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STATE ALCOHOL EXCISE TAXES MAY HAVE LITTLE EFFECT ON DRUNK DRIVING FATALITIES

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Reducing the number of deaths from drunk driving is an important policy goal, and some researchers, advocates, and policymakers have recommended that the excise tax on alcohol be raised for that purpose. In new research, we examine whether two substantial increases in alcohol excise taxes in Illinois led to reductions in fatal alcohol-related motor vehicle crashes (McClelland and Iselin 2017). With respect to the first excise tax increase, imposed by Illinois in 1999, we find no evidence that it reduced the number of such crashes. However, we do find evidence of a significant—if temporary—reduction in these crashes in the interior counties of Illinois in response to the 2009 tax increase, possibly because individuals in these counties could not easily cross state lines to avoid the tax increase.

Alcohol–impaired driving, legally defined as operating a vehicle with a blood alcohol content (BAC) of 0.08 grams per deciliter (0.08 percent) or higher, is illegal at both the federal and state level in the United States. Yet in 2015, out of 35,092 motor vehicle fatalities, 10,265 (or 29.3 percent) occurred in an accident in which a driver had a BAC at or above 0.08 percent (National Highway Traffic Safety Administration 2016). Although the number of fatalities in 2015 is far too high, it reflects a decline stretching back over four decades. Credit for that decline goes to many actions by federal and state governments as well as efforts by grassroots organizations to change the culture around drinking and driving.

State governments in particular have an important role because the 21st amendment to the Constitution gave states broad latitude in their regulation of alcohol sales. States can choose either to distribute and sell alcohol directly—in what are known as "monopoly" or "control" states—or regulate its sale. In the latter case, most states employ a "three-tier system," where a single firm or entity (with a few exceptions) can act as only an importer or producer, a distributor, or a retailer. Many states and the federal government also impose excise taxes (which are narrowly based taxes on consumption) on beer, wine, and spirits. Although the federal government has not raised tax rates since 1991, it has used financial incentives, such as the allocation of highway funding, to push states to prohibit driving while intoxicated and to set a legal minimum drinking age. During the 1980s states moved to enact laws that set minimum legal BAC levels, which settled at 0.08 after 2000, and toward a minimum purchasing age of 21.

Raising excise taxes on alcohol sales is one potential way to further reduce the rate of fatal alcohol-related motor vehicle crashes. The approach has shown promise because research suggests that when excise taxes are sharply raised, retail prices tend to increase by more than the amount of the tax increase (Hansom and Sullivan 2016; Young and Bielińska-Kwapisz 2002). However, although extensive research has demonstrated that alcohol consumption responds to price changes (Gallet 2007), the evidence on the effects of alcohol taxation on motor vehicle fatalities is mixed: some studies find large, significant effects, but others find no effect at all.[1] Surveys of research on the topic note that one explanation for the difference is the studies' varied success in disentangling the effect of the 1980s tax changes from regulatory and cultural changes that occurred at about the same time. The effectiveness of regulatory and tax changes also may be limited because consumers in many states can cross borders into nearby jurisdictions with lower tax rates (Beatty, Larsen, and Sommervoll 2009). This type of tax avoidance occurs with items other than alcohol, such as cigarettes, soft drinks, and in Denmark, saturated fats (Cawley and Frisvold 2015; DeCicca, Kenkel, and Liu 2010; Snowdon 2013).

But in 2015, research on the effect of excise taxes and traffic fatalities uncovered a startling result: Illinois' increase in excise taxes in 2009 led to an immediate 26 percent decline in fatal alcohol-related crashes (Wagenaar, Livingston, and Staras 2015). That tax increase was hypothesized to be effective in reducing alcohol-related fatalities because both were relatively large. Before July 1, 1999, Illinois imposed a tax on manufacturers or importing distributors of alcohol of $0.07 per gallon of beer, $0.23 per gallon of wine, and $2.00 per gallon of spirits. After the increases in 1999 and 2009, those tax rates were $0.23 for beer, $1.39 for wine, and $8.55 for spirits. Compared with other states, these two tax increases moved Illinois from the 48th highest beer tax to the 22nd highest, the 42nd highest wine tax to the 9th highest, and the 29th highest tax on spirits to the 2nd highest.

Table 1 shows the 2008–10 change in spirit excise taxes in Illinois with that of surrounding states.[2] Before the increase, the Illinois excise tax on spirits was slightly higher than that of Tennessee and substantially higher than that of other states. After the increase, the Illinois rate is almost twice the rate in Tennessee and more than triple the rate in Indiana. Comparisons of wine and beer taxes, available in the report this brief is based on, show a similar but less dramatic pattern.

TABLE 1

Spirit Tax Rates in Illinois and Surrounding States

2015 dollars per gallon

State	2008	2010
Illinois	4.50	8.55
Indiana	2.68	2.68
Kentucky	1.92	1.92
Missouri	2.00	2.00
Tennessee	4.40	4.40
Wisconsin	3.25	3.25

Source: Various sources of liquor taxation and author's calculations. See McClelland and Iselin (2017) for details.

[1] For two recent surveys of the literature, see Nelson and McNall (2016) and Wagenaar, Tobler, and Komro (2010).

[2] Iowa and Michigan are omitted because they are monopoly states.

We examine the effect of the 1999 and 2009 excise tax increases by using the synthetic control method to create a hypothetical version of Illinois in which the tax increases never occurred.[3] The alcohol-related motor vehicle fatal crashes in this synthetic Illinois are formed as a weighted sum of the fatalities in other states. The weights are chosen such that the synthetic Illinois matches the actual Illinois as closely as possible before the tax increase. This involves matching not only the rate of fatal alcohol-related motor vehicle crashes for selected years[4] but also several variables related to motor vehicle crashes, such as the share of the population between ages 15 and 24 and the share of population that are heavy drinkers. Comparing the path over time of alcohol-related motor vehicle crashes in the actual and synthetic Illinois after the tax increase provides evidence of the difference made by raising excise taxes. If the two paths are similar, there is no evidence that the excise taxes effectively lowered the fatality rate. If the fatality rate of the actual Illinois falls below that of its synthetic twin, the tax increase would appear to have effectively reduced fatal alcohol-related motor vehicle crashes.

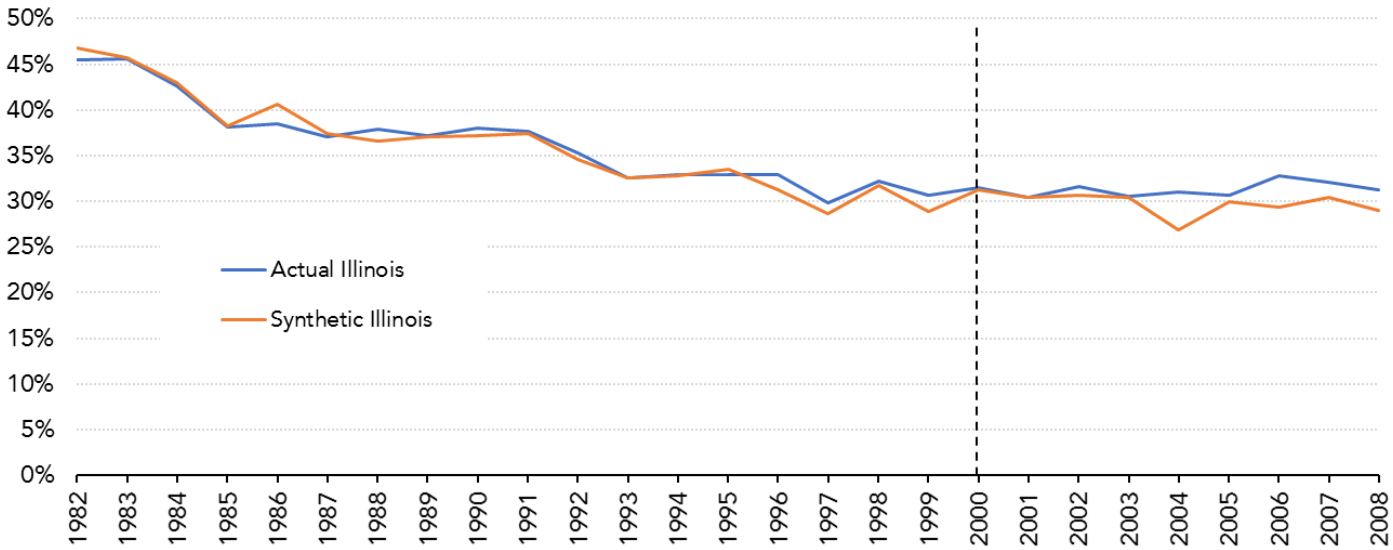
We use two separate measures of alcohol-related fatalities. We first examine how the increase in excise taxes affected the share of all fatal motor vehicle crashes that involved alcohol (defined as a fatal motor vehicle crash in which a driver had a BAC of at least 0.08 percent). Using the share allows us to avoid conflating changes in the overall rate of fatal crashes with changes in the rate of fatal alcohol-related crashes. For example, the downward trend in fatal alcohol-related crashes was undoubtedly partially caused the development of passive restraints, such as airbags. Measuring fatal alcohol-related crashes as a share of all fatal motor vehicle crashes focuses on the effect of excise taxes because it is unaffected by safety improvements that reduce the fatality rates of all crashes.

FIGURE 1

Share of Total Fatal Motor Vehicle Crashes Involving Alcohol Before and After 1999 Excise Tax Increase

Actual Illinois versus Synthetic Illinois

Percent of fatal motor vehicle crashes involving BAC values at or above 0.08 (percentage)



Source: Author's calculations based on Synthetic Control Methodology.
Notes: Because 2000 was the first full year under the increased tax rate, we use 2000 as the treatment year. BAC stands for Blood Alcohol Concentration.

[3] This method is described in detail by Abadie, Diamond, and Hainmueller (2010, 2015).

[4] In the report this brief draws upon (McClelland and Iselin 2017), we conduct several tests to ensure that our results do not depend on choices such as the years selected for matching.

The effect of the 1999 excise tax increase on our first measure is shown in figure 1. Before 1999, the share of fatal crashes involving alcohol in the synthetic Illinois carefully tracks that of the actual Illinois. The two do not perfectly match, but the difference between the two in each year is small. From 1999 to 2008, the fatality rates diverge in a surprising direction: the rate for the actual Illinois, which experienced the tax increase, often lies above that of the synthetic Illinois. This is almost certainly caused by factors other than the excise tax increase and does not indicate that the excise tax increase drove up the fatality rates.[5] One possible source for the divergence lies in our measure of alcohol-related motor vehicle crashes. Recessions increase unemployment, and after a recession, when unemployment returns to normal, the number of crashes during commutes to and from work may rise. That, by itself, could increase total fatal crashes and consequently decrease the share of fatal alcohol-related crashes. Our surprising result might reflect nothing more than increases in commuting crashes as the Illinois economy recovered from the 2001 recession.[6] In fact, any factor that increases non-alcohol-related motor vehicle crashes more in Illinois than other states after 1999 could cause the share of fatal alcohol-related crashes in the actual Illinois to rise above the share in the synthetic version.

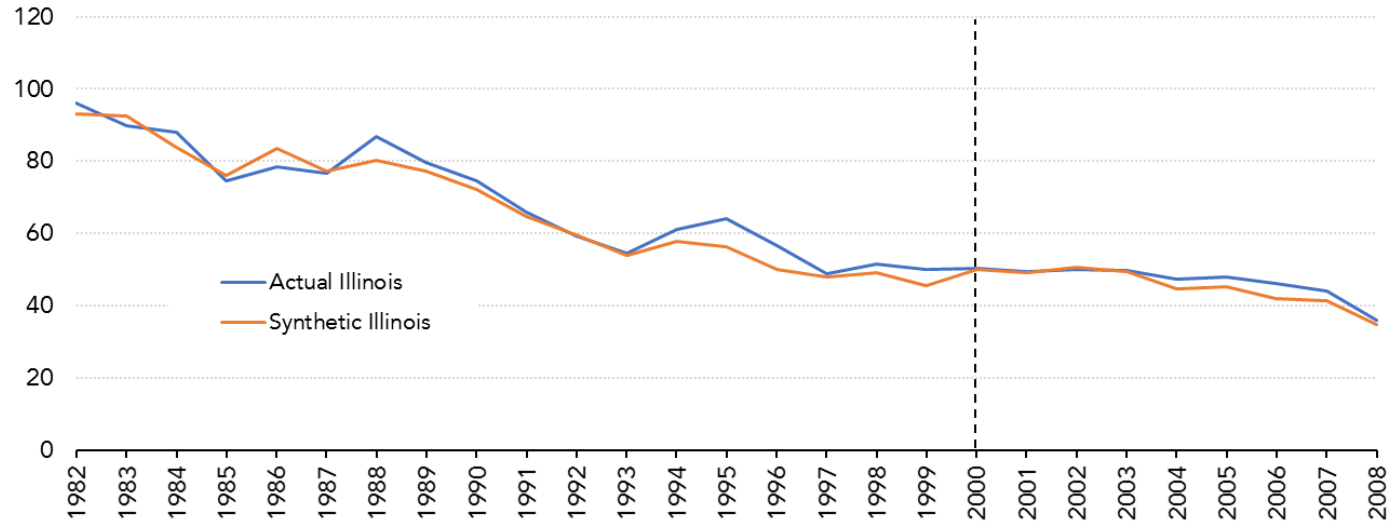
Our second measure, the share of all drivers involved in a fatal alcohol-related crash, avoids that problem.[7] The results are shown in figure 2. This measure clearly produces weaker match between the synthetic and the actual Illinois. More importantly, the two paths do not diverge over the 2000 through 2008 period. As with the first measure, the evidence does not suggest that the 1999 excise tax increase led to a decrease in fatal alcohol-related motor vehicle crashes in Illinois.

FIGURE 2

Fatal Alcohol-Related Motor Vehicle Crashes per Million Drivers Before and After 1999 Excise Tax Increase

Actual Illinois versus Synthetic Illinois

Fatal motor vehicle crashes involving BAC values at or above 0.08 per 1 million drivers



Source: Authors' calculations based on Synthetic Control Methodology.
Notes: Because 2000 was the first full year under the increased tax rate, we use 2000 as the treatment year. BAC stands for Blood Alcohol Concentration.

[5] Our results are robust to a number of sensitivity tests fully described in the full report (McClelland and Iselin 2017).

[6] For this explanation to hold, commuter crashes in Illinois must have increased more than crashes in other states.

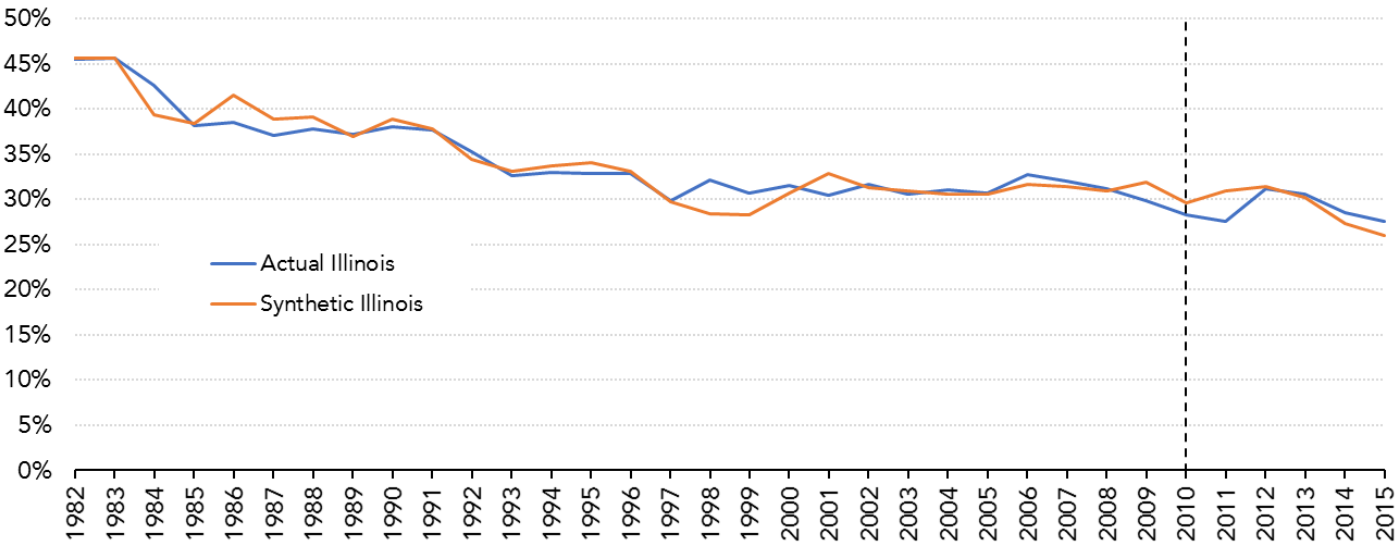
[7] This measure could be conflating changes in auto safety with changes in alcohol-related fatalities. When creating our synthetic Illinois using this measure, we match states using the original variables plus the unemployment rate, per capita personal income, and the gasoline tax rate.

We also analyze the 2009 excise tax increase. The effect of the 2009 excise tax increase on our first measure is shown in figure 3. Fatal alcohol-related crashes drop slightly but noticeably following the 2009 tax increase, and that drop does not occur in the synthetic Illinois. The drop disappears by 2012 and could simply reflect random differences between the actual and synthetic Illinois just as there are differences of similar magnitude before the excise tax increase. Does any evidence suggest that the drop is more than just random chance? We answer this question by applying the same synthetic control method to states that did not increase their excise taxes.[8] If the difference between the actual and synthetic Illinois is larger than most of the differences found in those states, we have evidence that the excise tax was effective. As shown in the report this brief draws upon, however, the difference is not large relative to other states, so the evidence that the excise tax was effective is not strong. The second measure (the share of drivers involved in fatal alcohol-related crashes) also provides no evidence the tax increase was effective at reducing alcohol-related motor vehicle deaths.

FIGURE 3

Share of Total Fatal Motor Vehicle Crashes Involving Alcohol Before and After 2009 Excise Tax Increase

Actual Illinois versus Synthetic Illinois



Source: Author's calculations based on Synthetic Control Methodology.
Notes: Because 2010 was the first full year under the increased tax rate, we use 2010 as the treatment year. BAC stands for Blood Alcohol Concentration.

But the immediate effect of the tax increase could have been weakened if some motorists crossed state borders to purchase alcohol in states with lower prices. Seven of the 10 most populous counties in Illinois border another state, providing a large share of Illinois drivers with a relatively easy opportunity to visit a neighboring state.[9] To adjust for the possibility that motorists are crossing state borders to purchase lower-taxed alcoholic beverages, we apply the synthetic control method to Illinois after removing all counties that lie on state borders.[10] As shown in figure 4, the resultant

[8] This "placebo" approach is described by Abadie, Diamond, and Hainmueller (2010).

[9] These are Cook, Lake, Madison, McHenry, St. Clair, Will, and Winnebago Counties.

[10] Because we do not have county-level information for all of the variables used to match the states to Illinois, we instead adopt a common alternative: we match the states using all of the outcomes before the change in excise taxes.

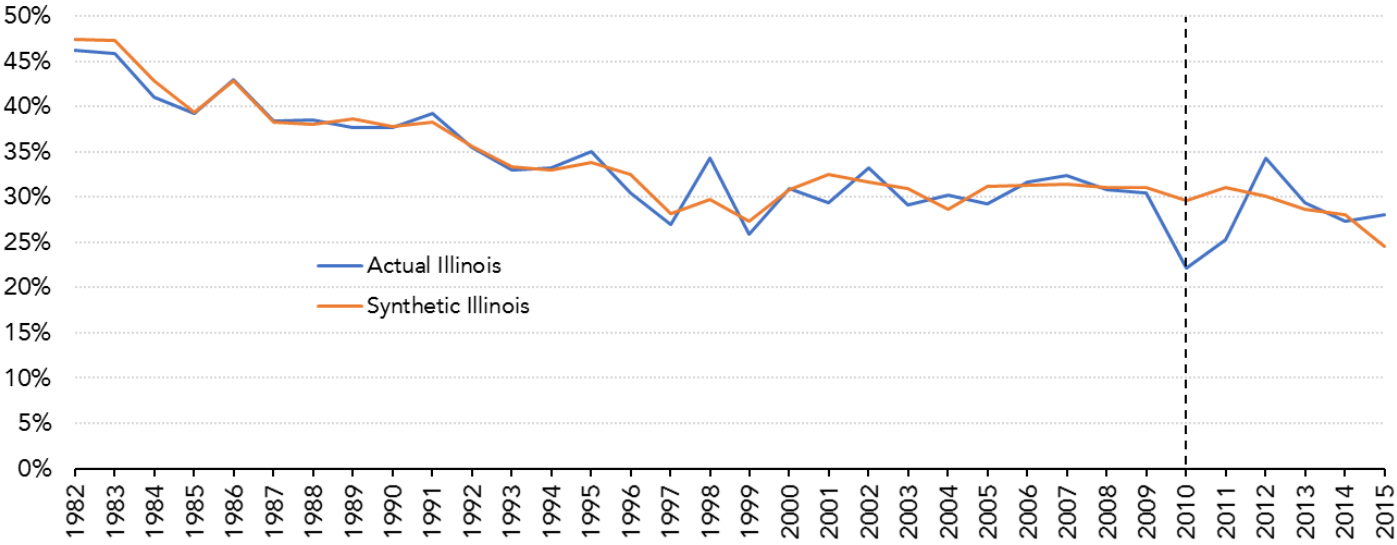
synthetic state now has a sharp, short-lived drop in the share of fatal alcohol-related motor vehicle crashes.[11] In the report this brief draws upon, we again apply the synthetic control method to states that did not raise their excise taxes, and the difference between the synthetic and actual Illinois combination is larger than the difference in any of those states. That suggests the excise tax was temporarily successful in reducing fatal alcohol-related crashes in the interior counties of Illinois but may have been less successful in counties where motorists can easily purchase alcohol from states that did not raise alcohol excise taxes.

FIGURE 4

Share of Total Fatal Motor Vehicle Crashes Involving Alcohol Before and After 2009 Excise Tax Increase

Actual Illinois versus Synthetic Illinois, Border Counties Omitted

Percent of fatal motor vehicle crashes involving BAC values at or above 0.08 (percentage)



Source: Author's calculations based on Synthetic Control Methodology.
Notes: Because 2010 was the first full year under the increased tax rate, we use 2010 as the treatment year. BAC stands for Blood Alcohol Concentration.

It appears that Illinois' liquor tax increases in 1999 and 2009 were ineffective in reducing fatal crashes involving alcohol. We found a temporary decrease in the interior counties of Illinois, but this reduction highlights one of the difficulties with using state-level excise taxes to reduce some societal costs. There is evidence from studies of alcohol, cigarettes, and unhealthy food and drinks that individuals will cross borders to evade these taxes, a task made easier by Illinois' proximity to five other states with lower taxes. Even where the increase appeared to be effective, the reduction was short-lived. Given these results, policymakers should seek other state-level policy options when trying to reduce fatal alcohol-related crashes.

[11] We do not use our second measure of fatal alcohol-related motor vehicle crashes, because we do not have data on the number of drivers in each county.

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