrictions that indicates that our instruments do not directly affect drinking rates.

24. Staiger and Stock (1997) discuss how, for first-stage *F*-statistics under 10, the asymptotic approximations of the distributions of the major diagnostic statistics (such as those used for tests of overidentifying restrictions) break down. Further, Angrist and Krueger (2001) discuss how sets of instruments with a first-stage *F*-statistic less than 10 generate

Table 4. Instrumental-Variables Estimation Relating Parity to Beer Consumption

Variable	(1)	(2)	(3)	(4)	(5)	(6)
Parity with Alcohol	−.145	.179	.179	−.184	.145	.144
	(.120)	(.043)	(.043)	(.135)	(.059)	(.060)
Parity Excluding Alcohol	. . .	. . .	. . .	−.054	−.081	−.080
				(.074)	(.095)	(.095)
Beer Tax	. . .	−.229	−.398	. . .	−.230	−.378
		(.056)	(.183)		(.056)	(.184)
Beer Tax$_{t-1}$	. . .	. . .	.081	. . .	. . .	.053
			(.115)			(.199)
Beer Tax$_{t+1}$	. . .	. . .	.108	. . .	. . .	.114
			(.144)			(.144)
Personal Income	. . .	.035	.034	. . .	.040	.039
		(.006)	(.006)		(.009)	(.009)
Uninsured	. . .	−.000	.000	. . .	.001	.001
		(.001)	(.001)		(.002)	(.002)
Secondary Education	. . .	.006	.006	. . .	.004	.004
		(.002)	(.002)		(.003)	(.003)
Population 15 to 19	. . .	−.022	−.022	. . .	−.028	−.028
		(.013)	(.013)		(.015)	(.015)
Population 20 to 29	. . .	.018	.018	. . .	.014	.014
		(.006)	(.006)		(.008)	(.008)
Black Population	. . .	−.045	−.044	. . .	−.040	−.039
		(.011)	(.011)		(.012)	(.012)
Unemployment	. . .	.001	.000	. . .	−.000	−.000
		(.002)	(.002)		(.003)	(.003)
Rural	. . .	.003	.003	. . .	.006	.006
		(.002)	(.002)		(.003)	(.003)
Small Business	. . .	−.061	−.062	. . .	−.077	−.077
		(.009)	(.009)		(.020)	(.020)
Medicaid	. . .	.000	.000	. . .	.001	.001
		(.001)	(.001)		(.001)	(.001)
Medicare	. . .	.017	.017	. . .	.012	.013
		(.008)	(.008)		(.010)	(.009)
Psychiatrists	. . .	−.001	−.001	. . .	−.002	−.002
		(.002)	(.002)		(.002)	(.002)
Mental Health Spending	. . .	−.000	−.000	. . .	.002	.002
		(.002)	(.003)		(.004)	(.004)
Religion	. . .	−.003	−.004	. . .	−.005	−.005
		(.002)	(.002)		(.003)	(.003)
Adjusted R^2	.940	.972	.972	.932	.972	.972
Observations	600	599	599	600	599	599
First-stage F (parity, parity no alcohol)	3.82	19.84	19.54	3.82	19.84	19.54
				7.94	4.01	4.11
Overidentification test[a]	.688	.754	.735	.073	.027	.034
	(.710)	(.686)	(.693)	(.787)	(.870)	(.853)
Hausman test[a]	1.684	17.018	16.736	1.630	8.685	8.530
	(.195)	(.000)	(.000)	(.197)	(.000)	(.000)

Note. The dependent variable is per capita (person aged 14 years and older) beer sales by state measured in gallons of ethanol. One gallon of ethanol equals approximately 267 standard (that is, 12 ounces; 4% alcohol by volume) beers. Population weights are used. The instruments for the parity with alcohol and the parity excluding alcohol variables are Medmal Cap, Diabetes Mandate, and Doctors. First-stage regression results are available in the Appendix. State and year effects are included for all equations. Standard errors are in parentheses below coefficient estimates.

[a] Values in parentheses are p-values.

After controlling for the simultaneity involved in passage of mental health mandates, we find that passage of mandates that include addiction treatments leads to a statistically significant increase in beer consumption. Table 4 indicates that passage of an addiction mandate is associated with an increase in ethanol consumption of .18, which is the equivalent of about 48 extra beers per person per year. In the specifications that control for mandates that exclude addiction treatments, we again find no relationship between these mandates and beer consumption, and the coefficient for mandates that include addiction treatment decreases only slightly to .15, or 40 extra beers per person annually.

Our low Sargan overidentification test statistics imply that our instruments do not directly affect beer consumption. Also, the Hausman test statistics suggest that the OLS estimates do suffer from a simultaneity bias indicating that our instrumental variables results are consistent. These results suggest that the adoption of mental health insurance parity mandates that include addiction treatments are causally related to drinking rates. Further, they lend support to models of addiction that assume individuals are forward looking in their decision making.

6. CONCLUSION

The rational addiction model provides important insights into the effect of increases in access to addiction treatment. Specifically, any model of addiction that assumes forward-looking individuals implies that increased availability of addiction treatment in the future will lead to increased consumption of the addictive good currently. To test this implication, we use the adoption of mental health parity mandates as a natural experiment in which parity exogenously increases future treatment access. We show that this increased access generates significantly more current-period beer consumption.

The estimated effect is significantly larger when we control for the endogeneity of parity adoption. By using factors that influence the political decisions regarding the adoption of insurance mandates, we are able to surmount the simultaneity bias that limits the value of our OLS estimates. Our instrumental variables results provide substantial evidence that the positive relationship estimated between adoption of parity mandates including substance abuse and alcohol sales is causal. From a

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estimates of the coefficient on the endogenous regressors that are biased toward the ordinary least squares estimate.

theoretical viewpoint, we present the first investigation of the effect of treatment options and insurance in the rational addiction framework. From a policy perspective, our results suggest that mental health parity mandates generate unexpected costs through moral hazard.

APPENDIX

Table A1. First-Stage Regression Results

	Parity Including Alcohol			Parity Excluding Alcohol		
	(4)	(5)	(6)	(4)	(5)	(6)
Medmal Cap	−.044	−.080	−.080	.186	.147	.148
	(.038)	(.034)	(.034)	(.049)	(.047)	(.047)
Diabetes Mandate	.061	.050	.050	−.023	−.012	−.010
	(.021)	(.019)	(.019)	(.027)	(.026)	(.026)
Doctors	−.001	−.003	−.003	−.001	.001	.001
	(.000)	(.000)	(.000)	(.000)	(.001)	(.001)

Note. All first-stage equations contain the covariates presented in Table 4 as well as state effects and year effects. Standard errors are in parentheses.

REFERENCES

American Medical Association. 1988–98. *Census of Physicians*. Chicago: American Medical Association.

American Tort Reform Association. 2005. Issues: Medical Liability Reform. http://www.atra.org/issues/index.php?issue=7338.

Angrist, Joshua D. 2000. Estimation of Limited-Dependent Variable Models with Dummy Endogenous Regressors: Simple Strategies for Empirical Practice. Technical Working Paper No. 248. National Bureau of Economic Research, Cambridge, Mass.

Angrist, Joshua D., and Alan B. Krueger. 2001. Instrumental Variables and the Search for Identification: From Supply and Demand to Natural Experiments. Working Paper No. 8456. National Bureau of Economic Research, Cambridge, Mass.

Arcidiacono, Peter, Holger Sieg, and Frank Sloan. 2001. Living Rationally under the Volcano? An Empirical Analysis of Heavy Drinking and Smoking. Working Paper No. 8602. National Bureau of Economic Research, Cambridge, Mass.

Becker, Gary S., Michael Grossman, and Kevin M. Murphy. 1994. An Empirical Analysis of Cigarette Addiction. *American Economic Review* 84:396–418.

Becker, Gary S., and Kevin M. Murphy. 1988. A Theory of Rational Addiction. *Journal of Political Economy* 96:675–700.

Beer Institute. Various years. *Brewer's Almanac*. Washington, D.C.: Beer Institute.

Besley, Timothy, and Anne Case. 2003. Political Institutions and Policy Choices: Evidence from the United States. *Journal of Economic Literature* 41:7–73.

Boyer, Marcel. 1978. A Habit Forming Optimal Growth Model. *International Economic Review* 19:585–609.

———. 1983. Rational Demand and Expenditures Patterns under Habit Formation. *Journal of Economic Theory* 31:27–53.

Buck, Jeffrey A., Judith L. Teich, Beth Umland, and Mitchell Stein. 1999. Behavioral Health Benefits in Employer-Sponsored Health Plans, 1997. *Health Affairs* 18:67–78.

Buck, Jeffrey A., and Beth Umland. 1997. Covering Mental Health and Substance Abuse Services. *Health Affairs* 16:120–26.

Bureau of Economic Analysis. 1988–98. Annual State Personal Income. http://www.bea.doc.gov/bea/regional/spi/#notes.

Bureau of Labor Statistics. 1988–98. Local Area Unemployment Statistics. http://data.bls.gov/PDQ/outside.jsp?survey=1a.

Chaloupka, Frank. 1991. Rational Addictive Behavior and Cigarette Smoking. *Journal of Political Economy* 99:722–42.

Chaloupka, Frank, and Kenneth Warner. 2000. The Economics of Smoking. Pp. 1539–1628 in vol 1B of *The Handbook of Health Economics*, edited by Anthony J. Culyer and Joseph P. Newhouse. New York: North Holland.

Chatterji, Pinka, Dhaval Dave, Robert Kaestner, and Sara Markowitz. 2004. Alcohol Abuse and Suicide Attempts among Youth. *Economics and Human Biology* 2:159–80.

Congressional Budget Office. 2001. Cost Estimate of S.543: Mental Health Equitable Treatment Act of 2001. Congressional Budget Office, Washington, D.C., August 22. http://www.cbo.gov/ftpdocs/30xx/doc3013/S543.pdf.

DiNardo John, and Thomas Lemieux. 2001. Alcohol, Marijuana, and American Youth: The Unintended Consequences of Government Regulation. *Journal of Health Economics* 20:991–1010.

England, Mary Jane. 1999. Capturing Mental Health Care Offsets. *Health Affairs* 18:91–93.

Grossman, Michael, and Frank J. Chaloupka. 1998. The Demand for Cocaine by Young Adults: A Rational Addiction Approach. *Journal of Health Economics* 17:427–74.

Grossman, Michael, Frank Chaloupka, and Ismail Sirtalan. 1998. An Empirical Analysis of Alcohol Addiction: Results from the Monitoring the Future Panels. *Economic Inquiry* 36:39–48.

Gruber, Jonathan. 1994. State-Mandated Benefits and Employer-Provided Health Insurance. *Journal of Public Economics* 55:433–64.

Gruber, Jonathan, and Botond Köszegi. 2001. Is Addiction "Rational"? Theory and Evidence. *Quarterly Journal of Economics* 116:1261–1303.

Heckman, James, and Thomas MaCurdy. 1985. A Simultaneous Equations Linear Probability Model. *Canadian Journal of Economics* 18:28–37.

Iannaccone, Laurence R. 1986. Addiction and Satiation. *Economics Letters* 21: 95–99.

Jensen, Gail A., Kathryn Rost, Russell P. D. Burton, and Maria Bulycheva. 1998. Mental Health Insurance in the 1990s: Are Employers Offering Less to More? *Health Affairs* 17:201–208.

Jensen, Majken, Anne Andersen, Thorkild Sorensen, Ulrik Becker, Thorkil Thorsen, and Morten Gronbaek. 2002. Alcoholic Beverage Preference and Risk of Becoming a Heavy Drinker. *Epidemiology* 13:127–32.

Jones, Dale, Sherri Doty, Clifford Grammich, James Horsch, Richard Houseal, Mac Lynn, John Marcum, Kenneth Sanchagrin, and Richard Taylor, eds. 2002. *Religious Congregations and Membership in the United States 2000: An Enumeration by Region, State, and County Based on Data Reported by 149 Religious Bodies*. Nashville, Tenn.: Glenmary Research Center.

Keeler, Theodore E., Teh-wei Hu, Paul G. Barnett, and Willard G. Manning. 1993. Taxation, Regulation, and Addiction: A Demand Function for Cigarettes Based on Time-Series Evidence. *Journal of Health Economics* 12:1–18.

Klick, Jonathan, and Sara Markowitz. Forthcoming. Are Mental Health Insurance Mandates Effective? Evidence from Suicides. *Health Economics*.

Klick, Jonathan, and Thomas Stratmann. 2003. The Effect of Abortion Legalization on Sexual Behavior: Evidence from Sexually Transmitted Diseases. *Journal of Legal Studies* 32:407–33.

Levitt, Steven D., and Jack Porter. 2001. How Dangerous Are Drinking Drivers? *Journal of Political Economy* 109:1198–1237.

Markowitz, Sara. 2000. The Price of Alcohol, Wife Abuse, and Husband Abuse. *Southern Economic Journal* 67:279–303.

———. 2005. Alcohol, Drugs, and Violent Crime. *International Review of Law and Economics* 25:20–44.

McGuire, Thomas G. 1981. *Financing Psychotherapy*. Cambridge, Mass.: Ballinger.

Miller, William R., and Elizabeth A. Cervantes. 1997. Gender and Patterns of Alcohol Problems: Pretreatment Responses of Women and Men to the Comprehensive Drinker Profile. *Journal of Clinical Psychology* 53:263–77.

Mobilia, Pamela. 1993. Gambling as a Rational Addiction. *Journal of Gambling Studies* 9:121–51.

Mullahy, John, and Jody L. Sindelar. 1993. Alcoholism, Work, and Income. *Journal of Labor Economics* 11:494–520.

———. 1996. Employment, Unemployment, and Problem Drinking. *Journal of Health Economics* 15:409–34.

Murray, Christopher J. L., and Alan D. Lopez, eds. 1996. *The Global Burden of Disease: A Comprehensive Assessment of Mortality and Disability from Dis-*

eases, Injuries, and Risk Factors in 1990 and Projected to 2020. Cambridge, Mass.: Harvard University Press.

National Association of State Mental Health Program Directors. 1992. *Final Report: Funding Sources and Expenditures of State Mental Health Agencies: Revenue/Expenditure Study Results, Fiscal Year 1990*. Alexandria, Va.: NASMHPD Research Institute.

———. 1996. *Supplemental Report, Fiscal Year 1993*. Alexandria, Va.: NASMHPD Research Institute.

———. 1999. *Fiscal Year 1997. Final Report*. Alexandria, Va.: NASMHPD Research Institute.

National Conference of State Legislatures. 2004. State Laws Mandating Diabetes Health Coverage. http://www.ncsl.org/programs/health/diabetes.htm.

———. 2005. Health Care: State Laws Mandating or Regulating Mental Health Benefits. http://www.ncsl.org/programs/health/Mentalben.htm.

National Institutes of Health. 2005. Per Capita Ethanol Consumption for States, Census Regions, and the United States, 1970–2003. http://www.niaaa.nih.gov/Resources/DatabaseResources/QuickFacts/AlcoholSales/consum03.htm.

Newhouse, Joseph P., and the Insurance Experiment Group. 1993. *Free for All? Lessons from the Rand Health Insurance Experiment*. Cambridge, Mass.: Harvard University Press.

Olfson, Mark, Merrile Sing, and Herbert J. Schlesinger. 1999. Mental Health/Medical Care Cost Offsets: Opportunities for Managed Care. *Health Affairs* 18:79–90.

Pacula, Rosalie Liccardo, and Frank J. Chaloupka. 2001. The Effects of Macro-Level Interventions on Addictive Behavior. *Substance Use and Misuse* 36: 1901–22.

Pollak, Robert. 1970. Habit Formation and Dynamic Demand Functions. *Journal of Political Economy* 78:745–63.

Ryder, Harl E., Jr., and Geoffrey M. Heal. 1973. Optimal Growth with Intertemporally Dependent Preferences. *Review of Economic Studies* 40:1–31.

Staiger, Douglas, and James H. Stock. 1997. Instrumental Variables Regression with Weak Instruments. *Econometrica* 65:557–86.

Stigler, George J., and Gary S. Becker. 1977. De Gustibus Non Est Disputandum. *American Economic Review* 67:76–90.

Sturm, Roland. 1997. How Expensive Is Unlimited Mental Health Care Coverage under Managed Care? *Journal of the American Medical Association* 278: 1533–37.

Sturm, Roland, and Rosalie Liccardo Pacula. 1999. State Mental Health Parity Laws: Cause or Consequence of Differences in Use? *Health Affairs* 18:182–92.

U.S. Census Bureau. 1988–98. *Statistical Abstract of the United States*. Washington, D.C.: U.S. Department of Commerce.

———. 1988–98. Current Population Survey (CPS). Conducted by the Bureau of

the Census for the Bureau of Labor Statistics. Washington, D.C.: Bureau of the Census.

U.S. Small Business Association. 1988–98. Private Firms, Establishments, Employment, Annual Payroll and Receipts by Firm Size, 1988–2000. http://www.sba.gov/advo/research/us_tot.pdf.

Young, Douglas J., and Agnieszka Bielinska-Kwapisz. 2002. Alcohol Taxes and Beverage Prices. *National Tax Journal* 55:57–73.