Estimates of employment gains attributable to beer legalization in spring 1933

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Abstract

In April 1933, eight months prior to the end of Prohibition, states within the US gained the ability to legalize 3.2 percent alcohol beer. Proponents of legalization predicted that the brewer's dray would bring jobs along with beer. We estimate that legalization brought around 81,000 jobs between April and June of 1933, 60,000 of which were created in April, when the nation emerged from the trough of the Great Depression. This suggests that around 5.6 percent of nationwide non-agricultural spring employment gains, and around 15 percent of April job gains, were associated with beer legalization. Thus, this very early New Deal policy played an important supporting role in helping the nation turn the corner toward recovery.

Keywords: Legalization, Beer, Great Depression, New Deal, Recovery, Employment
JEL Codes: L5, N4, K4.

1. Introduction

After 43 months of recession, the US economy hit the trough of the Great Depression in March 1933. Beginning in April, the nation experienced an unprecedented economic surge. Taylor and Neumann (2016) note that between March and July, industrial production rose 57 percent and labor input in manufacturing grew 65 percent—four-month growth rates in those measures that are far and away the highest in American history. Temin and Wigmore (1990) and Eggertsson (2008) attribute much of the spring recovery to a rise in inflation expectations. Jalil and Rua (2016) show that inflation expectations jumped unexpectedly beginning with two news events on April 19 and April 28. However, the April 1933 data, which show a sharp uptick from March, reflect the pay period ending on April 16 and thus some factor other than rising inflation expectations had to be responsible for the economy's turning of the corner between March and April.

A May 26 *New York Times* article listed beer legalization as one of the important factors—along with gold inflows, bank reforms, and inflation—"combining to stimulate recovery."[1] In fact, there are sound theoretical reasons to believe that legalization could have stimulated economic activity as the production and service of beer was a large economic sector prior to Prohibition. This paper explores the role that beer legalization played in the recovery that began in April by estimating the employment legalization brought in the spring of 1933 in both the retail and manufacturing sectors.

The 18th Amendment and its companion Volstead Act prohibited the sale, manufacture, and transportation of beverages containing more than 0.5 percent alcohol by volume (ABV) beginning in January 1920. Nine days after he took office in March 1933, President Franklin Roosevelt asked Congress to amend the Volstead Act to allow beer that was up to 3.2 percent alcohol by weight

[1] *New York Times*, "Business Advances: A survey of the Trend," May 26, 1933, p. 21

(i.e. approximately 4 percent alcohol by volume). Proponents of the "beer bill" predicted that legalization would create a significant economic boost by generating employment for the manufacturers, distributors, sellers, and servers of beer. The Cullen-Harrison Act was signed into law on March 22, making this one of the earliest of Roosevelt's New Deal policies. The act allowed states to legalize beer beginning on April 7, 1933—20 states legalized on that day 23 other states legalized later in 1933.

We leverage the variation in the state-level timing of beer legalization to estimate the impact it had upon employment in the beer retail and service sector. We estimate that beer legalization brought up to 68,500 new jobs (with 44,000 as our more conservative preferred estimate) in bars, restaurants, and bottle shops that served or sold beer in the spring of 1933, with up to 42,000 (23,000) of these created in April. We also examine the potential employment impact of beer legalization in the manufacturing sector. We estimate that legalization created around 37,000 manufacturing jobs related to the brewing, bottling, refrigeration, and transport of beer in April of 1933. As reported gains in total non-agricultural employment were 1.45 million between March and June 1933, our results estimate that around 5.6 percent of employment gains nationwide were attributable to beer legalization. Perhaps more importantly, when restricting the analysis to April 1933 alone—the month the economy turned the corner from the Great Depression—our results suggest that over 15 percent of the nation's employment gains are attributable to beer legalization.

2. Historical background

In the years leading to Prohibition, most US breweries produced beer for local markets. Stack (2000, 2010) notes that only six breweries—Schlitz, Pabst, Blatz, Lemp, Anheuser-Busch, and Christian Moerelein—out of over 1,500 in existence, distributed beer on the national market.

During Prohibition most breweries either folded or employed their capital in the production of other goods such as soda or non-alcoholic beer that had a smaller economic return. Some large breweries, such as Schlitz, of Milwaukee, Wisconsin, kept their entire brewing operation in place under an assumption that Prohibition would eventually be abandoned. In addition to producing a non-alcoholic brew named "FAMO," Schlitz made malt syrup and milk chocolate during Prohibition.[2] Pabst, also of Milwaukee, produced "Pabst-ett," which was a processed cheese spread aged in the brewery's cold storage cellars. In 1916 the Schaefer Brewery of New York built what was then considered to be the most state-of-the-art brewery in the United States on the banks of the East River in Brooklyn. This facility operated throughout Prohibition, focusing mainly on the production of non-alcoholic beer.[3] Anheuser-Busch of St. Louis, Missouri likewise produced non-alcoholic beer and also used its facilities and cold storage trucks for the production and distribution of ice cream and soft drinks.[4] The Belmont Brewery, a regional brewery located in Harpers Ferry, Ohio, remained in operation during Prohibition by producing ginger ale (Musson, 2005).[5]

Of course, Prohibition did not mean that alcohol was not produced, sold, and consumed. Miron and Zwiebel (1991), using mortality, mental health, and crime statistics as proxies, estimate that alcohol consumption remained between 50 and 70 percent of its prior level during Prohibition. However, Dighe (2015, p. 17) notes that because breweries were more difficult to conceal, and beer more difficult to covertly transport, than production units for higher proof alcoholic beverages, beer production and consumption fell far more steeply than that of spirits. Employing

[2] http://www.slahs.org/history/brewery/schlitz/history4.htm
[3] http://www.beerhistory.com/library/holdings/schaefer_anderson.shtml
[4] http://www.anheuser-busch.com/about/heritage.html
[5] Hernandez (2016) finds breweries that experienced reductions in demand due to nearby local prohibitions (prior to the federal one in 1920) were more likely to invest in soda-specific machinery and hence were more likely to switch to soda production during the 1920s. As a result, they were more likely to survive Prohibition.

hops production as a proxy, Warburton (1932), estimates that beer production fell to as low as 7 percent of its prewar level in the early years of Prohibition. Furthermore, the economic gains to the unlawful brewers were tenuous as Ronnenberg (1998) notes that a large share of the profits from illegal production went to kick-backs and bribes to local law enforcement.

The tide of public opinion against Prohibition rose steadily in the 1920s and by the early 1930s several organizations such as the Association Against the Prohibition Amendment and the Women's Organization for National Prohibition Reform argued that it had created a burgeoning and dangerous underground economy. With the onset of the Great Depression, many of those who pushed for the relegalization of alcohol, and beer in particular, claimed that it would help spur economic recovery by creating new employment throughout the supply chain. Additionally, proponents of repeal emphasized the potential benefit of additional tax revenue from legalization—as late as 1910, taxes on the sale of liquor and beer had accounted for around 30 percent of federal collections (Okrent, 2010, p. 54).

Prohibition reform was a major issue in the election of November 1932, which went heavily toward Democratic candidates who were generally (though far from exclusively) more in favor of the "wet" position than their Republican counterparts. Shortly after taking office, President Roosevelt asked Congress to legalize beer. On March 14, 1933, the Cullen-Harrison Bill passed the House of Representatives by a vote of 316 to 97. The Senate passed the bill 43 to 36 on March 21, 1933 and Roosevelt signed the bill the following day.[6] The law effectively changed the Prohibition threshold for illegal beverages from 0.5 percent alcohol by volume to 3.2 percent alcohol by weight (around 4 percent by volume, which is comparable to most "light" beers today).

[6] Poelmans, Dove, and Taylor (2018) show that special interests and party affiliations were important drivers of congressional voting behavior on beer legalization.

The Cullen-Harrison Act banned the sale of alcohol to anyone under the age of 18 and the federal tax was set at $5 per barrel, approximately one penny per serving of beer (which typically sold for 10 cents), an increase of 50 percent from the tax in place prior to Prohibition.[7] Brewers also had to pay a federal license fee of $1,000 per year and states and local municipalities could likewise impose their own taxes and licensing fees. Estimates varied, but it was believed that the beer bill would bring between $125 and $375 million of new revenue to the federal government each year.[8] The Cullen-Harrison Act also reaffirmed prior laws such as the Webb-Kenyon Act of 1913, which allowed states, or localities within states, to remain "dry"—i.e. federal legalization did not usurp state or local prohibitions.[9]

Passage of Cullen-Harrison meant that unless a state had its own temperance law in place beer would become legal on April 7, 1933. Still, at the onset of Prohibition, 32 states had full-blown prohibitions in place and 17 more states had "local options" whereby counties or cities could impose restrictions on alcohol that were stronger than the prevailing federal ones.[10] Thus, after the beer bill's passage, many state and/or local governments had to decide whether to amend their own prohibitions so as to allow beer.[11] Many took quick action so as to remove impediments by April 7. Others voted to legalize prior to April 7, but set the legal date for a point in the future (for example May 19 in the case of Wyoming). Still others took no immediate action thus keeping their prohibition on beer in place. Table 1 lists the date that beer became legal in each state. Twenty of

[7] *Barron's*. Dec 11, 1933, p. 13.

[8] *The Washington Post*, "House Passes 3.2 Beer Bill; Vote is 316-97." March 15, 1933, p. 1.

[9] Ibid.

[10] Poelmans, Dove, Taylor, and Dighe (2021).

[11] The ability of states to create their own rules came from the unique organization of the Volstead Act. In order to win the support of Southern states—generally favoring state's rights—the Act allowed states to have their own Prohibition laws, which could provide differing definitions of intoxicating liquors. As is the case with minimum wage laws today, the prevailing law is the stronger of the federal and state law.

the 48 states legalized on April 7, 1933. Twenty-three others legalized sporadically over the following eight months so that by December 5, 1933, when the Federal Prohibition was repealed, 43 of the 48 states had legalized 3.2 percent beer. Even after Prohibition's repeal, some states remained dry by keeping their own prohibitions in place. Figure 1, which offers a spatial view of legalization, shows that states in the Great Lakes and West Coast regions generally legalized earlier than those in the southern and middle parts of the country.

[Table 1 Around Here]
[Figure 1 Around Here]

3. Bringing back beer

In states that either had no restrictions on beer, or had already reformed their laws in anticipation of the beer bill's passage, brewers had around two weeks to prepare for the sale of beer on April 7. The law allowed producers in legal states to begin to produce and bottle beer immediately, and the federal government began to sell the $5 beer tax stamps that had to be attached to each barrel—in fact the federal government collected $10 million in revenues from the sale of these stamps prior to April 7.[12]

All aspects of the beer supply chain went into frenetic motion in late March and early April. It is important to note that many aspects of this supply chain were unaffected by whether beer was legal in that particular state. For example, in the few days between the beer bill's introduction and passage, the York Ice Machinery Corporation of York, Pennsylvania accepted orders from breweries across the country for more than $100,000 of refrigeration equipment and had inquiries,

[12] *Wall Street Journal*, "Beer Aids N.Y.C. Funds." April 8, 1933, p. 1.

for which it provided quotes, for brewery refrigeration equipment totaling $1,155,000.[13] As beer kegs would be needed to transport beer, the A.O. Smith Corporation of Milwaukee, Wisconsin, quickly converted its automobile frame plant into a mass production line for kegs. By March 30, the company was rolling out between 4,000 and 5,000 steel kegs per day with a labor "force of 150 men working three shifts a day."[14] It is important to note that these were 450 new jobs—i.e., they were not crowding out existing jobs at A.O. Smith, as the frame plant had been effectively idle since 1931 (A.O. Smith Corp, 1979, p. 11). Brewers also needed to purchase mass quantities of beer inputs such as barley malt and hops.[15]

A March 31, 1933 *Wall Street Journal* article described the actions of four major Chicago brewers who had previously been producing non-alcoholic beer—as Illinois did not have a state-level prohibition in place at the onset of the federal one, beer would become legal there on April 7. The Atlas Brewing Company had contracted for 400,000 additional bushels of barley malt and had purchased 11 trucks and added 400 men to its payrolls. Prima contracted for 450,000 bushels of barley malt and bought 50 trucks and added 100 employees. Schoenhofen contracted for 150,000 bushes of barley malt and was in the process of purchasing 50 trucks and hiring between 300 and 400 additional employees. Finally, the United States Brewing Company contracted for 250,000

[13] *The Evening Sun* (Hanover, PA), "York Plant Receives Order of Breweries." March 23, 1933, p. 1.

[14] *Wall Street Journal*, "A.O. Smith to Make Beer Kegs of Steel: Rips Out Old Auto Frame Machinery and Prepares for Mass Output for Brewers." March 30, 1933, p.1.

[15] According to the 1935 *Census of Manufactures*, beer producers in the United States spent around $70 million on Barley and Barley Malt, $11 million on hops, and around $19 million on all other inputs such as rice, grits, sugar, corn syrup, yeast, etc. (*Census of Manufactures*, 1935, "Malt Liquors," Table 6, "Principal Materials Consumed, by Kind, Quantity, and Cost for the United States: 1935."). Thus, barley represented around 70 percent of the total cost of raw material inputs into beer and hops around 11 percent.

bushels of barley malt, had acquired 25 additional trucks, and hired 250 additional employees.[16] Thus, just these four Chicago companies alone saw employment expand by over 1,000 workers—and purchased 136 trucks—in the early spring of 1933. Chicago breweries also ramped up their demand for bottles and cases. For example, Atlas ordered 6 million beer bottles from the Owens-Illinois Glass Co., while Birk Brothers placed an order for $40,000 worth of wooden cases from the Chicago Mill & Lumber Co.[17] Of course Chicago breweries were not the only ones in need of more workers to produce, bottle, and ship beer. Rupert's Brewery in New York City announced on April 7 that it had hired 300 new employees—200 of whom were expected to be permanent, with the other 100 helping the brewery prepare for the surge in demand that would accompany legalization.[18]

Perhaps the most vital component of the actions taken between the passage of the Cullen-Harrison Act (March 22) and the date beer could be sold (April 7) was that of those states and localities that had alcohol regulations in place to amend them to allow for 3.2 beer. For example, Prince Georges County (Maryland) immediately went to work revising its local prohibition law to allow for both the sale and production of beer. But any local changes they made would have no effect until Maryland's state-level prohibition on the sale and production of beer was removed. Attorney General William Preston Lane was charged with writing new legislation for Maryland's General Assembly to consider and thanks to the state's quick action it was able to legalize on April 7.[19] In many cases the passage of these legalization bills went right down to the wire. For example, in Washington DC, President Roosevelt signed the District's beer bill at 4:06 p.m. on April 6. In

[16] *Wall Street Journal*, "Brewers at Chicago Lay in Barley Malt." March 31, 1933, p. 1.
[17] Ibid.
[18] *New York Times*, "Brewers Here Swamped." April 8, 1933, p. 1.
[19] *Washington Post,* "Maryland Repeal Plans Under Way: Prince George Beer Bill is Among First Offered Before Ass.embly," March 23, 1933, p. 2.

Rhode Island, the legislature debated late into the morning of April 7, with the governor signing the bill to legalize at 4:17 a.m. so that the state's citizens could consume beer that day.[20]

Beer's legalization in 20 states with a combined population of 70 million on April 7 was met with a carnival-like atmosphere. In Milwaukee, the *New York Times* reported "a joyous street celebration, with German bands leading the rejoicing." An estimated 1.5 million barrels of beer were sold within the first 24 hours of legalization and "restaurants, beer gardens, soda fountains, and other dispensaries of the beverage reported in scores of cities that their supplies had been exhausted by early afternoon [so that] the thirsty had to trample from place to place late in the day in search of a bottle."[21] In White Plains, New York, stores were running out of beer so quickly on the morning of April 7 that many limited purchases to six bottles per customer. Some stores experiencing shortages drove their own trucks to distributors to get more beer rather than wait for deliveries.[22] Industry experts noted that if consumption continued at this pace, the producers that were currently in place would not be able to come close to meeting the demand for beer going forward.

4. What types of jobs could beer legalization create?

Representative Thomas Cullen of New York, a co-sponsor of the "beer bill," suggested that his bill would be a "tonic" to the nation's unemployment problem. He contended that "creation of a new industry or a new business is the best way to reabsorb labor," and he estimated legalization would bring around 300,000 jobs. C.D. Williams, secretary of the United States Brewers Association, was even more optimistic suggesting the creation of 500,000 jobs in 1933 if the beer

[20] *New York Times*, "Supply Soon Exhausted." April 8, 1933, p. 1.
[21] Ibid.
[22] *New York Times,* "Rush in Westchester." April 8, 1933, p. 3.

bill was passed. Williams said Americans could drink knowing that "in every glass there is a step forward to prosperity."[23]

Politicians and industry representatives have a tendency (and incentive) to oversell the benefits of their desired policy changes. Our objective is to estimate the number of jobs beer legalization created in the spring of 1933, and hence gauge how important legalization was to the economic recovery that began in April. The two major categories of employment that could be most affected by beer legalization are jobs related to (1) the sale and serving of beer and (2) the manufacturing of beer (brewery jobs) and related products (such as bottles, kegs, refrigeration equipment, etc.). To examine employment gains in the first category, we will rely on the 1933 *United States Census of American Business*, hereafter *CAB*, which reports employment from the retail and distribution sector. To explore those from the second category we examine the *Census of Manufactures.*

Table 2 reports data from the *CAB* for four categories of retail stores—(1) bottled beer and liquor stores, (2) drinking places, and (3) restaurants, cafeterias and lunchrooms and (4) lunch counters and refreshment stands.[24] The number of stores, the number of proprietors of those stores, and the average number of employees per month across 1933, both full-time and part-time, are reported. Proprietors are extremely important to count when measuring employment in this era because they generally worked at the stores they owned. In fact, it is clear that many stores were staffed *solely* by their proprietors and had no employees—note that the number of employees in

[23] Quotes from this paragraph are from *New York Times*, "Cullen Predicts 300,000 Beer Jobs." March 20, 1933, p. 3. The article gathers the quotes from an afternoon radio forum titled "The Effects of the Beer Bill" broadcast on New York City station WOR.

[24] For complete descriptions of these categories see pages 61 and 66 of the *United States Census of American Business 1933*, Retail Distribution, Part 1.

drinking places and beer stores is substantially lower than the number of stores. Also note that many stores reported multiple proprietors—for example two partners may have co-owned and operated a beer store or a bar, and they may not have hired any employees, relying instead only on their own labor. In aggregate for the four categories, the number of proprietors is 34.7 percent of the total number of employees plus proprietors—in other words there are fewer than two employees for every one proprietor.

[Table 2 around here]

The *CAB* notes that the bottled beer stores category was newly created (i.e., it was not in the prior 1929 *CAB*) as it included stores that "specialize in the sale of bottled beer" and that such stores "came into legal existence on or after April 7, 1933" or after December 5, 1933 in the case of liquor stores (p. 61). Also newly created was the "drinking places" category, which "includes retail establishments whose principal business is the sale, for consumption on the premises, of beer … and which derive no appreciable revenue from the sale of meals" (p. 66). Thus, it seems safe to assume that most jobs in these new categories existed because of legalization—though certainly some of these jobs may have been pre-existing via illegal speakeasys that were simply brought into the formal economy after legalization. Table 2 suggests that around 60,000 workers were employed in these two categories in 1933. However, the *CAB* noted that "Many places selling [alcoholic] drinks, *probably greatly exceeding in number and sales those classified as drinking places, are included in the restaurant classifications*. [Unfortunately] it is impossible to distinguish between those restaurants and lunch counters which sell such beverages with meals and those which do not" (italics added). Table 2 also includes employment in restaurants, cafeterias, and lunchrooms. How many of these 170,439 eating places with 606,605 employees and proprietors served beer? Most importantly, how many extra employees and proprietors of new businesses

gained employment at eating establishments because of increased business related to the sale of beer? In the next section we will formally address these questions.

In addition to creating jobs in the beer sales and service sector, legalization could also have created employment opportunities in manufacturing. The 1935 *Census of Manufactures* reports the number of wage earners in the US by month in 1933 in the "Malt Liquor" industry, of which beer is by far the main component.[25] In January 1933, around 8,000 were employed in this industry (primarily making non-alcoholic beer and other products as described above); however, in April, this number surged to over 20,500 and by summer the number of employees in this industry rose to 32,000.[26] Additionally, in 1909 there were 69,000 employed in the glass bottle production industry and it was reported that 4.6 percent of the total value of sales of this industry was for beer or liquor bottles—thus we can roughly estimate that around 3,000 people owed employment to beer bottle production in 1909.[27] Using the past as precedent, beer legalization in the spring of 1933 could have created up to 3,000 new jobs in glass manufacturing, although this number may be lower given electrification and other labor-saving technologies were broadly adopted between 1909 and 1933. Still, potentially pushing these potential job gains higher, 85 percent of all beer was kegged rather than bottled in 1909, but during prohibition breweries switched largely to bottles for near beer and this trend continued in the post-Prohibition era (Stack, 2003). More jobs were certainly created via the production of new refrigeration equipment, production of beer barrels, wooden crates, and kegs, as well as jobs for beer delivery drivers, and other miscellaneous production and distribution services related to beer. Although the employment gains from each of these sectors

[25] *Census of Manufactures*, 1935, "Malt Liquors," Table 3. "Wage Earners by months for the United States, 1935 and 1933 and for states, 1935," page. 163.

[26] By the summer of 1935, the number of wage earners in the industry rose to 44,043.

[27] *Census of Manufactures*, 1909, "The Manufacture of Glass," Page 881, Table 15.

may be relatively trivial, when aggregated, the job totals could certainly be in the tens of thousands.

5. Empirical analysis of job gains attributable to beer legalization in the beer sales and service sector

In this section we empirically estimate the employment gains across 1933 in the beer sales and service industry that are attributable to beer legalization.[28] Although the 1933 *CAB* writes that we cannot know how much employment in restaurants, cafeterias, lunch counters, and refreshment stands was attributable to beer legalization, we can create empirical estimates by examining the state-level, monthly employment data that it reports. The *CAB* reports full- and part-time employment data by month and state for 1933 for these food service categories, however, the number of proprietors is only reported for the year as a whole. To create a monthly estimate for the number of proprietors, we assume a straightforward correlation between the number of employees and the number of proprietors, although we also report our results without the inclusion of proprietors.[29]

To begin our analysis, we use a difference-in-difference strategy and estimate the following

[28] For data and replication files see Poelmans, Taylor, Raisanen, and Holt (2021).

[29] For example if the number of proprietors in the state is reported for the year as 10, and the number of employees in December (which was generally the peak employment month) is 40, we assume full time employment of 50 (40 + 10) for December. For earlier months, we estimate total employment as the employment reported in that month plus that number divided by December employment then multiplied by 10 (the total number of proprietors). So if, for example, July employment was 20, we would estimate July total employment plus proprietors to be 20 + (20/40)*10 = 25. In other words, since employment in July is half its December level, we assume the number of proprietors in that month is also half of its total reported number for that year. To check on the reasonableness of this assumption, we regressed the state-level wage earner to proprietor ratio on the number of months beer was legalized in each state in 1933. We find a negative linear correlation that is statistically significant at the 10 percent level for both the restaurants etc. and the lunch counter industries. While this is not a conclusive test showing that beer legalization caused the number of proprietors to grow faster than the number of employees, it does suggest that our assumption that the growth rate of proprietors and employees due to beer legalization was the same is a conservative one for our analysis.

equation:

$$Ln\, Y_{st} = \beta \cdot LEGAL_{st} + At + As + \varepsilon_{st} \quad (1)$$

where Y_{st} refers to the number of employees in state *s* in month *t*, and *LEGAL* is a dummy variable equal to 1 if beer sales are legalized in state *s* at time *t*, and zero otherwise. The *CAB* survey asked firms to report employment during the pay period ending nearest the 15th day of the month. For this reason, if legalization did not occur until the 16th day of the month or later, we treat that month as a non-legal one. The final terms in the equation refer to month fixed effects, state fixed effects, and an error term. The month fixed effect controls for common macroeconomic shocks that affected employment across states in a given month. The state fixed effect controls for state-level characteristics that do not vary across the sample. The coefficient of interest, β, represents the percentage change in the number of employees in a state caused by the legalization of beer.

Table 3 reports the results for Drinking Places, Restaurants, and Lunch Counters, with each category reported separately. The coefficients suggest that legalization increases employment in drinking places by 55.3 percent, employment in restaurants by 4.2 percent and employment in the lunch counter industry by 5.2 percent.

[Table 3 Here]

5.1. Event studies

Next, to ensure that our estimates are causal and to estimate any potential dynamic effects, we employ an event-study framework. Unfortunately, we only have 12 months of data in our sample since the Census of Business was not collected in either 1932 or 1934, and thus many states have as few as three pre-legalization observations. Additionally, since a handful of states did not legalize until late in 1933, we have treatment periods for only two or three months for such states. Hence, we use two leads and three lags in order to ensure that our pre-trends and treatment effects

are estimated using a mostly balanced panel of states from event time -2 to event time 3. Observations outside of this effect window are binned into the -3 and 4 event time groups. While these coefficients are estimated, we do not report them as they are not of interest due to the unbalanced nature of the states in each bin.[30] In this event-study framework, the estimating equation becomes:

$$Ln\, Y_{st} = \sum_{\tau=-3}^{-1} \beta_\tau \cdot LEGAL_s \cdot \mathbf{1}_{[t=j_s+\tau]} + \sum_{\tau=1}^{4} \beta_\tau \cdot LEGAL_s \cdot \mathbf{1}_{[t=j_s+\tau]} + At + As + \varepsilon_{st} \qquad (2)$$

where τ is the index for the event time and j_s represents the month state s legalized beer. Thus, β_τ estimates the difference in log employment in event time τ relative to the difference in log employment the month before legalization between states that legalized beer in the sample and states that did not legalize beer. For τ less than zero, β_τ estimates the pre-trends. For τ greater than zero, β_τ estimates the treatment effect. We cluster the standard errors at the state level.

5.2. State timing of legalization

From a policy-analysis perspective, the date of each state's legalization would ideally be a random draw. In reality, this was unlikely to be true. The major concern for our empirical analysis is whether any factors that might drive employment growth in the food service industry could also have influenced the timing of a state's legalization of beer. For example, if states that were hit hardest by the Depression saw larger economic rebounds in the spring of 1933, and hard-hit states also were more likely to legalize beer earlier under the assumption that it would promote recovery,

[30] See Schmidheiny and Siegloch (2019) on binning treatment indicators in event studies.

this may appear as a spurious positive employment effect in the food service industry from beer legalization policy.

Ideally, we would regress each pre-treatment variable on dummy variables corresponding to groups of states based on the timing of treatment; however, with forty-eight state observations and nine timing groups, the F-statistic for joint significance would be statistically insignificant simply due to lack of power.[31] To get around this, we regress each variable on the number of months each state had legalized beer in our sample.

$$Y_s = \alpha + \delta \cdot Total\ Months\ Legal_s + \varepsilon_s \qquad (3)$$

All variables, including the total months legal, are standardized to have mean zero and variance one to ease interpretation. Coefficients and their corresponding 95 percent confidence intervals are shown in solid black in Figure 2. As can be seen, quite a few variables are not balanced between late legalizers and early legalizers. States that legalize early tend to be in the north, have higher manufacturing value added, more foreign-born individuals, more Catholics, are more urban, and tend to have an historic brewing tradition as measured by barrels of beer produced per million people in 1914, prior to a wave of state prohibitions that lead to the federal Prohibition of 1920.

To gain a clearer understanding of how these pre-1933 characteristics vary between early and late adopting states, we also present estimates of δ when we include 1914 barrels per million people as a control variable. After controlling for historic production of beer, estimates become insignificant at the 5 percent level for every other pre-1933 characteristic. Clearly, the main driver of how quickly a state legalized was its pre-Prohibition brewing tradition. Our empirical results

[31] No states legalized in December 1933, so there are eight timing groups, one each for months April through November and one for the five states that did not legalize at all in 1933.

should be viewed with this caveat in mind.[32]

[Figure 2 Here]

Because of the unbalanced nature of the timing of treatment, we interact pre-treatment control variables with month fixed effects to ensure that these differences are not driving our results. Specifically, we interact the percentage of a state that is urban in 1930, percentage of a state voting Democrat in the 1932 presidential election, longitude, and latitude with month dummy variables. Our percentage urban control interactions account for any potential changes in employment trends between rural and urban states over time. The controls for Democratic vote share, longitude, and latitude can help account for potential divergent employment time trends along political and climate dimensions. In other specifications we interact the number of barrels of beer per million people produced in 1914 with month fixed effects. Again, once controlling for the historic production of beer at the state level, the timing of treatment becomes balanced across every other pre-1933 characteristic. Lastly, we present estimates where we include census region by month fixed effects. With these control interactions, the estimating equation becomes:

$$Ln\, Y_{st} = \sum_{\tau=-9}^{-1} \beta_\tau \cdot LEGAL_{st} \cdot \mathbf{1}_{[t=j_s+\tau]} + \sum_{\tau=1}^{9} \beta_\tau \cdot LEGAL_{st} \cdot \mathbf{1}_{[t=j_s+\tau]} + \sum_{t=2}^{12} \boldsymbol{X_s \Gamma_t} + At + A_S + \varepsilon_{st} \quad (4)$$

where $\boldsymbol{X_s}$ is a vector containing cross-sectional control variables and $\boldsymbol{\Gamma_t}$ is a vector of coefficients measuring any changes in the association of those variables in month *t* relative to January 1933. Again, we cluster standard errors at the state level.

[32] The deltas in Figure 2 can be interpreted as the standard deviation increase in the pre-1933 characteristic associated with a standard deviation increase in the total months of legalization in 1933.

5.3. Event study of "drinking places"

We begin our event study analysis with an examination of drinking places. While this was a new *CAB* category, created in response to beer legalization, many states did report positive employment in the months prior to their legalization dates, although it was typically a relatively small fraction of the number employed in the later months of 1933. This suggests that some of these beer related jobs could have crowded out non-beer jobs—i.e. perhaps the surveyed firm, which was classified as an alcohol "drinking place" by the 1933 *CAB*, was a different type of retail firm in the months prior to legalization—or was an illegal speakeasy—and reported employment numbers for this operation during pre-legal months. To illustrate, Michigan "drinking place" firms reported 100 jobs in April 1933 even though beer was not legalized in the state until May 10, 1933. Not surprisingly, the number of jobs in drinking places rose to 400 in May, to 659 in June, and to 980 in July. By the end of the 1933 Michigan reported 1,444 jobs in firms classified as drinking places.

Another important issue with respect to drinking places is that there was state-level heterogeneity in beer regulations. Some legalizing states outlawed what the CAB classified as "drinking places" by restricting sales for on premises consumption to places that also served meals—i.e. those that would, by definition, fall in our restaurant and lunch counter categories. For example, while Arizona legalized beer on April 7, state law required that beer could only be sold for on premises consumption "with meals." Thus, it is not surprising that the raw employment data for drinking places show no change in employment in Arizona in the months immediately following legalization. This heterogeneity in terms of just what "legalization" meant certainly attenuates our estimates of the impact of legalization.

The four panels of Figure 3 plot the beta coefficients for the log of employment in drinking places according to equations 2 and 4. The panels differ based on the controls that are included in the analysis. The effects are shown via the solid line while the shaded region corresponds to the 95 percent confidence interval. Panel A shows estimates without any pre-1933 state characteristic-by-month interactions. Panel B controls for different time trends along the urban, political, and seasonality/geographic dimensions. Panel C controls for diverging time trends based on historic beer production. Panel D uses census region-by-month fixed effects. The specification that generates Panel A is our preferred one, while we view the specifications used in panels B, C, and D as robustness checks. We find parallel trends in the pre-periods across all specifications, which suggests these employment effects are indeed causal. We also find similar coefficient estimates across the specifications. Our results suggest that employment in drinking places rose by around 40 percent in the first month of a state's beer legalization, and had risen by over 60 percent within three months of state legalization.

[Figure 3 Here]

5.4. Event studies of food service categories

Of course, the strong results above should come as little surprise since the category examined was almost exclusively tied to beer. Next, we employ our event study analysis to examine the effect of beer legalization on employment in the category "Restaurants, Cafeterias, and Lunchrooms" whereby beer service was not the primary consideration, if it was done at all. Still, we wish to test whether beer legalization meant that eateries now serving beer hired more workers to accommodate beer sales, as suggested by the writers of the *CAB*. The results are plotted in the four panels of Figure 4, which again vary based on controls. While adding controls slightly reduces both the size of the coefficient and its statistical significance, all four specifications suggest

statistically significant job gains were associated with legalization. Again, as we find parallel trends in the pre-periods, we believe that these job gains are causal. These four specifications suggest that the legalization of beer brought between 2.2 and 3.2 percent increases in restaurant employment during the first month, and this rose to between 2.3 and 5.0 percent increases by the third month of legalization.

[Figure 4 Here]

Figure 5 plots the beta coefficients for the employment gains in the Lunch Counters industry. Again, across all specifications we find statistically significant percentage increases, broadly comparable to those in the restaurant category, in the number of jobs following the legalization of beer.

[Figure 5 Here]

5.5. Placebo test: beer legalization and auto sales

To ensure that the previous findings are not simply capturing the general recovery in 1933, we perform the same event-study exercise but use the log of new car sales as the outcome measure. Hausman, Rhode, and Weiland (2019) show an important role for the "farm channel" in the recovery of 1933 by examining car sales in farm and non-farm states. Because new car sales are associated with the general recovery in 1933, and we do not believe that the legalization of beer should affect such sales, we consider this to be an appropriate placebo test. Figure 6 plots the event study coefficients for car sales. Panel A shows coefficient estimates from equation 2 for log of car sales using 1933 data. In Panel B, we add car sales data from 1932 while still using equation 2 to estimate the coefficients. Because we have additional data, we can expand the number of balanced pre-trend estimates, which we do in Panel C. None of the estimates are statistically significant.

The lack of finding a meaningful effect suggests that our estimates for food-service employment are indeed causal and not capturing the general recovery across 1933.

[Figure 6 Here]

5.6. The potential effect of the National Industrial Recovery Act on restaurant employment

A major goal of the National Industrial Recovery Act of 1933 (NIRA) was to increase employment by reducing hourly workweeks—thus, scarce work could be spread amongst more people. Industry-level "codes of fair competition" mandated maximum workweeks and minimum rates of pay. These codes, however, were subject to government approval and the speed of code implementation was disappointing (Taylor, 2019). In fact, the Restaurant industry code was not approved until February 16, 1934. However, starting August 1, 1933, the President's Reemployment Agreement (PRA) was implemented to cover firms in uncodified industries until their code of fair competition was approved. The PRA mandated a 40-hour maximum workweek for most positions as well as minimum rates of pay that were generally between 32.5 and 40 cents per hour depending on city population and geographic region.

Industries could, however, appeal for modifications to the PRA wage and hour guideposts. On August 10, 1933, restaurants were granted a modification whereby minimum wages for wait staff were to be between 21 to 28 cents per hour (again depending on city population and region) and maximum workweeks were set at 54 hours for men and 48 hours for women.[33] These modifications, which were vigorously opposed by organized labor, were amongst the largest ever granted to an industry under the PRA. Incidentally, when the restaurant's NIRA code was approved in February 1934, it kept the 54- and 48-hour workweeks (based on gender) and actually

[33] "Mediation Board Ends Hosiery Fight." *New York Times*, August 11, 1933, p. 3.

reduced the minimum wage allowed even further to between 17 and 20 cents an hour. The justification for the low wage was that wait staff collected tips as part of their compensation.

The significance of this for our analysis is that unlike most other industries, which experienced work-sharing induced gains in employment starting in August 1933, as well as some offsetting declines in employment due to having to pay higher hourly wages (Taylor, 2011), the restaurant industry was largely unaffected by the PRA/NIRA's labor provisions. Taylor and Neumann (2016) show that industries that were more affected by the wage and hour provisions of the PRA experienced larger declines in economic activity in the fall of 1933. The minimal impact of the program on the restaurant industry allows us to better isolate the employment impact of beer legalization across 1933.

5.7. Beer stores

As mentioned earlier, the *CAB* reports employment data by month across 1933 in the 3,767 "bottled beer and liquor stores." These data are problematic to employ in an event study analysis similar to that carried out above. Around a third of the states reported no employment in this category throughout 1933, and in many cases this is true even though they legalized beer. A severely complicating factor is the heterogeneity of legalization status between states. Some states restricted the sale of beer for off premises consumption to what the *CAB* classified as "beer stores," while in many other states beer was sold in pharmacies and grocery stores. Naturally this dramatically affected how much "beer store" employment the followed in a state after legalization. Furthermore, even in the states where employment numbers are reported, the employment numbers are quite small as these were almost always proprietor run. In total the stores listed 4,203 proprietors and they had only around 1,800 employees in November 1933—there was a large bump

in employment that occurred in December after the end of federal prohibition, a policy unrelated to beer legalization earlier in the year, as in this case many states mandated liquor be sold in such stores. For all these reasons, event study estimates would be very unreliable.

While this is a very small employment category, we still want to examine its potential contribution to employment in 1933. Figure 7 reports employment (proprietor-adjusted) by state over the event time. As can be seen, the effect of legalization was extremely heterogenous, having relatively large effects in a handful of states, while having little or no effect over most others. To provide some context, New Jersey's beer bill was lax in terms of what types of places could be granted licenses to sell beer, but it prohibited beer's sale "over a bar or in any place which shall exclude the view of the public."[34] Such a mixture meant that what the CAB classified as "beer stores" could be an important seller of beer. Massachusetts regulations likewise prohibited bars, which can help explain why its "drinking place" employment saw little movement in the months immediately following the state's legalization, but its beer store employment surged much more than it did in other states.

[Figure 7 Here]

5.8. Estimated employment gains from legalization

Up to this point our analysis has focused on whether legalization increased employment. Next, we use our empirical estimates to tabulate the number of jobs that beer legalization brought in spring 1933. Table 4 reports the cumulative employment gains across April, May, and June of 1933. We report these job gains in three different panels. Panels A and B report job gains derived from the use of the event study coefficients reported in Figures 3, 4, and 5 for drinking places,

[34] "Shore Towns Ready for Beer, Sale Not Legal Till 7 A.M. Ban on Bars Makes Speakeasies Illegal." *Ashbury Park Evening Press*, April 6, 1933, p. 1.

restaurants, and lunch counters, respectively. Panel A reports the results without counting proprietors in the jobs tally while Panel B includes proprietors via the method discussed earlier. Panel C uses the event study estimates to compute jobs in the two food-service categories but uses the raw employment numbers (including our proprietor adjustment) in the beer store and drinking place categories. Panel C assumes that absent legalization jobs in beer stores and drinking places would have been zero. While Panels A and B may understate actual employment gains attributable to legalization due to the attenuation issues discussed above, Panel C almost certainly overstates these gains. A firm that was classified as a "drinking place" or a "beer store" may have been in operation either as an illegal alcohol-serving "speakeasy" or as something different entirely and thus some of these jobs would have existed even absent legalization. We feel the results reported in Panel B, while relatively conservative, are the most reliable and hence view them as our preferred measure.

[Table 4 Here]

The results from our event study estimates (Panels A and B) suggest that between 26,371 and 43,817 jobs were created by beer legalization in the spring of 1933 depending upon whether proprietors are counted as workers. Spring job gains rise to more than 68,000 if we assume that all employment in drinking places and beer stores (Panel C) was caused by legalization. To put these estimates into perspective, the *CAB* reports that employment (full-time plus part-time) in the entire retail sector rose from 3.125 million in March 1933 to 3.372 million in June 1933—a gain of 247,000 jobs. Using our estimate of proprietor growth and counting proprietors as workers, employment rose by 350,000 (from 4.37 to 4.72 million). Thus, depending on which panel is used, 10.7 (panel A), 12.5 (panel B), or 19.6 (panel C) percent of all employment gains in the retail

sector in spring of 1933 may be attributed to employment gains in the beer sales and service sector caused by legalization.

6. Empirical analysis of employment attributable to beer legalization in the manufacturing sector

While the analysis above uses employment data from the beer retail sector via the 1933 *Census of American Business*, this subsection examines the potential employment gains legalization brought to the manufacturing sector. Brewery workers are classified as manufacturing workers and the number of workers by month across 1933 are reported under the category "Malt Liquor" manufacturing employment in the 1933 *Census of Manufactures*.[35] Ideally, we would duplicate our event study using the monthly data for brewery employment, however the Census only reports employment data for 24 "selected" states—while the other 24 states employment is near zero, there is a small residual when aggregating the employment of these 24 states and comparing it to the reported total nationwide employment. The main problem as it relates to our analysis is that an overwhelming majority of the states for which data are reported legalized beer in April or shortly thereafter. Thus, there is not enough variation in the timing of legal status to identify the effects of legalization. Still, the raw data are instructive. Figure 8 plots the number of employees in the malt liquor industry by state over the event time. Not surprisingly, there is a clear jump in employment in the month that legalization occurs in each state. We do not think it controversial to simply attribute the raw employment gains in this industry to beer legalization. By this measure, April saw 11,300 new brewery jobs while the "recovery spring" months of April through June brought a total of 21,264 new jobs.

[Figure 8 Here]

[35] Table 2 "Liquors, Malt—Wage Earners by Months for Selected States, 1933" (p. 48).

The employment numbers above could be viewed as a lower bound of the impact of beer legalization on total manufacturing sector employment in spring 1933. However, expanded beer production and distribution was likely to have contributed to thousands of new jobs in industries that support beer production and distribution. The 1933 *Census of Manufactures* reports state-level manufacturing employment for each month during 1933. Between March and June of 1933, the number of manufacturing jobs rose nationwide from 4.93 million to 5.72 million. While beer legalization likely created jobs in industries tied to beer like refrigeration equipment, steel kegs, glass bottles, trucks, barley, hops, and so on, it is important to note that such products could be produced *in any state regardless of whether it legalized beer*. While restaurant jobs are effectively "non-tradeable," many of the products that support the production and distribution of beer manufacturing could be produced in non-legal states and shipped to legal ones. Given this, an event study on the whole of the manufacturing sector, like that employed above for the food service industry, does not seem appropriate. Indeed, when we duplicated our analysis for the manufacturing growth data the results were statistically insignificant.[36]

In varying our empirical approach, an important question to ask is just when would one expect to find the largest effect of beer legalization on manufacturing employment, if any occurred at all? A large surge in new manufacturing jobs appears to have occurred in the weeks immediately after the passage of the Cullen-Harrison Act as breweries very quickly ramped up their production and employment—recall the narrative evidence presented earlier from four Chicago breweries, which suggested that they had hired around 1,000 new employees during the last week of March

[36] The coefficient on the first month of legalization suggests a 1.4 percent increase in the growth rate of employment, however, the result (t-stat 1.57) is not statistically significant.

alone. Our narrative also suggested that jobs were created relatively quickly after the passage of the beer bill in firms that produced glass bottles, kegs, refrigeration equipment, and other items that supported beer production, distribution, and consumption. Furthermore, while prior data on the number of breweries in existence are only available at the annual level, Hayne and Taylor (2021) explore contemporary newspaper accounts to plot brewery entry by month across 1933. They show that nearly a third of breweries that operated in 1933 commenced operation in April. This is consistent with the brewery employment data discussed above, which shows that over half of all new brewery jobs across 1933 were created in April alone. With breweries ramping up production, this could have induced other manufacturing employment in April 1933 such as production of glass bottles, delivery trucks, refrigeration equipment, assembly lines, steel kegs, and so on, as outlined in our earlier historical narrative.

With this in mind, we explore a 48-state cross-sectional analysis focused exclusively on manufacturing employment growth between March and April of 1933. Table 5 reports the results of a series of regressions whereby the dependent variable is a state's percentage growth rate in manufacturing employment in April 1933. Specification (1), which is effectively a difference in means test, shows that states that legalized beer in April 1933 saw manufacturing employment rise 1.73 percent faster than those states that did not. Specification (2) controls for the degree the state was more oriented toward manufacturing by including the number of workers per capita employed in manufacturing in 1931. It also includes two measures designed to see how hard states' manufacturing sectors were hit by the Great Depression—the change in the number of workers per capita and the change in valued added in manufacturing. None of the coefficients on these controls are statistically significant. Specification (3) add barrels of beer produced per million people in 1914 and specification (4) adds this variable interacted with the April-legal dummy. Specification

(5) includes each state's share of total brewing employment in March of 1933 while specification (6) includes this variable interacted with our legalization dummy. The coefficients on the interaction terms are negative, though not statistically significant. One possibility is that the states with a lot of breweries already in place may have ramped up employment in March in anticipation of beer legalization and thus limiting the effect on April employment growth. The variable of primary interest is the April-legal dummy. Across the six specifications, the coefficients' average value suggests that April legalizers saw manufacturing employment growth that was 2.2 percent higher than non-legalizers, and these coefficients are statistically significant at the 10 percent confidence level across all specifications with the exception of the final one where it falls just short of that interval.

[Table 5 Here]

With respect to magnitude, the number of manufacturing workers employed in March 1933 in the 24 states that legalized beer in April was 3,636,918. To be conservative, using the smallest coefficient on the 'legal in April 1933' dummy reported in Table 5, additional employment growth of 1.73 percent would suggest around 63,000 manufacturing jobs were associated with beer legalization in April 1933. To put this in context, total employment in manufacturing rose by 160,000 in April. Still, as we are less confident about the coefficients of these OLS regressions reflecting true causality, we view 63,000 jobs an upper bound of beer legalization's impact on manufacturing employment in April. A clear lower bound would be the 11,300 April jobs reported in the raw data on brewery employment. The true number is likely somewhere between these two, say 37,000 jobs if we split the difference. This would suggest that nearly a quarter of manufacturing jobs created in April 1933, were attributable to beer legalization. While it is certainly possible that

more manufacturing jobs were created from beer legalization in the later months of 1933, we are unable to show this empirically.

If we add 37,000 April manufacturing jobs to our job tallies in the beer service and sales sector reported in the three panels of Table 4, we arrive at between 63,000 and 105,500 estimated jobs attributable to beer legalization in the spring of 1933, with between 51,000 and 79,000 of these created in April alone, depending on which panel of estimates we use. Using our preferred estimates, reported in Panel B of Table 4, we estimate around 81,000 jobs created across the spring of 1933 with 60,000 of these created in April.

In terms of placing these estimated job gains in the context of the entire economy, the Bureau of Labor Statistics series on total non-agricultural employment shows an increase from 20.89 million to 22.34 million—i.e. 1.45 million jobs created from March to June 1933.[37] Thus, our preferred estimates suggest that around 5.6 percent of these new spring 1933 employment opportunities may be attributable to beer sales and service. In the perspective of total non-agricultural employment, the BLS measure suggests an increase of 400,000 jobs in April and thus our preferred estimate suggests that around 15 percent of the nationwide April employment bounce could be attributable to beer legalization. This suggests that while beer may not have been the most important "tonic" for ending the Great Depression—enhanced inflation expectations, devaluation, and other financial reforms were certainly more important—legalization did play an important role in helping the economy turn the corner in the spring of 1933.

7. Discussion: the potential role of New Deal spending

[37] "Employees in Nonagricultural Establishments," Bureau of Labor Statistics, NBER Series 8268.

Our preferred estimates suggest that beer legalization created around 81,000 new jobs in the beer service, retail, and manufacturing sectors in the spring of 1933. However, if early adopters of beer legalization were also on the receiving end of disproportionately more New Deal spending than other states, this could be driving the finding of faster employment growth than otherwise. This short section addresses this possibility.

First, it seems unlikely that New Deal spending could have affected employment gains in the spring 1933 turnaround since very little New Deal spending took place prior to July 1933. The Federal Emergency Relief Administration (FERA) was created in mid-May 1933 and on May 29 it was announced that FERA would send by the end of June its first grants totaling just under $22 million to 31 states and the territory of Hawaii.[38] The Civilian Conservation Corps (CCC), which employed young men on conservation projects, set up its first camp on April 17, 1933, however it spent relatively little prior to July 1933. The Public Works Administration was created under the National Industrial Recovery Act on June 16, 1933 and it did not begin spending in earnest until July of 1933. The Civil Works Administration (CWA) began in November of 1933 and operated through March of 1934. The Agricultural Adjustment Act (AAA) was passed on May 12, 1933 but did not begin paying farmers until July 1933. Likewise, the Farm Credit Administration began in July 1933. Spending by the Tennessee Valley Authority did not begin until 1934. In short, large amounts of New Deal spending did not begin to kick in until well after the spring recovery had begun.

This is not to say that there was no government relief spending prior to July 1933. By 1932 President Hoover had set up a large relief apparatus consisting of direct relief and spending on

[38] "Grants 21,659,282 Under Wagner Act." New York Times, May 30, 1933, p. 13.

public works as well. Unfortunately, there are no measures of New Deal or other public works spending by state and month for the 1930s. Annual data by state for a host of different government programs were, however, compiled and published by Fishback (2015). Fortunately for the purpose here, many programs reported spending data by the fiscal rather than calendar year, and during the 1930s the government's fiscal year began July 1 of the prior year and ran through June 30. Thus, 1933 fiscal year data measures spending that took place between July 1932 and June 1933, which covers the key three months after beer legalization, and hence we can use the fiscal year 1933 New Deal spending data (i.e. March, April, May, and June 1933) to see whether states that legalized beer had higher levels of this spending during these months. We also examine fiscal year 1934 to see whether New Deal spending after July 1933 went disproportionately to states that legalized beer earlier.

Table 6 suggests no systematic bias of per capita New Deal spending toward states that legalized in April compared to those who did not. Difference-in-means tests suggest that only in the case of Agricultural Adjustment Act spending across fiscal year 1934 is spending significantly different—states that did not legalize beer in April received more AAA spending than those that did.[39]

[39] While the results are not reported in the interest of space, we repeated this exercise but broke the states into two halves based on brewing tradition, which is measured by how many breweries per capita a state had in 1932. Such a bias toward brewing tradition states could be important if we assume that these states saw larger employment gains from legalization. Again, there is no systematic bias either towards or away from brewing tradition states in terms of per capita New Deal spending in either 1933 or 1934. We also ran specifications of our food service employment event study where we interacted per capita New Deal spending in fiscal years 1933 and 1934 for each state with the month dummy variables. Such a specification is essentially a flexible difference-in-difference specification, which can be used to estimate the effect of New Deal spending per capita on employment outcomes. We find that including these New Deal controls does not change the estimated coefficients for legalization from the event-study specifications. We do not report these estimates, however, because while our other controls

[Table 6 Here]

8. Discussion of crowding out and other pertinent issues

If an economy's factors of production are operating at full capacity, an increase in employment in one sector must be exactly offset by a decline in employment in another sector. In 1933, with the national unemployment rate at 25 percent—and total hours worked in manufacturing in March at 62 percent below its August 1929 peak (Taylor and Neumann, 2016, p. 56)—the notion that the new jobs from beer legalization could have crowded out those in other sectors should be less of a concern. In fact, all 52 categories of retail business experienced substantial growth in the 2nd and 3rd quarters of 1933 with respect to number of new stores.[40] Furthermore, 51 of the 52 categories experienced employment growth between March and December 1933.[41] While we concede that beer may have crowded out some sales and employment in other industries, ceteris paribus, firms economy-wide were generally able to hire workers who were previously idle rather than having to attract them away from other firms, thus mitigating such concerns.

Beer legalization may also have positively contributed to recovery through the "farm channel." Hausman, Rhode, and Weiland (2019) show that dollar devaluation raised farm product prices and thus raised the income of agricultural households. Most importantly, the authors argue that these gains spilled over into non-farm sectors since farmers had higher marginal propensities to consume than non-farmers and thus the transfer of wealth to farmers raised aggregate demand.

(population 1930, percent rural 1930, Democratic vote share 1932, and latitude) precede, and hence are exogenous to the 1933 employment data, New Deal spending occurs during our sample period, which could raise endogeneity concerns.

[40] *United States Census of American Business* (1933), Table 6-A, p. A-21.

[41] *United States Census of American Business* (1933), Table 2A, p. 72.

As barley accounts for around 70 percent of the raw materials cost of beer, legalization may have similarly promoted recovery through its impact on barley prices. The April 26, 1933 *New York Times* reported that barley prices jumped from 33 cents to 60 cents a bushel "due largely to the legalization of beer."[42] By July 1933 barley prices had risen 250 percent from their pre-beer legalization level—an increase that was around eight times faster than other typical farm prices during the spring and summer of 1933.[43]

Another issue worthy of consideration is that of legalization's impact on government revenue. Proponents claimed that one of the major potential benefits of bringing back beer would be the additional revenue collected from beer taxes. Thus, legalization could have had affected government spending, which could have further impacted labor markets through a multiplier effect. One potential way to explore this effect would be to employ a county-level analysis using brewery location data (a proxy for new tax revenue to the county) and retail sales data. We leave this as an avenue for future work.

On the downside, Tremblay and Tremblay (2005, pp. 224-227) note that alcohol consumption can lead to negative health outcomes, has been linked to higher incidences of crime, and is a factor in 41 percent of all fatal motor vehicle crashes. Of course, during Prohibition there was a large illegal economy revolving around the illicit production, distribution, and sale of alcohol—mainly liquor rather than beer, but beer and liquor can certainly be viewed as substitutes. While this economic activity may not have always entered into official statistics, it certainly provided income and employment for those who participated in it. This illegal industry experienced a large dent in its business—or underground firms were now brought into the legal

[42] "Wheat Prices Sag as Trading Eases," *New York Times*, April 26, 1933, p. 28. Incidentally, these price increases were not temporary.

[43] "Grain Prices Soar in Rush of Buying," *New York Times*, July 18, 1933, p. 25.

sector—potentially offsetting some of the measured economic gains that beer legalization produced. Still, that illegal sector also brought with it many negative externalities such as crime, including murder, and created a need for increased spending on law enforcement (Miron, 2004). Our analysis should be viewed with such caveats in mind.

9. Conclusion

The US economy hit its nadir in March 1933, the month Franklin Roosevelt took office. Nine days into his presidency, Roosevelt asked Congress to amend the Volstead Act so as to allow 3.2 percent alcohol beer. Proponents of legalization suggested that beer would bring back prosperity by creating jobs in the production, distribution, and service of beer. Representative Thomas Cullen of New York, a co-sponsor of the "beer bill," suggested that legalization would create around 300,000 jobs while estimates from beer industry lobbyists were as high as half a million new jobs.

The beer bill's passage gave states the ability to legalize beer beginning on April 7 and the economy did indeed experience a tremendous surge in economic activity during the spring of 1933. Temin and Wigmore (1990) and Eggertsson (2008) credit rising inflationary expectations as being a major cause of this recovery, estimating that it can account for at least half, and likely more, of the economic surge. Still, Jalil and Rua (2016) show that inflation expectations did not rise until late April. Since employment data reflecting the week ending April 16 show the surge was already underway, this raises the question of what aided the economy's turning of the corner in the first half of April 1933. This paper suggests that beer legalization played an important role.

To estimate the relationship between beer legalization and employment we take advantage of the monthly variation in the timing of legalization to employ an event study analysis of the

drinking place and food service industries. Our results suggest that legalization brought substantial job gains in breweries, bottle shops, bars, and restaurants that served beer, and also suggest some jobs were created in other related manufacturing industries such as refrigeration equipment, steel kegs, delivery trucks, glass bottles, and so on. Specifically, we estimate that legalization brought between 63 and 105 thousand jobs in these sectors between April and June of 1933, with around 81 thousand being our preferred estimate. This represents 5.6 percent of all non-agricultural employment gains across the spring of 1933. We are particularly interested in beer's potential role in helping the economy turn the corner in April 1933, prior to the rise in inflation expectations that drove much of the subsequent recovery. Our preferred estimate suggests that around 60,000 of these new jobs were created in April. Since total non-agricultural employment rose by around 400,000 during that month, we estimate that 15 percent of the nationwide April employment bounce is attributable to beer legalization.

How do our findings fit into the broader New Deal literature? In a comprehensive review of New Deal scholarly work, Fishback (2017) notes that recent efforts have focused heavily on estimating the impact of New Deal spending on important issues such as mortality, crime, marriage, birth rates, labor force participation, and malaria, amongst others. Unfortunately, with respect to comparing past work to our findings here, relatively few studies have attempted to estimate the number of jobs created by specific New Deal policies. One such study is Taylor (2011), which concludes that the President's Reemployment Agreement (PRA) created 1.34 million jobs in the last half of 1933—a figure more than 15 times higher than our preferred employment estimates for beer legalization. Taylor also estimates that the net impact of the National Industrial Recovery Act as a whole, of which the PRA was a part, was the creation of 80,000 jobs between 1933 and 1935, which is comparable to our findings on beer legalization

employment gains.

With respect to the New Deal's effect on employment, many studies have more broadly examined how shocks to New Deal relief jobs impacted private sector employment. For example, Neumann, Fishback, and Kantor (2010) suggest that early New Deal relief jobs stimulated private employment and earnings—they estimate that one private employment month was added for every 8 months of government relief work (p. 210). However, after 1934, the authors find evidence of substantial crowding out whereby private employment fell nearly in line with increases in relief employment. This result is broadly consistent with Benjamin and Matthews (1992), who also find that New Deal relief jobs caused more crowding out after 1935 than before. As our study focuses on 1933, these results suggest that new private sectors jobs created from beer legalization were less likely to have crowded out other private sector jobs than they would have been had legalization occurred during later stages of the recovery. It is also important to note that unlike many other New Deal programs, beer legalization did not rely on any government spending to support it, but instead simply changed the legal status of a product.

While our findings do not suggest that beer was the most important tonic for ending the Great Depression, legalization does appear to have played an important role in helping the US turn the corner from the Depression after March of 1933. Beer legalization should be added to the list of other factors—enhanced inflation expectations, banking reforms, devaluation, the farm channel, and rising consumer confidence—that aided spring 1933 recovery. Thus, President Roosevelt appears to have been correct when on March 12, 1933 he remarked, "I think this would be a good time for beer."[44]

[44] Faith (2006, p. 86).

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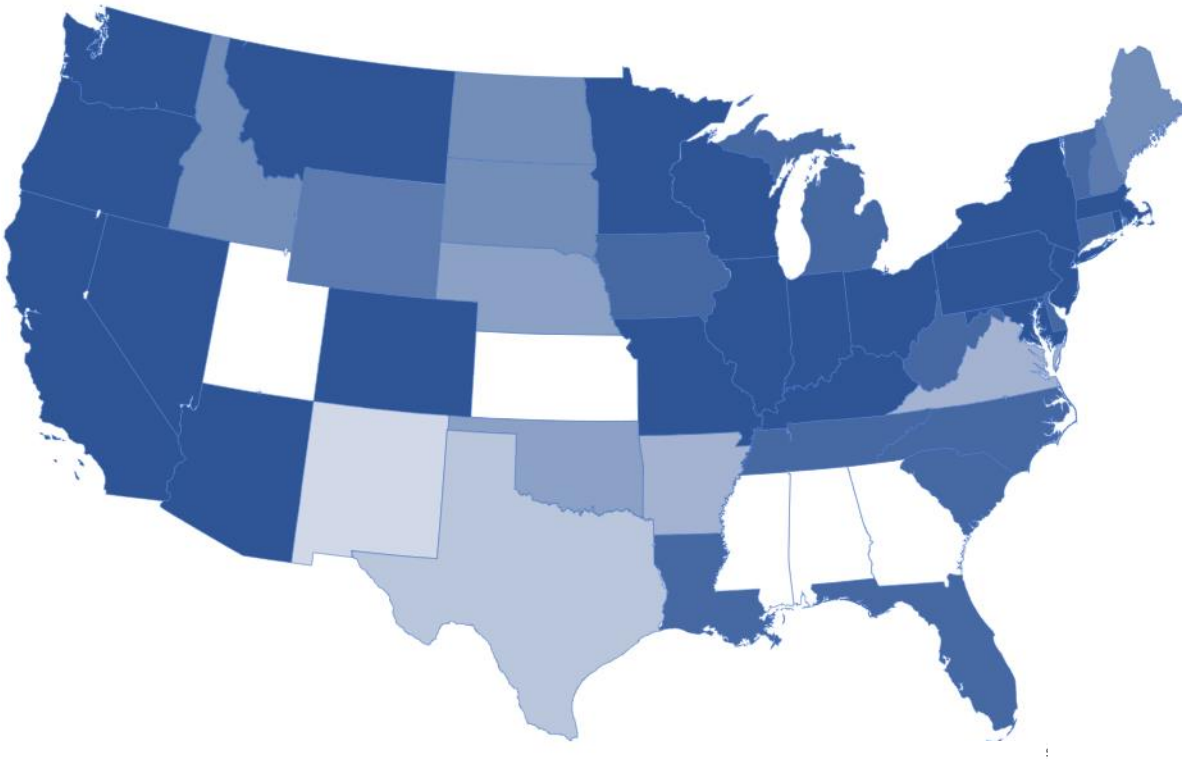

Figure 1

Number of Months 3.2 Percent Beer was Legal in 1933 by State

Notes: The darkest states legalized on April 7, 1933. Lighter shades legalized later in 1933. The five white states did not legalize until 1934 or later.

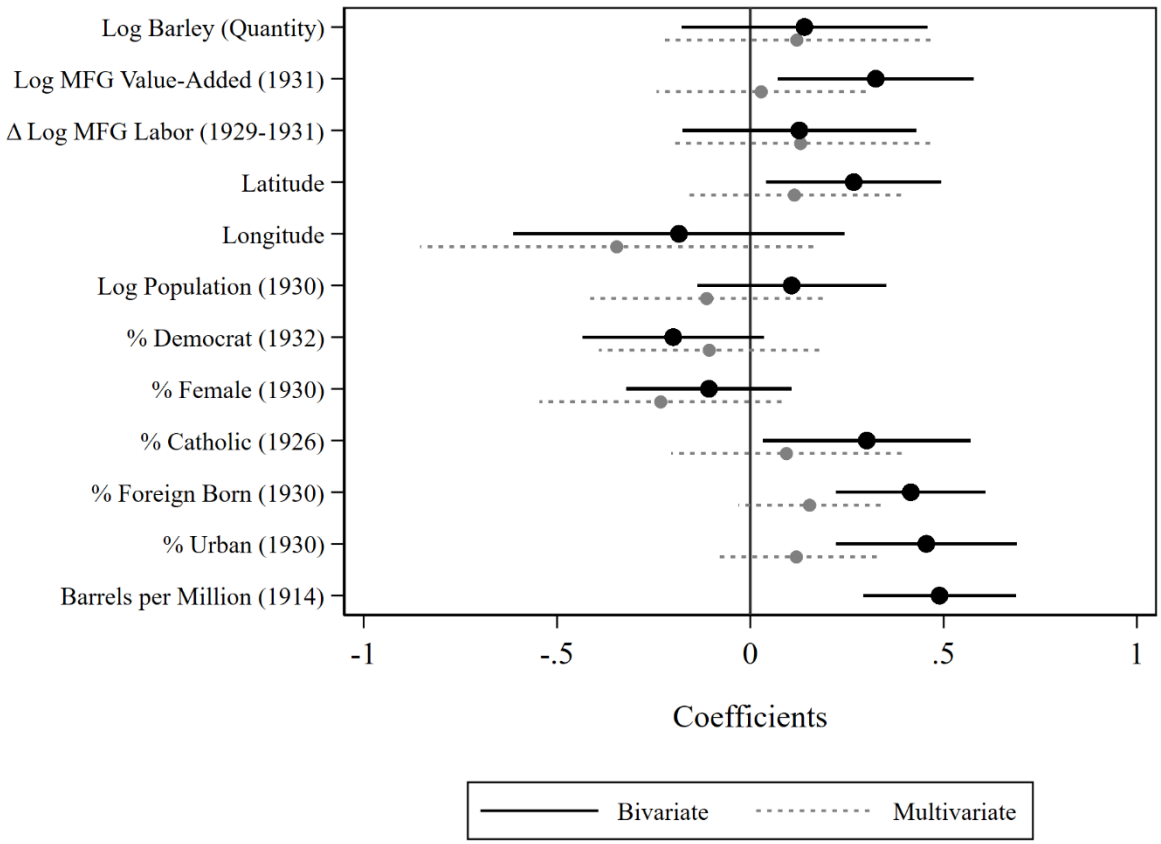

Figure 2

Balance Tests

Notes: Figure 2 plots the estimated beta coefficients, and the 95 percent confidence interval, from regressing each variable (standardized to have mean zero and standard deviation one) on the total number of months each state had legalized beer in 1933 (standardized to mean zero and standard deviation one). The bivariate regressions only contain the pre-legalization characteristic of interest and the total number of months legalized. The multivariate regression adds the barrels per million people in 1914 as a control.

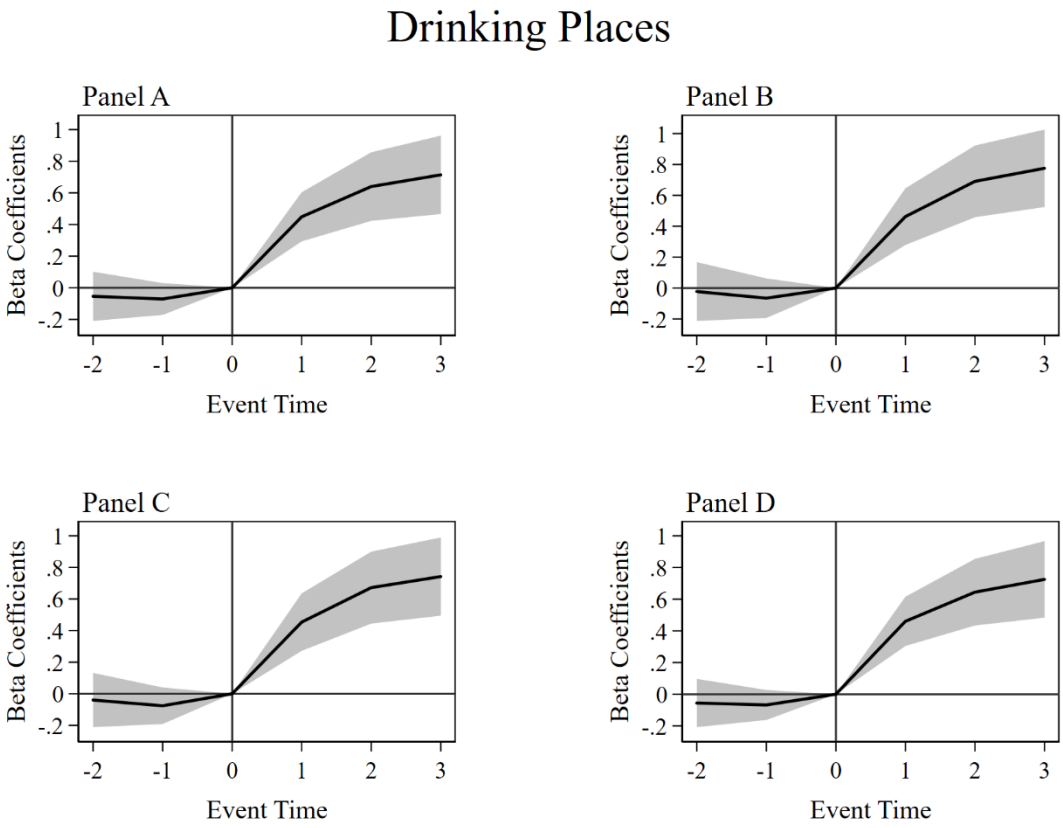

Figure 3

Impact of Beer Legalization on Drinking Place Employment

Notes: Figure plots the estimated beta coefficients for log drinking place employment with their corresponding 95 percent confidence interval. Panel A does not include the additional controls (trends). Panel B estimates are robust to allowing different time trends for rural states, democratic states, latitude, and longitude. Panel C estimates are robust to the inclusion of a divergent time trend for states with high beer production in 1914. Panel D estimates are robust to the inclusion of census region by month fixed effects.

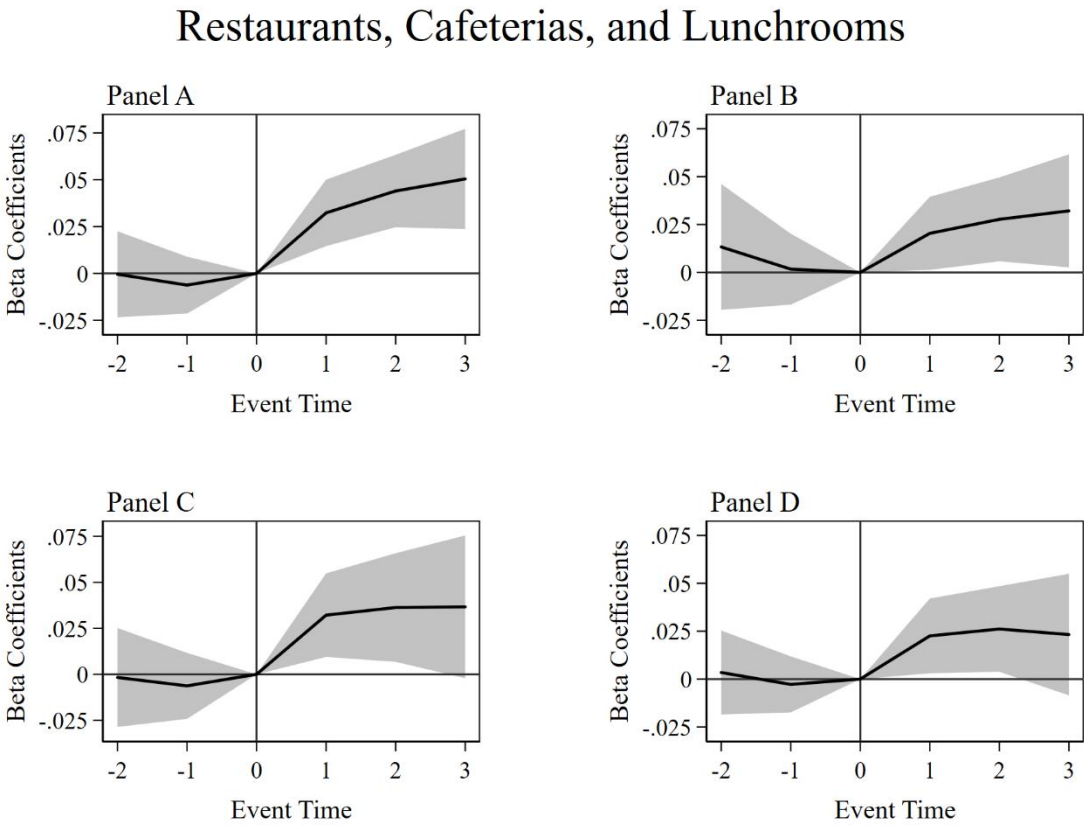

Figure 4

Impact of Beer Legalization on Restaurant, Cafeteria, and Lunchroom Employment

Notes: See notes to Figure 3.

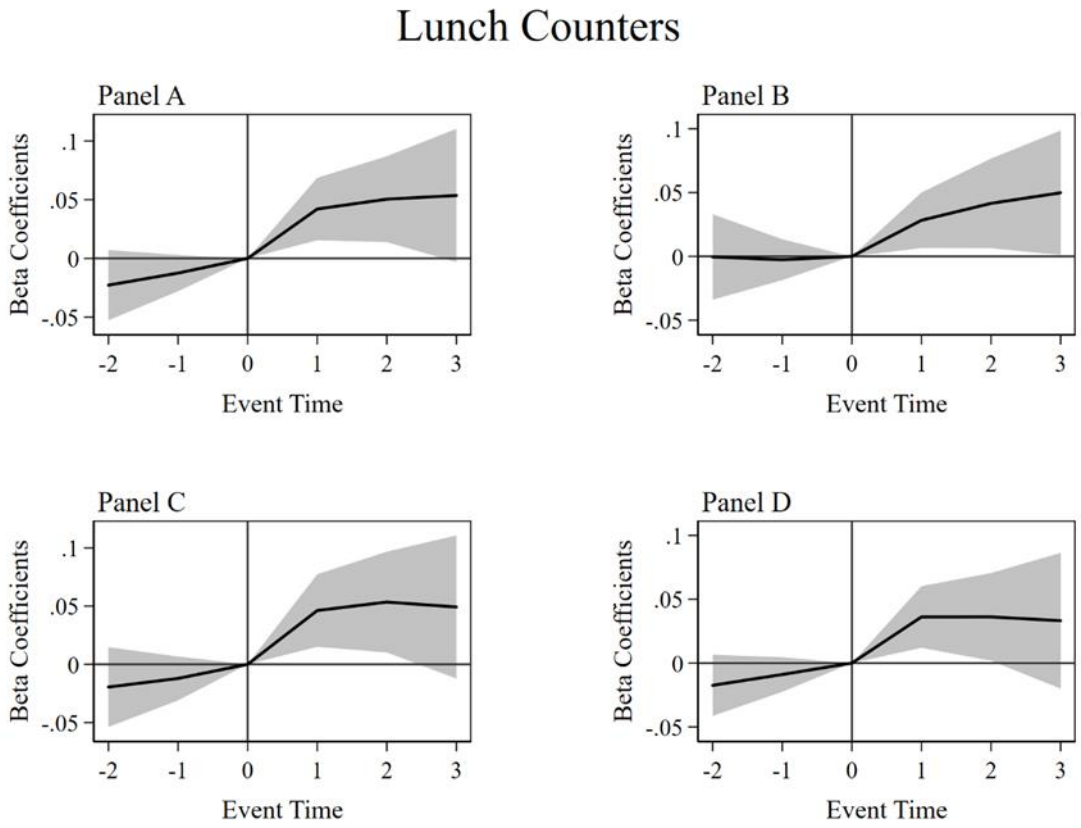

Figure 5

Impact of Beer Legalization on Lunch Counter Employment

Notes: See notes to Figure 3.

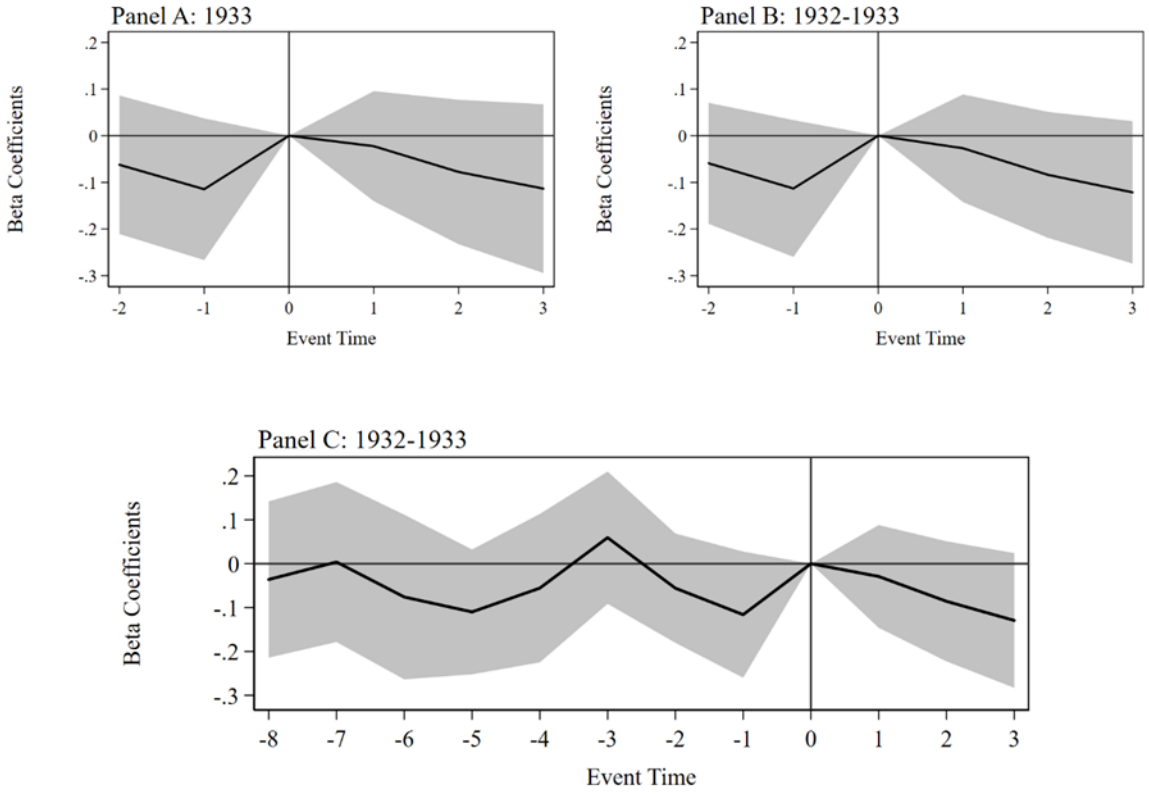

Figure 6

Impact of Beer Legalization on Car Sales

Notes: Figure 6 plots the estimated beta coefficients for log car sales with their corresponding 95 percent confidence interval. Panel A only includes the observations in 1933. Panel B expands the dataset to include observations from 1932 along with the 1933 observations. The addition of the 1932 car sales allows us to expand the range of pre-trend estimates, which we do in Panel C.

Figure 7

Beer Store Industry Employment

Notes: Each line plots a state's number of new employees, full-time plus part-time, in the "bottled beer and liquor stores" retail category over the event time, whereby time zero is the month before the state legalized. Data are from the 1933 *United States Census of American Business*, Table 2 "Employment by Types of Business."

Figure 8

Malt Liquor Industry Employment

Notes: Each line plots the number of new employees in the malt liquor industry by state over the event time, whereby time zero is the month before the state legalized. Data are from 1933 *Census of Manufactures*, Table 2 "Liquors, Malt—Wage Earners by Months for Selected States, 1933" (p. 48).

Table 1
Date of Beer Legalization by State

Alabama	March 22, 1937	Nebraska	August 10, 1933
Arizona	April 7, 1933	Nevada	April 7, 1933
Arkansas	August 24, 1933	New Hampshire	May 23, 1933
California	April 7, 1933	New Jersey	April 7, 1933
Colorado	April 7, 1933	New Mexico	October 16, 1933
Connecticut	May 10, 1933	New York	April 7, 1933
Delaware	May 4, 1933	North Carolina	May 1, 1933
Florida	May 8, 1933	North Dakota	July 1, 1933
Georgia	May 23, 1935	Ohio	April 7, 1933
Idaho	June 21, 1933	Oklahoma	July 15, 1933
Illinois	April 7, 1933	Oregon	April 7, 1933
Indiana	April 7, 1933	Pennsylvania	April 7, 1933
Iowa	April 15, 1933	Rhode Island	April 7, 1933
Kansas	May 1, 1937	South Carolina	April 14, 1933
Kentucky	April 7, 1933	South Dakota	August 7, 1933
Louisiana	April 13, 1933	Tennessee	May 1, 1933
Maine	July 1, 1933	Texas	Sept. 15, 1933
Maryland	April 7, 1933	Utah	January 1, 1934
Mass.	April 7, 1933	Vermont	May 1, 1933
Michigan	May 10, 1933	Virginia	Sept. 3, 1933
Minnesota	April 7, 1933	Washington	April 7, 1933
Mississippi	February 26, 1934	West Virginia	April 13, 1933
Missouri	April 7, 1933	Wisconsin	April 7, 1933
Montana	April 7, 1933	Wyoming	May 19, 1933

Source: Brewer's Almanac 2013, "Beer Excise Changes by State." All dates were confirmed by examining contemporary newspaper articles. From this analysis, we found that Arizona, Connecticut, Delaware, Maine, Nebraska, New Hampshire, New Mexico, North Carolina, Pennsylvania, South Dakota, Vermont, and West Virginia had incorrect dates reported and they were updated here.

Table 2

Stores, Proprietors, and Employment in 1933 in Beer Related Establishments

Category	# of Stores	# of Proprietors	Average Full-Time Employees	Average Part-Time Employees	Total Employees + Proprietors
Bottled Beer and Liquor Stores	3,767	4,203	1,238	365	5,806
Drinking Places	29,901	33,759	14,990	6,049	54,798
Restaurants, Cafeterias, and Lunchrooms	124,090	145,231	297,454	53,939	496,624
Lunch Counters and Refreshment Stands	46,349	52,978	43,894	13,109	109,981
Aggregate of these Four Categories	*204,107*	*236,171*	*357,576*	*73,462*	*667,209*

Source: The 1933 *Census of Business*, Retail Distribution Volume 1, United States Summary and Comparisons with 1929. "Number of Stores, Sales, Personnel, Pay Roll, and Expenses, by Kinds of Business" (p. A-3).

Table 3
Impact of Beer Legalization on Monthly Employment

Outcome:	(1) Drinking Places	(2) Restaurants, Cafeterias, and Lunchrooms	(3) Lunch Counters
Legal Dummy	0.553***	0.042***	0.052***
	(0.104)	(0.013)	(0.020)
Observations	548	576	576
R-squared	0.98	0.998	0.995
State Fixed Effects	YES	YES	YES
Time Fixed Effects	YES	YES	YES

Notes: Robust standard errors, clustered at state level, in parentheses. The first column estimates the effect on Drinking Places and Beer Store employment. The second column estimates the effect on Restaurant, Cafeteria, and Lunchroom employment. Third column estimates the effect on Lunch Counter employment. Coefficient on Legal Dummy represents percent increase in number of jobs caused by the legalization of beer. Sample is January to December 1933. Standard errors are clustered at the state level.

*** p<0.01, ** p<0.05, * p<0.1.

Table 4
Total Employment, by Month, Attributable to Beer Legalization in Beer Service/Retail Sector and in Breweries

	Total Jobs Beer Stores	Total Jobs Estimate Drinking Places	Total Jobs Estimate Restaurants, Cafes, and Lunchrooms	Total Jobs Estimate Lunch Counters	**Beer Legalization Jobs Total**
Panel A: Without Proprietors Event Study Estimates					
April	-	4,399	7,874	1,620	**13,893**
May	-	6,955	11,973	2,262	**21,190**
June	-	9,266	14,525	2,580	**26,371**
Panel B: With Proprietors Event Study Estimates					
April	-	9,280	10,529	3,161	**22,970**
May	-	14,496	16,072	4,469	**35,037**
June	-	19,156	19,522	5,139	**43,817**
Panel C: With Proprietors and Counting All Drinking Place and Beer Store Jobs in Legal States					
April	2,456	26,000	10,529	3,161	**42,146**
May	3,188	33,003	16,072	4,469	**56,732**
June	3,553	40,256	19,522	5,139	**68,470**

Source and Notes: Jobs in Beer Stores (Panel C) are based on the raw numbers reported in the 1933 *Census of American Business.* Estimates of jobs in the other categories are constructed using the event-study coefficients from our preferred specification, except in panel C where Drinking Place employment is based on raw numbers.

Table 5
Determinants of Manufacturing Employment Growth in April 1933

	(1)	(2)	(3)	(4)	(5)	(6)
Legal April (1933)	1.73*	1.92*	2.16*	3.12*	2.02*	2.27
	(0.99)	(1.11)	(1.18)	(1.79)	(1.20)	(1.37)
Wage Earners Per Capita (1931)		-6.95	-3.22	-11.13	-6.45	-9.27
		(14.91)	(18.59)	(21.59)	(15.60)	(17.29)
Value MFG Change, (1929-1931)		7.29	7.30	9.82	7.52	8.22
		(6.84)	(6.88)	(8.00)	(7.10)	(7.28)
Change Wage Earners, (1929-1931)		-17.15	-17.30	-19.03*	-17.31	-17.36
		(10.45)	(10.71)	(10.90)	(10.70)	(10.81)
Barrels Per Million People (1914)			-0.48	2.43		
			(1.01)	(4.17)		
Legal April * Barrels P.M.P (1914)				-3.21		
				(4.06)		
Emp Share Brewing March (1933)					-0.02	1.48
					(0.07)	(1.18)
Legal April * Emp Share Brewing March (1933)						-1.51
						(1.17)
Observations	48	48	48	48	48	48
R-squared	0.06	0.14	0.14	0.16	0.14	0.15

Notes: The dependent variable is the percentage growth rate in manufacturing employment between March and April of 1933. Robust standard errors are reported in parentheses. Manufacturing employment and share of brewing employment in 1933 come from 1933 *Census of Manufactures*. Data used to compute the number of wage earners in manufacturing in 1931, the change in value added of manufacturing from 1929 to 1931, and the change in number of wage earners in manufacturing from 1929 to 1931 come from the 1929 and 1931 *Census of Manufactures.* Barrels of beer produced in 1914 are from Cherrington (1915, p. 26). Employment share of brewing in March 1933 is from 1933 *Census of Manufactures*, Table 2, "Liquors, Malt—Wage Earners by Month for Selected States, 1933." Per capita terms are divided population from the 1910 and 1930 *Census of Population* where appropriate. *** p<0.01, ** p<0.05, * p<0.1.

Table 6
New Deal Per Capita Spending in States Legalizing in April 1933 or Not
Fiscal Years 1933 and 1934

	Direct Relief	Public Works	CCC	AAA	Relief Grants	FERA	CWA
1933 Legal April	$7.14	$8.85	$0.20		$7.35		
1933 Not Legal April	$6.53	$4.75	$0.24		$6.77		
Difference-in-Means t-stat	0.94	0.93	0.50		0.84		
1934 Legal April	$9.40	$12.74	$4.31	$1.53	$23.53	$15.45	$15.18
1934 Not Legal April	$8.82	$8.11	$5.05	$4.42	$22.85	$18.37	$17.35
Difference-in-Means t-stat	0.62	0.85	0.50	2.81***	0.33	0.27	0.26

Notes: State-level annual data are from Fishback (2015). Per capita spending calculated by dividing total state spending by the state's 1930 population. All series are for the fiscal years. The 1933 fiscal year covers July 1932 through June 1933 and the 1934 fiscal year covers July 1933 through June 1934. Difference-in-means t-stat reflects null hypothesis that the average spending in April-legal and non-April legal states are the same. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.