# Wet Laws, Drinking Establishments, and Violent Crime

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# Introduction

- A large number of studies have examined whether crime is related to alcohol availability as measured by the density of bars, liquor stores and restaurants
- These studies typically find a strong positive association between alcohol availability and crime
- This association has been interpreted as evidence of causality but could be due to unobserved factors that simultaneously influence both variables
- We exploit changes in Kansas dry laws to examine whether plausibly exogenous increases in the number of establishments licensed to sell alcohol by the drink are related to violent crime

# Introduction

- Our data cover the period 1977-2011.

- During this period, 86 counties in Kansas went from “dry” to “wet”
  - In Kansas, dry counties prohibit by-the-drink sales to the general public
  - Private clubs are exempt from this prohibition
  - Wet counties allow bars and restaurants to sell liquor to the general public for on-premises consumption

# Overview of Results

- First-stage estimates provide evidence that county-level dry laws limited the number of establishments licensed to sell liquor by the drink
- Second-stage estimates suggest that a 10% increase in drinking establishments leads to a 4% increase in violent crime
- This estimate is considerably larger than "naïve" OLS estimates
- Reduced-form estimates suggest that legalizing the sale of alcohol to the general public for on-premises consumption led to an 11% increase in violent crime (and an increase in property crime of comparable magnitude)
- Because we find no evidence that crime went down in dry counties when neighboring counties allowed by-the-drink sales, we conclude that bars and restaurants create criminal activity as opposed to simply displacing it

# Previous Studies

- Economists have produced a large number of studies examining the effects of taxes and other policies on crime. For instance:
  - Beer taxes (Cook and Moore 1993; Markowitz and Grossman 2000)
  - Minimum legal drinking age (Carpenter 2005 and Carpenter and Dobkin forthcoming)
  - Underage drunk driving laws (Carpenter 2005, 2007)
  - Relaxation of weekend sales restrictions (Heaton 2012 and Grönqvist and Niknami 2014)
  - Forcing bars/restaurants to close earlier (Biderman et al. 2010 and De Mello et al. 2013)
  - Prohibition during the 1920s and 1930s (Miron 1999; Owens 2011)

# Previous Studies

- Criminologists and public health experts have focused on the relationship between local alcohol availability and crime
- Most studies in the criminology literature have relied on cross-sectional variation in liquor stores or bars (e.g., Scribner et al. 1999; Reid et al. 2003; Zhu et al. 2004; Britt et al. 2005; Gruenewald et al. 2006; Livingston 2008a; Liang and Chikritzhs 2011; Toomey et al. 2012)
  - The association between local alcohol availability and crime in the cross-section could be driven by unobserved factors such as economic activity
- A handful of studies have used panel data methods, exploiting openings and closing of establishments over time (e.g., Gruenewald and Remer 2006; Livingston 2008, 2011; White et al. forthcoming)
  - Cleaner identification than using cross-sectional variation, but assumes that bar, restaurant and liquor store owners do not base their location decisions on predictions of future crime or the correlates of future crime

# Previous Studies

- Three studies on local alcohol availability and crime have exploited a clearly defined natural experiment
- Conlin et al. (2005) used county-level data from Texas for the period 1978-1996 to examine the reduced-form relationship between dry laws and drug-related arrests
  - Strict prohibitions on the sale of alcohol were associated with more drug-related arrests, but the authors did not examine their impact on other types of crime
  - Did not distinguish between counties that only allowed retail sales and those that allowed both retail and by-the-drink sales
- Billings (2014) used county-level data for the period 1994-2006 from Alabama, Kentucky, North Carolina, Tennessee, and Texas to examine the reduced-form relationship between dry laws and total arrests
  - Strict prohibitions on the sale of alcohol were associated with a decrease in total arrests
  - Did not distinguish between counties that only allowed retail sales and those that allowed both retail and by-the-drink sales

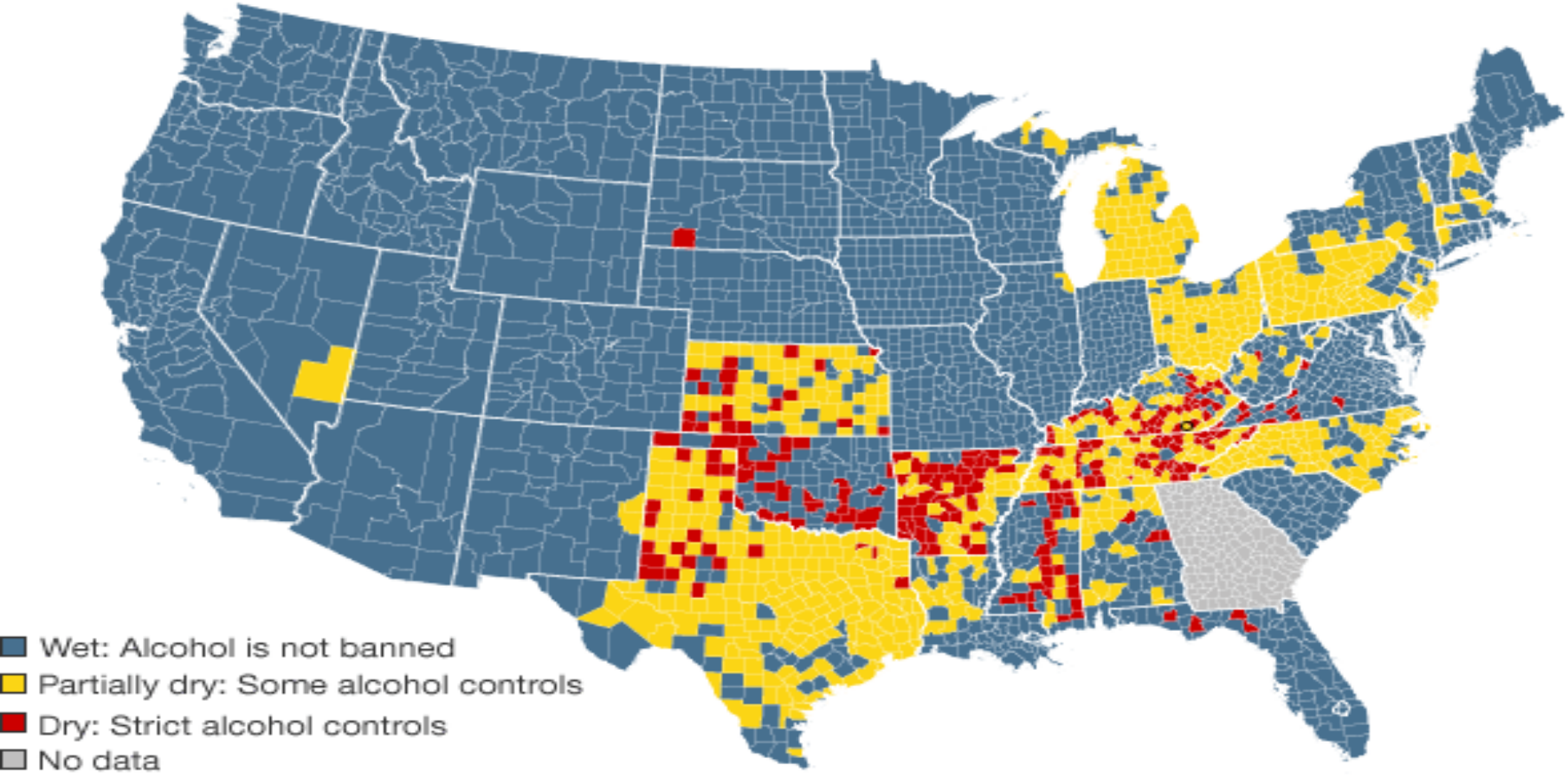
# Previous Studies

- Chamberlain (2014) exploited the privatization of distilled spirits sales in Seattle to estimate relationship between liquor stores and crime
  - Privatization led to sharp expansion local availability as large grocery and drug stores began to stock distilled spirits
  - One-mile reduction in distance to nearest liquor store was associated with a 6-8 percent increase in crime
  - Persistent effects on violent and drug crimes; temporary effects on non-violent crimes
  - Focus was on the relationship between retail liquor outlets and crime

- Like Conlin et al. (2005), Billings (2014) and Chamberlain (2014), our empirical strategy relies on a unique natural experiment. However, our focus is on establishments licensed to sell alcohol for on-premises consumption (e.g., bars and restaurants) as opposed to retail stores.

# Background: Dry Laws

- Dry laws take a variety of forms. For instance, they can prohibit on-premises consumption (i.e., "by-the-drink sales"), prohibit all alcohol sales, or even prohibit the possession of alcohol.
- Today, there are over 200 counties in the United States with some type of prohibition on alcohol sales in place (Wheeler 2012)



# Background: Kansas Dry Laws

- In 1881, Kansas became the first state to prohibit the manufacture and sale of “intoxicating liquors”

- Founded in 1883, the Anti-Saloon League was a powerful organization that advocated for prohibition. Its name reflects the fact that many Prohibitionists believed that saloons represented the greatest threat to American values.

- Carrie Nation, a radical member of the temperance movement, which opposed alcohol before the advent of Prohibition, became famous by walking into Kansas saloons, scolding customers, and using her hatchet to destroy bottles of liquor

# Carrie Nation in 1910

# Background: Kansas Dry Laws

- Even after adoption of 21st Amendment to the Constitution in 1933, by-the-drink sales to the general public were prohibited throughout Kansas

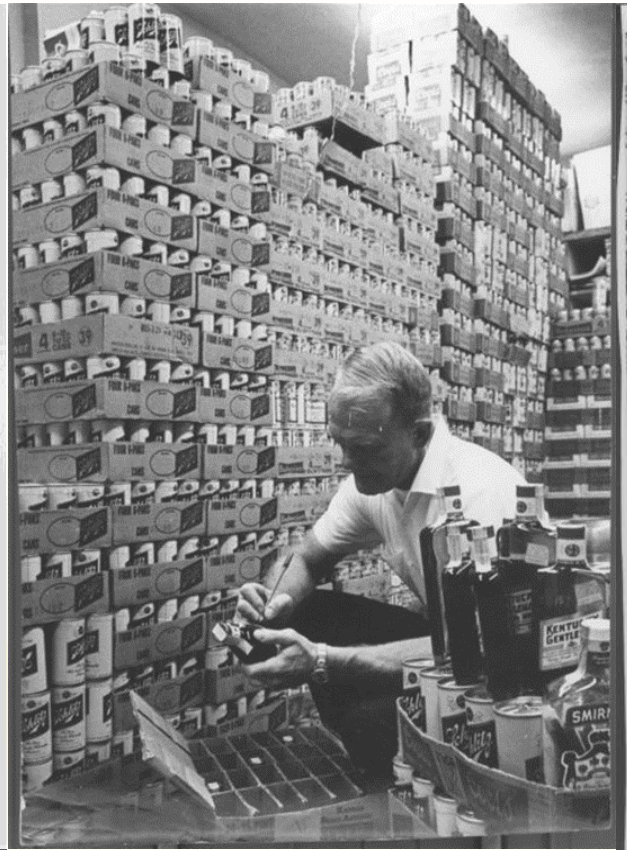
- Private clubs were exempted from this prohibition, but becoming a member required paying a $10 fee in person and a 10-day wait. Private clubs were required to keep a list of every member and screen applicants for "good moral character."

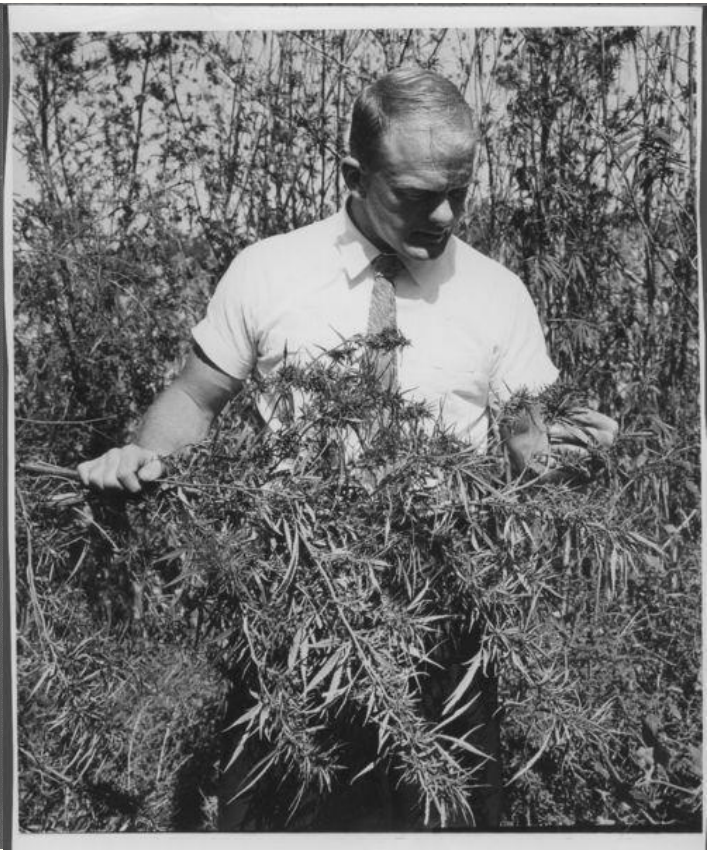
- These requirements are said to have limited the number of private clubs selling liquor by the drink (Stites 1985)

- The prohibition on by-the-drink sales appears to have been strictly enforced

In a sting operation last night, agents from Atty. Gen. Vern Miller's office boarded an Amtrak train in Kansas City at 7 p.m. and ordered drinks as the train proceeded toward Newton, Kansas. Miller boarded the train at Newton and assisted in the arrests of a conductor, waiter, and bartender, who were charged with a series of misdemeanors and released on $500 bond each pending a trial in Harvey County on August 8. Confiscated in the raid was a "considerable quantity" of liquor in two-ounce bottles as well as some larger sizes. "We cleaned them out," Miller said. "It took several men to carry it all out."

--Lawrence Daily Journal, July 19, 1972





# Drinkers to find it more difficult in, over Kansas ... and in Chile

TOPEKA, Kan. (UPI) — They admit it will pose certain "problems" for the stewardesses, but two airlines have bowed to Kansas' antiliquor laws and announced they will no longer serve drinks in flight while flying over the state.

Kansas Attorney General Vern Miller received notice of compliance with state liquor laws Monday from Frontier and Continental and said he expected similar notice from Trans World Airlines and Braniff International.

Frontier spokesman Richard Chanaud of Denver said there is no sure way to know the exact moment a jetliner passes into Kansas territory.

"We have to advise our stewardesses and figure when we should stop liquor sales when approaching Kansas and when to start sales again after leaving the state," Chanaud said. "We think we can work the problems out by the end of the week." Miller, who ordered raids on Amtrak trains last year to keep them from serving drinks in the club car as it passed through Kansas, said if the airlines had not voluntarily complied with state law against liquor by the drink, he would have forced them to.

"We would have considered taking appropriate steps to stop any violations of the law," Miller said.

The state's raid on Amtrak last July and the arrest of three persons awaits a decision by a federal court.

Frontier and Continental spokesmen said their decision to stop serving liquor was contingent on the federal decision in the Amtrak case.

But TWA has been reluctant to cease serving drinks while in Kansas skies. Spokesman Jack Burkam of New York said he'd like to discuss the technical details of Kansas' law with the state attorney general.

"We're wondering what Miller says if a passenger purchases a drink before Kansas and still has it in hand over Kansas," Burkam said.

SANTIAGO, Chile (UPI) — President Salvador Allende said Monday he may order liquor rationed and warned men that heavy drinking reduces their virility.

Allende told a pre-election rally that liquor rationing might lose a few male votes but that women would overwhelmingly support it.

"I am going to tell you something in public because I am a doctor," Allende said. "Some of you think that excessive drinking makes you more manly. Well, that is wrong. Too much drinking weakens your virility."

He said he was "very serious" about implementing a plan he announced earlier this month to ration liquor.

"In Chile, there are 300,000 chronic alcoholics and 800,000 excessive drinkers," he said. "The men who form these groups are often absent from work and perform poorly on the job. They also cause accidents."

Allende said some advisers felt his plans to ration liquor would handicap the government in the elections. He said he disagreed.

"If we lose a few male votes because of this measure," he said, "we will gain the support of thousands of women".

In the campaign for the election next month, a teenager was shot to death and 12 persons injured Monday. Political parties later agreed to cooperate in trying to curb the violence.

The government said at least six persons have been killed and more than 120 injured in incidents in the election campaign.

Interior Minister Carlos Prats said he was confident a "gentlemen's agreement" would restore peace between Allende supporters and opponents. He said political leaders agreed to ask supporters to stop painting political slogans and other signs outdoors and to avoid any act of violence or hostility.

The government, Prats said, also had ordered increased police vigilance and the "unrestricted application" of a tough gun control law passed earlier this year.

Topeka, Kan. (UPI, February 20, 1973)--They admit it will pose certain "problems" for the stewardesses, but two airlines have bowed to Kansas' antiliquor laws and announced they will no longer serve drinks in flight while flying over the state. Kansas Attorney General Vern Miller received notice of compliance with state liquor laws Monday from Frontier and Continental and said he expected similar notice from Trans World Airlines and Braniff International. Frontier spokesman Richard Chanaud of Denver said there is no sure way to know the exact moment a jetliner passes into Kansas territory.

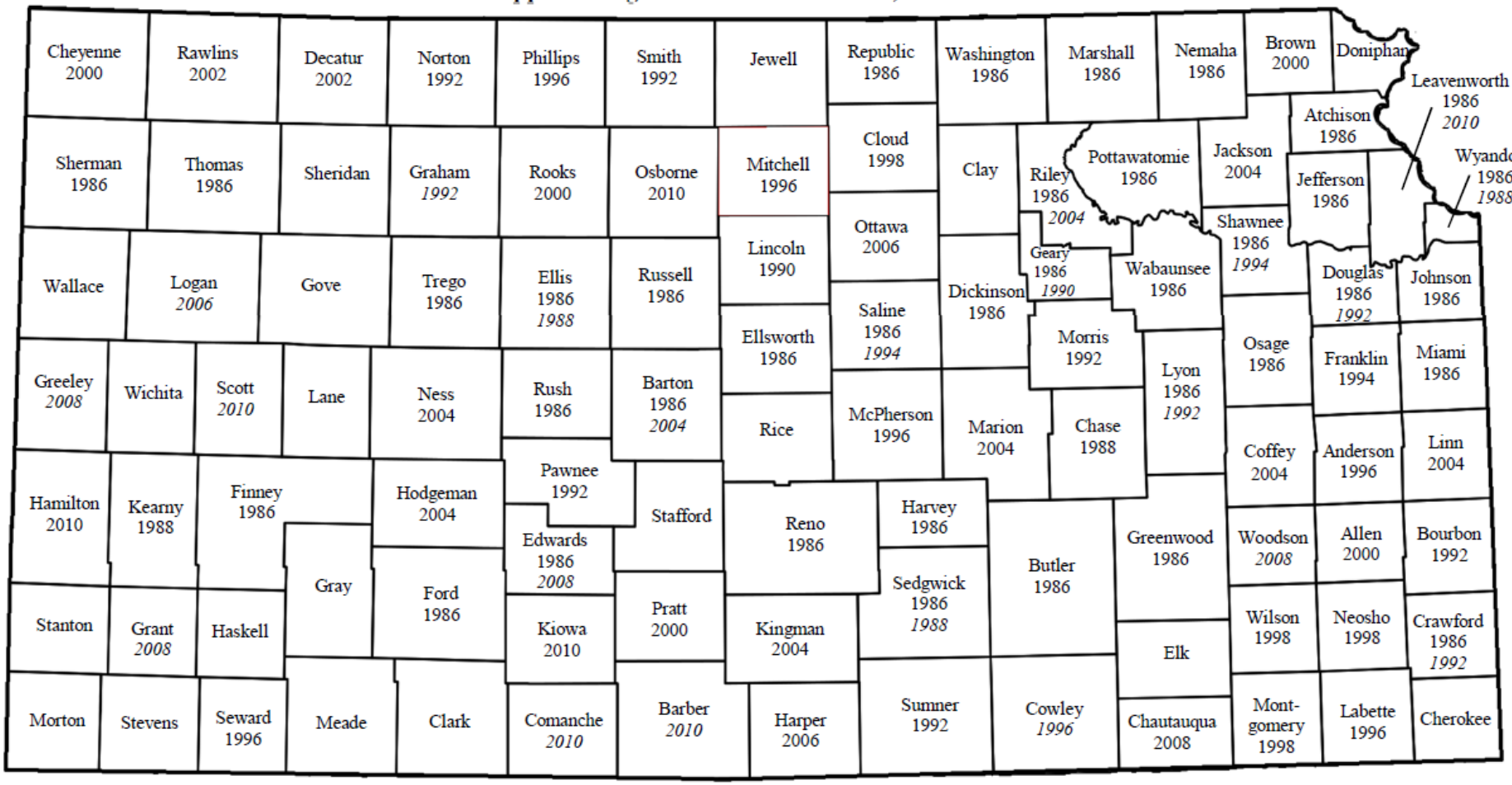
# Background: Kansas Dry Laws

- In November of 1986, Kansas voters approved a measure allowing counties to go from “dry” to “wet”. This measure garnered a majority of votes in 36 out of 105 counties. The state-wide vote was 59.9% in favor and 40.1% against.
- As of July 1, 1987, bars and restaurants in these 36 counties were permitted to sell beer, wine and spirits to the general public provided they derived 30 percent of their gross revenue from food sales
- Between 1987 and 2011, 13 of these original 36 counties removed the food sales requirement
- Between 1987 and 2011, 50 additional counties voted to become wet. Eleven of these 50 counties did not impose a food sales requirement; 39 required that establishments derive 30 percent of their gross receipts from food sales. By law, votes to allow by-the-drinks sales had to take place in November.
- By the end of 2011, only 19 Kansas counties still prohibited by-the-drink sales of alcohol

# Table 1. Kansas Wet Laws, 1977-2011

| | Food Sales 30% Gross | Food Sales Not Required | | Food Sales 30% Gross | Food Sales Not Required | | Food Sales 30% Gross | Food Sales Not Required |
|---|---|---|---|---|---|---|---|---|
| Allen | 2000 | | Greeley | | 2008 | Osborne | 2010 | |
| Anderson | 1996 | | Greenwood | 1986 | | Ottawa | 2006 | |
| Atchison | 1986 | | Hamilton | 2010 | | Pawnee | 1992 | zoom |
| Barber | | 2010 | Harper | 1996 | | Phillips | 1996 | |
| Barton | 1986 | 2004 | Harvey | 1996 | | Pottawatomie | 1986 | |
| Bourbon | 1992 | | Haskell* | | | Pratt | 2000 | |
| Brown | | 2000 | Hodgeman | 2004 | | Rawlins | 2002 | |
| Butler | 1986 | | Jackson | 2004 | | Reno | 1986 | |
| Chase | 1988 | zoom | Jefferson | 1986 | | Republic | 1986 | |
| Chautauqua | 2008 | | Jewell* | | | Rice* | | |
| Cherokee* | | | Johnson | 1986 | | Riley | 1986 | 2004 |
| Cheyenne | 2000 | | Kearny | 1988 | | Rooks | 2000 | |
| Clark* | | | Kingman | 2004 | | Rush | 1986 | |
| Clay* | | | Kiowa | 2010 | | Russell | 1986 | |
| Cloud | 1998 | | Labette | 1996 | | Saline | 1986 | 1994 |
| Coffey | 2004 | | Lane* | | | Scott | | 2010 |
| Comanche | | 2010 | Leavenworth | 1986 | 2010 | Sedgwick | 1986 | 1988 |
| Cowley | | 1996 | Lincoln | 1990 | | Seward | 1996 | |
| Crawford | 1986 | 1992 | Linn | 2004 | | Shawnee | 1986 | 1994 |
| Decatur | 2002 | | Logan | | 2006 | Sheridan* | | |
| Dickinson | 1986 | | Lyon | 1986 | 1992 | Sherman | 1986 | |
| Doniphan* | | | McPherson | 1996 | | Smith | 1992 | |
| Douglas | 1986 | 1992 | Marion | 2004 | | Stafford* | | |
| Edwards | 1986 | 2008 | Marshall | 1986 | | Stanton* | | |
| Elk* | | | Meade* | | | Stevens* | | |
| Ellis | 1986 | 1988 | Miami | 1986 | | Sumner | 1992 | |
| Ellsworth | 1986 | | Mitchell | 1996 | | Thomas | 1986 | |
| Finney | 1986 | | Montgomery | | 1998 | Trego | 1986 | |
| Ford | 1986 | | Morris | 1992 | | Wabaunsee | 1986 | |
| Franklin | 1994 | | Morton* | | | Wallace* | | |
| Geary | 1986 | 1990 | Nemaha | 1986 | | Washington | 1986 | |
| Gove* | | | Neosho | 1998 | | Wichita* | | |
| Graham | | 1992 | Ness | 2004 | | Wilson | 1998 | |
| Grant | | 2008 | Norton | 1992 | | Woodson | | 2008 |
| Gray* | | | Osage | 1986 | | Wyandotte | 1986 | 1988 |

**Appendix Figure 1. Kansas Wet Laws, 1977-2011**

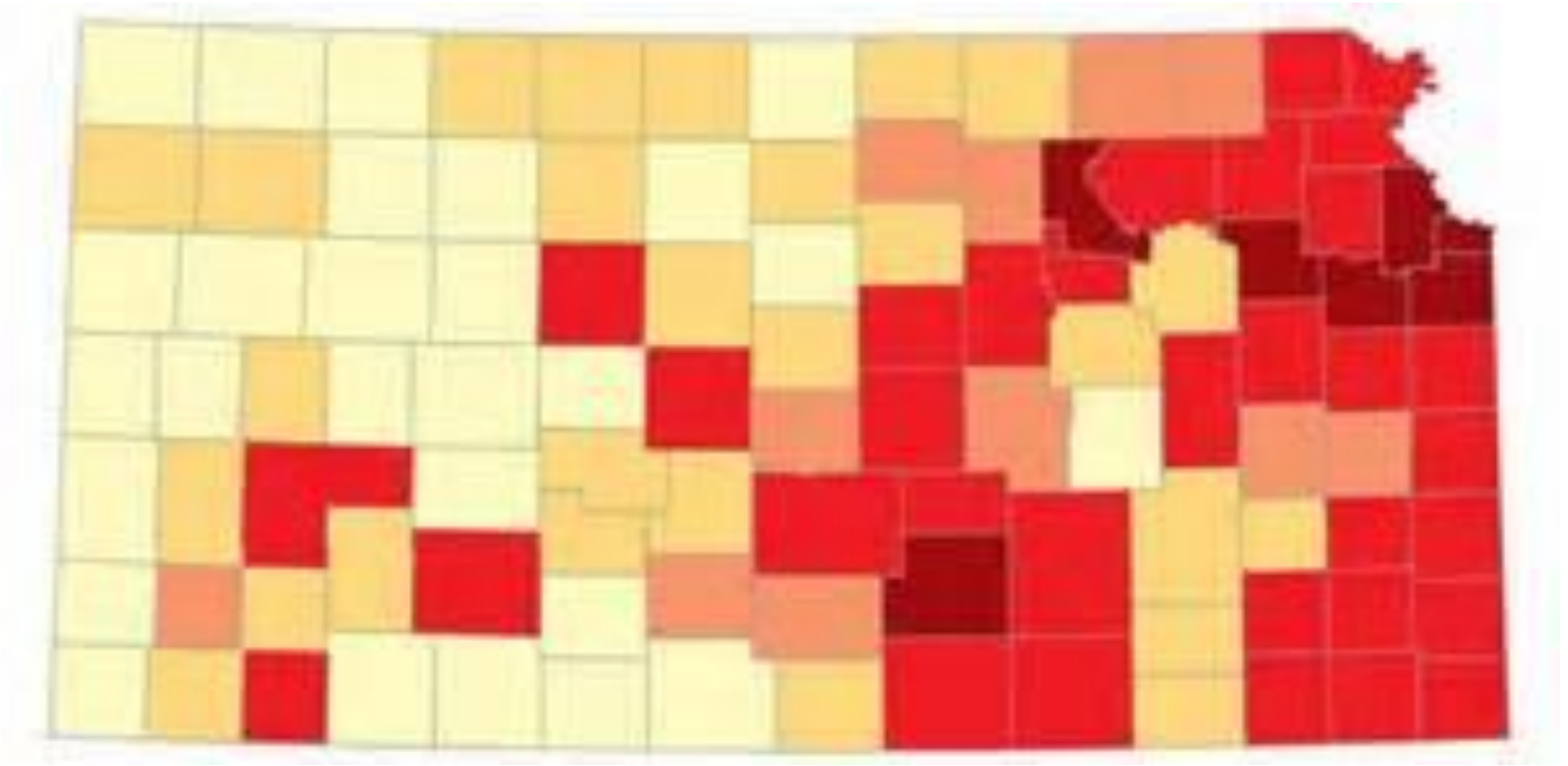



Note: The year below each county name denotes when on-premises alcohol consumption was voted into law. Italicized print indicates that on-premises consumption was allowed without requiring food sales.

NE corner

SW corner

# Kansas Population Density



# Conceptual Framework

- There is strong evidence that consuming alcohol heightens emotional responses, impairs cognitive functioning, and reduces inhibitions (Boles and Miotto 2003; Carpenter and Dobkin 2011)

- Allowing by-the-drink sales to the general public could increase total alcohol consumption through, in effect, allowing restaurants and bars to bundle alcohol with complementary goods and services (Guiltinan 1987; Lawless 1991)

- Allowing by-the-drink sales also provides an opportunity to drink in a different "social context involving a mix of circumstances, locations, and companions" (Lipsey et al. 1997)
  - In some bars and restaurants, heavy drinking is the norm (Kuo et al. 2003; Hastings et al. 2005)
  - In other establishments, the owners, staff and patrons actively enforce norms against drinking to excess (Gusfield et al. 1984; Lee et al. 2008)

# Conceptual Framework

- Regardless of its effect on total consumption, allowing by-the-drink sales could impact crime through shifting where consumption takes place.
- Previous researchers have argued that social interactions at bars and restaurants serve as a catalyst for violent behavior (Graham and Wells 2001; Buddie and Parks 2003; Middleton et al. 2010), but verbal arguments and minor scuffles may be less likely to escalate if they take place in public.
- In fact, ethnographic studies suggest that many bartenders and servers view the prevention and diffusion of aggressive behavior as important parts of their jobs (Gusfield et al. 1984; Lee et al. 2008).
- Allowing by-the-drink sales could also influence demand for other substances (e.g., marijuana and cocaine), which could, in turn, affect crime
  - Consistent with the hypothesis that marijuana and alcohol are substitutes, there is evidence that marijuana use falls sharply when individuals reach the minimum legal drinking age (Crost and Guerrero 2012), but the relationship between marijuana use and crime is still hotly debated (Morris et al. 2014)

# Data

- *Violent Crime* = violent crime rate in county *c* and year *t*
  - Murder, rape, assault, robbery
- *On-Premises Licenses* = the number of active on-premises liquor licenses in county *c* and year *t* (per 10,000 population)
- Crime data come from the FBI's Uniform Crime Reports (UCR).
  - UCR data were missing for the period 1993-1999
  - We obtained crime counts for 1993, 1994, 1997, and 1998 from the *Kansas Statistical Abstract*.
- Data on liquor licenses were purchased from the Kansas Division of Alcohol Beverage Control.
  - Include information on license type (on- versus off-premises)
  - Location and name of the establishment that purchased the license
  - Dates the license became active and inactive.
- Data on wet/dry laws were also obtained from the Kansas Division of Alcoholic Beverage Control

# Empirical Strategy (First Stage)

- First-stage regression:

$$\ln(\textit{On-Premises Licenses}_{ct}) = \alpha_0 + \alpha_1 \textit{Wet Law}_{ct} + \boldsymbol{X_{ct}\alpha_1} + \nu_c + z_t + \varepsilon_{ct},$$

  where $c$ indexes counties and $t$ indexes years.

- $\textit{Wet Law}_{ct}$ = 1if county $c$ allowed by-the-drink sales to the public in year $t$, = 0 otherwise.
- $\boldsymbol{X_{ct}}$ includes controls for:
  - economic conditions (income per capita and unemployment rate)
  - population density
  - demographics (%nonwhite, %adult male, and % 21+)
  - ratio of Democratic to Republican votes in presidential and gubernatorial elections
  - Sunday sales ( = 1 if sales for off-premises consumption were allowed in any municipality, = 0 otherwise)
- $\nu_c$ and $z_t$ represent county and year effects, respectively.
- Control for county-specific linear and quadratic time trends in some specifications.

# Empirical Strategy (Second Stage)

- Second-stage relationship between crime and on-premises liquor licenses:

$$\ln(\textit{Violent Crime}_{ct}) = \beta_0 + \beta_1 \ln(\textit{On-Premises Licenses}_{ct}) + \boldsymbol{X_{ct}\beta_2} + \nu_c + z_t + \varepsilon_{ct}.$$

  $\beta_1$ represents the elasticity of violent crime with respect to drinking establishments.

- After counties went wet, very few new private clubs opened. In 1986 there were roughly 550 private clubs operating in Kansas (or 2.30 per 10,000 population); by 2011, this number had fallen to 420 (or 1.50 per 10,000 population).

- This empirical strategy is based on assumption that changes in wet/dry status affected violent crime only through the number of establishments with on-premises liquor licenses.

- Below, we show that going from dry to wet had no appreciable effect on the number of establishments with off-premises licenses, perhaps because the retail liquor industry in Kansas is subject to tight controls (Byrne and Nizovtsev 2013).

# Empirical Strategy (Reduced Form)

- It is possible that changes in dry laws had a direct effect on the demand for alcohol, which would violate the exclusion restriction. For instance, going from dry to wet may have reduced the social stigma associated with binge drinking.

- To address this possibility, we also estimate the following reduced-form equation:

$$\ln(\textit{Violent Crime}_{ct}) = \pi_0 + \pi_1 \textit{Wet Law}_{ct} + \boldsymbol{X_{ct}\pi_2} + \nu_c + z_t + \Theta_c \cdot t + \varepsilon_{ct}.$$

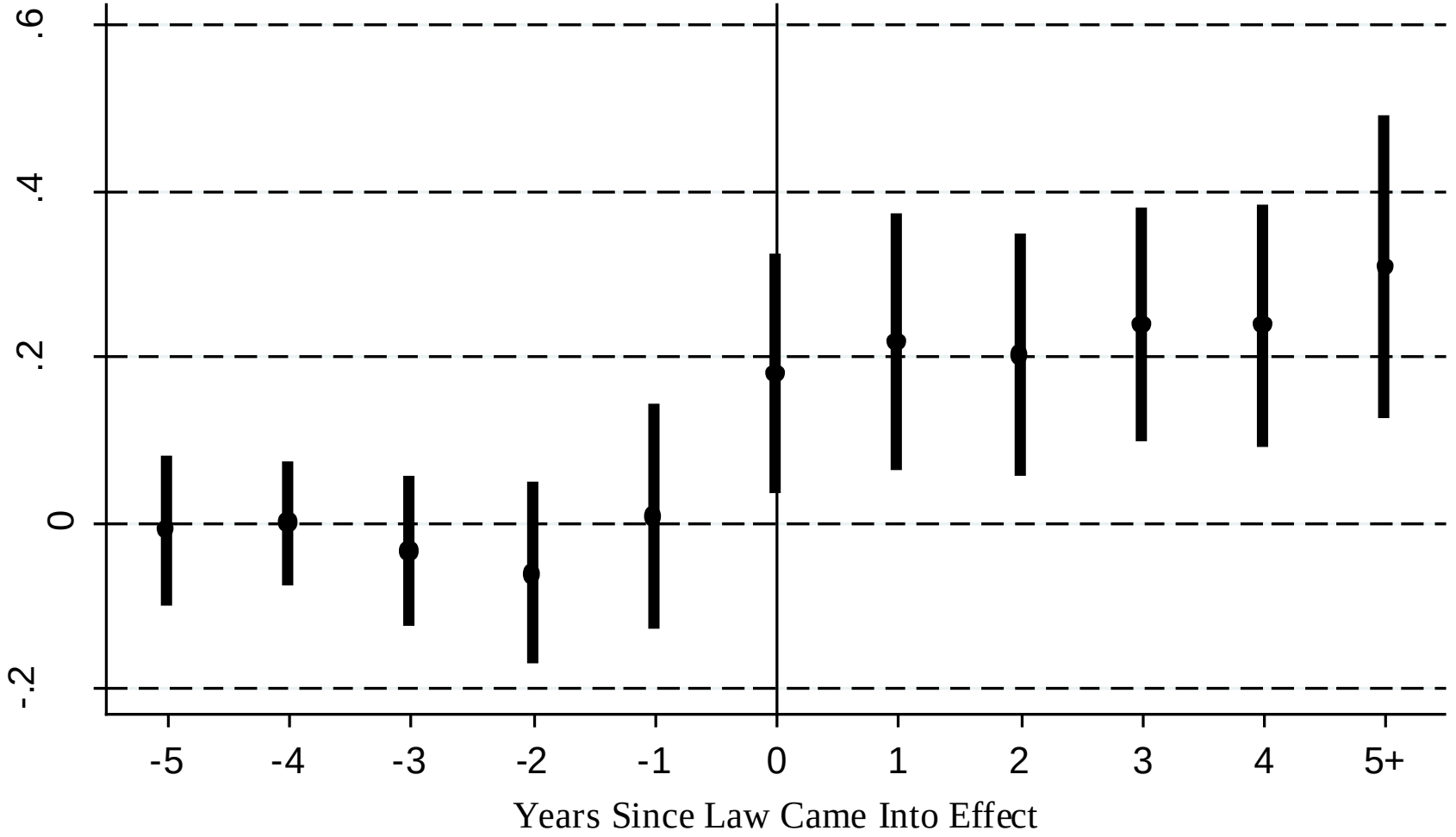
$\pi_1$ represents the effect of going from dry to wet on the crime rate.

# Descriptive Statistics

| Variable | *Wet Law* = 1<br>Mean<br>(SD) | *Wet Law* = 0<br>Mean<br>(SD) | Description |
|---|---|---|---|
| *Violent Crime* | 4.28<br>(2.94) | 3.05<br>(2.86) | Violent crimes per 1,000 population |
| *Property Crime* | 42.2<br>(20.6) | 38.8<br>(23.0) | Property crimes per 1,000 population |
| *On-Premises Licenses* | 8.13<br>(2.23) | 2.95<br>(2.16) | Active on-premises liquor licenses per 10,000 population |
| N | 1,291 | 2,061 | |

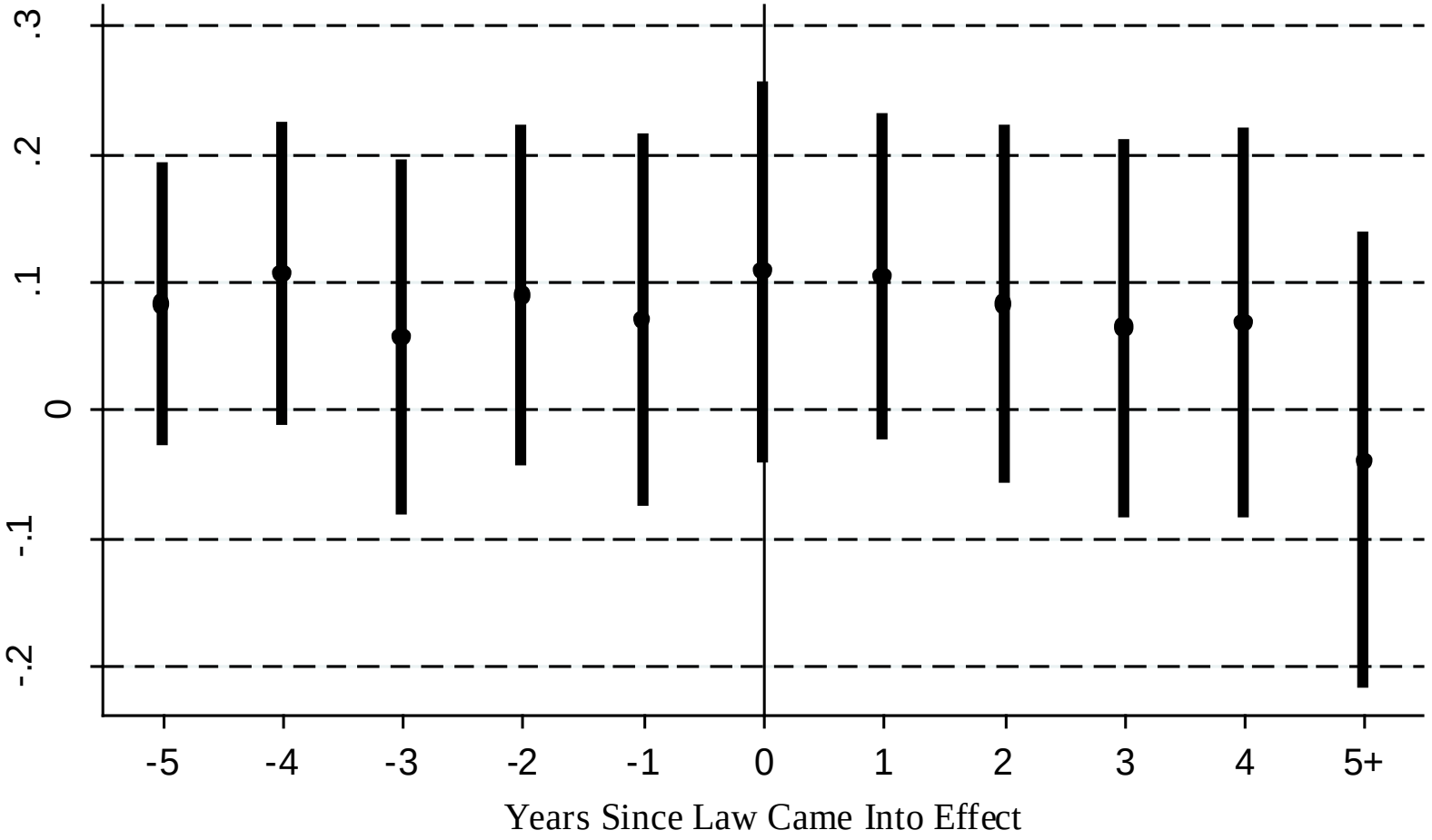
Weighted means based on information from the Kansas Alcoholic Beverage Control, *The Kansas Statistical Abstract*, and the Uniform Crime Reports for the period 1977-2011. The years 1995, 1996, and 1999 are excluded because of missing crime data.

# Figure 1. Trends in On-Premises Alcohol Licenses




Notes: OLS coefficient estimates (and their 95% confidence intervals) are reported. The dependent variable is equal to the natural log of the number of on-premises liquor licenses per 10,000 population in county *c* and year *t*. The controls include county and year fixed effects and the data cover the period 1977-2011.

# Figure 2. Trends in Off-Premises Alcohol Licenses




Notes: OLS coefficient estimates (and their 95% confidence intervals) are reported. The dependent variable is equal to the natural log of the number of off-premises liquor licenses per 10,000 population in county *c* and year *t*. The controls include county and year fixed effects and the data cover the period 1977-2011.

## First-Stage Estimates: Wet Laws and On-Premises Alcohol Licenses, 1977-2011

| | ln(*On-Premises Licenses*) | ln(*On-Premises Licenses*) |
|---|---|---|
| *Wet Law* | .284*** | .251*** |
| | (.043) | (.032) |
| N | 3,352 | 3,352 |
| $R^2$ | .909 | .947 |
| F-Statistic | 43.6 | 62.9 |
| Year FEs | Yes | Yes |
| County FEs | Yes | Yes |
| Covariates | Yes | Yes |
| County linear trends | No | Yes |

Notes: Regressions are weighted by county population and standard errors are corrected for clustering at the county level. The dependent variable is equal to the natural log of the number of active on-premises liquor licenses per 10,000 population in county *c* and year *t*. The years 1995, 1996, and 1999 are excluded because of missing crime data.

## Wet Laws and Off-Premises Alcohol Licenses, 1977-2011

| | ln(*Off-Premises Licenses*) | ln(*Off-Premises Licenses*) |
|---|---|---|
| *Wet Law* | -.011 | .036 |
| | (.053) | (.046) |
| N | 3,352 | 3,352 |
| $R^2$ | .763 | .842 |
| Year FEs | Yes | Yes |
| County FEs | Yes | Yes |
| Covariates | Yes | Yes |
| County linear trends | No | Yes |

Notes: Regressions are weighted by county population and standard errors are corrected for clustering at the county level. The dependent variable is equal to the natural log of the number of active off-premises liquor licenses per 10,000 population in county *c* and year *t*. The years 1995, 1996, and 1999 are excluded because of missing crime data.

# On-Premises Alcohol Licenses and Violent Crime, 1977-2011

| | OLS ln(*Violent Crime*) | OLS ln(*Violent Crime*) | 2SLS ln(*Violent Crime*) | 2SLS ln(*Violent Crime*) |
|---|---|---|---|---|
| ln(*On-Premises Licenses*) | .062 | .110* | .365** | .405*** |
| | (.043) | (.054) | (.183) | (.179) |
| N | 3,352 | 3,352 | 3,352 | 3,352 |
| $R^2$ | .767 | .820 | .758 | .815 |
| Year FEs | Yes | Yes | Yes | Yes |
| County FEs | Yes | Yes | Yes | Yes |
| Covariates | Yes | Yes | Yes | Yes |
| County linear trends | No | Yes | No | Yes |

Notes: Regressions are weighted by county population and standard errors are corrected for clustering at the county level. The dependent variable is equal to the natural log of the violent crime rate in county *c* and year *t*. The years 1995, 1996, and 1999 are excluded because of missing crime data.

# Why are the 2SLS estimates so much larger than the OLS estimates?

- It is possible that opening a bar or restaurant has a larger effect on crime than opening a private club, perhaps because private clubs attract less rowdy patrons or because KS law requires that members of clubs be "screened by the club for good moral character"
  - Because so few new private clubs opened after votes to allow by-the-drink sales, the 2SLS estimates should be thought of as reflecting the effect of opening a bar or restaurant as opposed to a private club.
- Bars, clubs and restaurants could have opened because their owners predicted that economic conditions would improve and crime rates would go down

## 2SLS Estimates: On-Premises Licenses and Violent Crime by Type, 1977-2011

| | ln(*Murder*) | ln(*Rape*) | ln(*Robbery*) | ln(*Assault*) |
|---|---|---|---|---|
| ln(*On-Premises Licenses*) | .009<br>(.017) | .138**<br>(.067) | .302**<br>(.137) | .312*<br>(.184) |
| N | 2,932 | 2,932 | 2,932 | 2,932 |
| $R^2$ | .515 | .677 | .862 | .648 |
| Year FEs | Yes | Yes | Yes | Yes |
| County FEs | Yes | Yes | Yes | Yes |
| Covariates | Yes | Yes | Yes | Yes |
| County linear trends | No | No | No | No |

Notes: Regressions are weighted by county population and standard errors are corrected for clustering at the county level. The dependent variable is equal to the natural log of the relevant crime rate in county *c* and year *t*. The years 1993-1999 are excluded because of missing crime data.

## 2SLS Estimates: On-Premises Licenses and Violent Crime by Type, 1977-2011

| | ln(*Murder*) | ln(*Rape*) | ln(*Robbery*) | ln(*Assault*) |
|---|---|---|---|---|
| ln(*On-Premises Licenses*) | .022<br>(.024) | .139**<br>(.063) | .459**<br>(.194) | .290<br>(.208) |
| N | 2,932 | 2,932 | 2,932 | 2,932 |
| $R^2$ | .536 | .751 | .877 | .771 |
| Year FEs | Yes | Yes | Yes | Yes |
| County FEs | Yes | Yes | Yes | Yes |
| Covariates | Yes | Yes | Yes | Yes |
| County linear trends | Yes | Yes | Yes | Yes |

Notes: Regressions are weighted by county population and standard errors are corrected for clustering at the county level. The dependent variable is equal to the natural log of the relevant crime rate in county *c* and year *t*. The years 1993-1999 are excluded because of missing crime data.

## Reduced-Form Relationship between Wet Laws and Violent Crime, 1977-2011

| | ln(*Violent Crime*) | ln(*Violent Crime*) |
|---|---|---|
| *Wet Law* | .104** | .102** |
| | (.051) | (.048) |
| N | 3,352 | 3,352 |
| $R^2$ | .768 | .820 |
| Year FEs | Yes | Yes |
| County FEs | Yes | Yes |
| Covariates | Yes | Yes |
| County linear trends | No | Yes |

Notes: Regressions are weighted using county population and standard errors are corrected for clustering at the county level. The dependent variable is equal to the natural log of the violent crime rate in county *c* and year *t*. The years 1995, 1996, and 1999 are excluded because of missing crime data.

## Adding Leads and Lags to the Model

| | ln(*Violent Crime*) | ln(*Violent Crime*) | ln(*Violent Crime*) | ln(*Violent Crime*) |
|---|---|---|---|---|
| *7 Years Before* | | | | .064* |
| | | | | (.035) |
| *6 Years Before* | | | .053 | .067 |
| | | | (.038) | (.043) |
| *5 Years Before* | | -.052 | -.042 | -.026 |
| | | (.041) | (.045) | (.051) |
| *4 Years Before* | | -.063 | -.052 | -.037 |
| | | (.047) | (.050) | (.055) |
| *3 Years Before* | | -.014 | -.004 | .014 |
| | | (.050) | (.053) | (.058) |
| *2 Years Before* | | .026 | .038 | .053 |
| | | (.051) | (.055) | (.060) |
| *1 Year Before* | | .076 | .086 | .108 |
| | | (.057) | (.061) | (.069) |
| *Year 0* | .003 | -.000 | .014 | .032 |
| | (.044) | (.058) | (.063) | (.068) |
| *1 Year After* | .077 | .072 | .084 | .104 |
| | (.054) | (.070) | (.074) | (.080) |
| *2 Years After* | .135** | .129* | .142* | .160* |
| | (.059) | (.075) | (.080) | (.086) |
| *3 Years After* | .167** | .163* | .175* | .204** |
| | (.070) | (.088) | (.091) | (.101) |
| *4 Years After* | .156** | .153* | .173* | .195** |
| | (.065) | (.082) | (.088) | (.095) |
| *5+ Years After* | .062 | .057 | .074 | .102 |
| | (.060) | (.070) | (.072) | (.079) |

## Reduced-Form Estimates by Crime Type, 1977-2011

| | ln(*Murder*) | ln(*Rape*) | ln(*Robbery*) | ln(*Assault*) |
|---|---|---|---|---|
| *Wet Law* | .006 | .039** | .129** | .082 |
| | (.007) | (.019) | (.057) | (.061) |
| N | 2,932 | 2,932 | 2,932 | 2,932 |
| $R^2$ | .539 | .757 | .891 | .775 |
| Year FEs | Yes | Yes | Yes | Yes |
| County FEs | Yes | Yes | Yes | Yes |
| Covariates | Yes | Yes | Yes | Yes |
| County linear trends | Yes | Yes | Yes | Yes |

Notes: Regressions are weighted by county population and standard errors are corrected for clustering at the county level. The dependent variable is equal to the natural log of the relevant crime rate in county *c* and year *t*. The years 1993-1999 are excluded because of missing crime data.

# Robustness Checks

- Restrict our attention to large counties
  - Lott and Whitley (2003) noted that rural counties in the UCR underreport crime
- Add quadratic time trends
- To account for effect of crack epidemic on violent crime in urban centers, we include a control based on crack index developed by Fryer et al. (2013)
  - Crack epidemic began in 1986, shortly before by-the-drink sales became legal in 36 KS counties
    - Kansas City (Johnson and Wyandotte County)
    - Topeka (Shawnee County)
    - Wichita (Sedgwick County)
- Replace ln(crime rate) with crime rate
- Negative binomial regression model

## Robustness Checks, Violent Crime

| | Counties > 5,000 | Counties > 10,000 | County-Specific Quadratic Trends |
|---|---|---|---|
| *Wet Law* | .098* | .121* | .145** |
| | (.051) | (.066) | (.072) |
| N | 2,299 | 1,366 | 3,352 |
| Year FEs | Yes | Yes | Yes |
| County FEs | Yes | Yes | Yes |
| Covariates | Yes | Yes | Yes |
| County linear trends | Yes | Yes | Yes |

Notes: Regressions are weighted by county population and standard errors are corrected for clustering at the county level. The dependent variable is equal to the natural log of the violent crime rate in county *c* and year *t*. The years 1995, 1996, and 1999 are excluded because of missing crime data.

## Robustness Checks, Violent Crime

| | Control for crack epidemic | Dependent variable = *Violent Crime* | Negative Binomial |
|---|---|---|---|
| *Wet Law* | .119** | .714** | .117* |
| | (.058) | (.281) | (.065) |
| N | 3,352 | 3,352 | 3,352 |
| Year FEs | Yes | Yes | Yes |
| County FEs | Yes | Yes | Yes |
| Covariates | Yes | Yes | Yes |
| County linear trends | Yes | Yes | Yes |

Notes: Regressions are weighted by county population and standard errors are corrected for clustering at the county level. In the first column the dependent variable is equal to the natural log of the violent crime rate in county *c* and year *t*. In the second column the dependent variable is equal to the violent crime rate in county *c* and year *t*. In the third column the dependent variable is measured as a count and county population is added as a control. The years 1995, 1996, and 1999 are excluded because of missing crime data. Fryer et al. (2013) provide information on the crack epidemic in Kansas.

# Wet Laws and Police Officers

- Changes in policing effort in response to legalization represent a potential source of omitted variable bias

- If departments hired extra officers after legalization, then true estimates may be larger than those reported above

## Wet Laws and Police Officers

| | ln(*Officers Employed by Sheriff's Offices*) | ln(*Officers Employed by Police Departments*) |
|---|---|---|
| *Wet Law* | -.031<br>(.059) | -.032<br>(.046) |
| Mean of the number of sworn officers per 10,000 population | 7.18 | 14.0 |
| N | 1,731 | 1,398 |
| $R^2$ | .912 | .878 |
| Year FEs | Yes | Yes |
| County FEs | Yes | Yes |
| Covariates | Yes | Yes |
| County linear trends | Yes | Yes |

Notes: Regressions are weighted using county population and standard errors are corrected for clustering at the county level. The dependent variable is equal to the natural log of the number of officers per 10,000 population employed in county *c* and year *t*.

# Economic Conditions, Voting Patterns, and Wet Laws

- Did economic conditions or broad changes in social mores, as measured by voting patterns in congressional and gubernatorial elections, predict legal status of by-the-drink sales?

- To answer this question, we regress *Wet Law* on
    - Real income per capita
    - Unemployment rate
    - Ratio of Democratic to GOP votes

# Economic Conditions, the Democratic to GOP Voting Ratio, and Wet Laws

| | *Wet Law* | *Wet Law* |
|---|---|---|
| *Income* | .002 | .007 |
| | (.005) | (.005) |
| *Unemployment* | -.014 | -.005 |
| | (.009) | (.009) |
| *Democratic to GOP* | -.029 | -.044 |
| | (.029) | (.035) |
| Mean of dependent variable | .629 | .629 |
| N | 3,675 | 3,675 |
| $R^2$ | .840 | .876 |
| Year FEs | Yes | Yes |
| County FEs | Yes | Yes |
| Covariates | Yes | Yes |
| County linear trends | No | Yes |

Notes: Regressions are weighted using county population and standard errors are corrected for clustering at the county level. The dependent variable is equal to 1 if by-the-drink sales were allowed in county *c* and year *t* (and 0 otherwise).

## Distinguishing between wet laws based on food sales requirement

- By the end of 2011, 24 out of the 86 wet counties in Kansas did not require food sales.
- Remaining 62 wet counties required that establishments derive 30 percent of their gross receipts from food sales
- We replace *Wet Law* with two mutually exclusive indicators
  - *Wet Law with Food Sales 30% Gross*
  - *Wet Law with Food Sales Not Required*

## Wet Laws with vs. without the 30 Percent Food Sales Requirement

| | ln(*Violent Crime*) | ln(*Violent Crime*) |
|---|---|---|
| *Food Sales 30% Gross* | .101** | .104** |
| | (.049) | (.047) |
| *Food Sales Not Required* | .119 | .078 |
| | (.098) | (.074) |
| N | 3,352 | 3,352 |
| $R^2$ | .768 | .820 |
| Year FEs | Yes | Yes |
| County FEs | Yes | Yes |
| Covariates | Yes | Yes |
| County linear trends | No | Yes |

Notes: Regressions are weighted using county population and standard errors are corrected for clustering at the county level. The dependent variable is equal to the natural log of the violent crime rate in county *c* and year *t*. The years 1995, 1996, and 1999 are excluded because of missing crime data.

# Did Wet Laws Simply Displace Violent Crime?

- Issue of displacement has not been typically addressed by studies on local alcohol availability and crime
- The positive relationship between wet laws and violent crime could, in theory, reflect a net increase in criminal activity
- Alternatively, it could be that violence-prone residents of neighboring counties drove across the border after establishments began selling alcohol to the general public for on-premises consumption
- To explore this issue
  - Control for the number of wet counties bordering county *c* in year *t*
    - If crime was displaced, then its estimated coefficient should be negative
  - Include mutually exclusive indicators for having one wet county as a neighbor or having two or more wet counties as neighbors

# Did Wet Laws Create or Displace Violent Crime?

| | Full Sample | | Always-Dry Counties | |
|---|---|---|---|---|
| *Wet Law* | .108* | .101* | | |
| | (.059) | (.052) | | |
| *Number of Wet Counties On Border* | -.006 | | .012 | |
| | (.024) | | (.054) | |
| *One Wet County on Border* | | .043 | | -.075 |
| | | (.095) | | (.173) |
| *Two or More Wet Counties on Border* | | .018 | | .008 |
| | | (.090) | | (.137) |
| N | 3,352 | 3,352 | 607 | 607 |
| Year FEs | Yes | Yes | Yes | Yes |
| County FEs | Yes | Yes | Yes | Yes |
| Covariates | Yes | Yes | Yes | Yes |
| County linear trends | Yes | Yes | Yes | Yes |

Notes: Regressions are weighted by county population and standard errors are corrected for clustering at the county level. The dependent variable is equal to the natural log of the violent crime rate in county *c* and year *t*. The years 1995, 1996, and 1999 are excluded because of missing crime data.

# Property Crime

- Carpenter (2005, 2007) found that very strict underage drunk driving laws decreased property and nuisance crimes, but not violent crime
- Carpenter and Dobkin (forthcoming) found that the minimum legal drinking age decreased property and nuisance crimes
- Gronqvist and Niknami (2014) found that allowing liquor stores to stay open on Saturday in Sweden increased property crime
- Corman and Mocan (2013) found that alcohol sales in New York City were positively associated with larceny

# On-Premises Consumption and Property Crime, 1977-2011

| | 2SLS ln(*Property Crime*) | 2SLS ln(*Property Crime*) | Reduced-Form ln(*Property Crime*) | Reduced-Form ln(*Property Crime*) |
|---|---|---|---|---|
| ln(*On-Premises Licenses*) | .328* | .408** | | |
| | (.192) | (.201) | | |
| *Wet Law* | | | .093* | .102* |
| | | | (.054) | (.052) |
| N | 3,352 | 3,352 | 3,352 | 3,352 |
| $R^2$ | .761 | .800 | .768 | .806 |
| Year FEs | Yes | Yes | Yes | Yes |
| County FEs | Yes | Yes | Yes | Yes |
| Covariates | Yes | Yes | Yes | Yes |
| County linear trends | No | Yes | No | Yes |

Notes: Regressions are weighted by county population and standard errors are corrected for clustering at the county level. The dependent variable is equal to the natural log of the property crime rate in county *c* and year *t*. The years 1995, 1996, and 1999 are excluded because of missing crime data.

## 2SLS Estimates: On-Premises Licenses and Property Crime by Type, 1977-2011

| | ln(*Burglary*) | ln(*Larceny*) | ln(*Motor Vehicle Theft*) |
|---|---|---|---|
| ln(*On-Premises Licenses*) | .380<br>(.235) | .482**<br>(.223) | .640**<br>(.249) |
| N | 2,932 | 2,932 | 2,932 |
| $R^2$ | .799 | .809 | .771 |
| Year FEs | Yes | Yes | Yes |
| County FEs | Yes | Yes | Yes |
| Covariates | Yes | Yes | Yes |
| County linear trends | Yes | Yes | Yes |

Notes: Regressions are weighted by county population and standard errors are corrected for clustering at the county level. The dependent variable is equal to the natural log of the relevant crime rate in county *c* and year *t*. The years 1993-1999 are excluded because of missing crime data.

## Reduced-Form Estimates by Property Crime Type, 1977-2011

| | ln(*Burglary*) | ln(*Larceny*) | ln(*Motor Vehicle Theft*) |
|---|---|---|---|
| *Wet Law* | .107 | .136** | .180** |
| | (.069) | (.062) | (.073) |
| N | 2,932 | 2,932 | 2,932 |
| $R^2$ | .802 | .818 | .793 |
| Year FEs | Yes | Yes | Yes |
| County FEs | Yes | Yes | Yes |
| Covariates | Yes | Yes | Yes |
| County linear trends | Yes | Yes | Yes |

Notes: Regressions are weighted by county population and standard errors are corrected for clustering at the county level. The dependent variable is equal to the natural log of the relevant crime rate in county *c* and year *t*. The years 1993-1999 are excluded because of missing crime data.

# Property Crime

- Wet laws associated with roughly a 10 percent increase in property crime
- Property crime results are robust to the checks we showed above for violent crime
- No evidence that wet laws displace property crime

# Conclusions

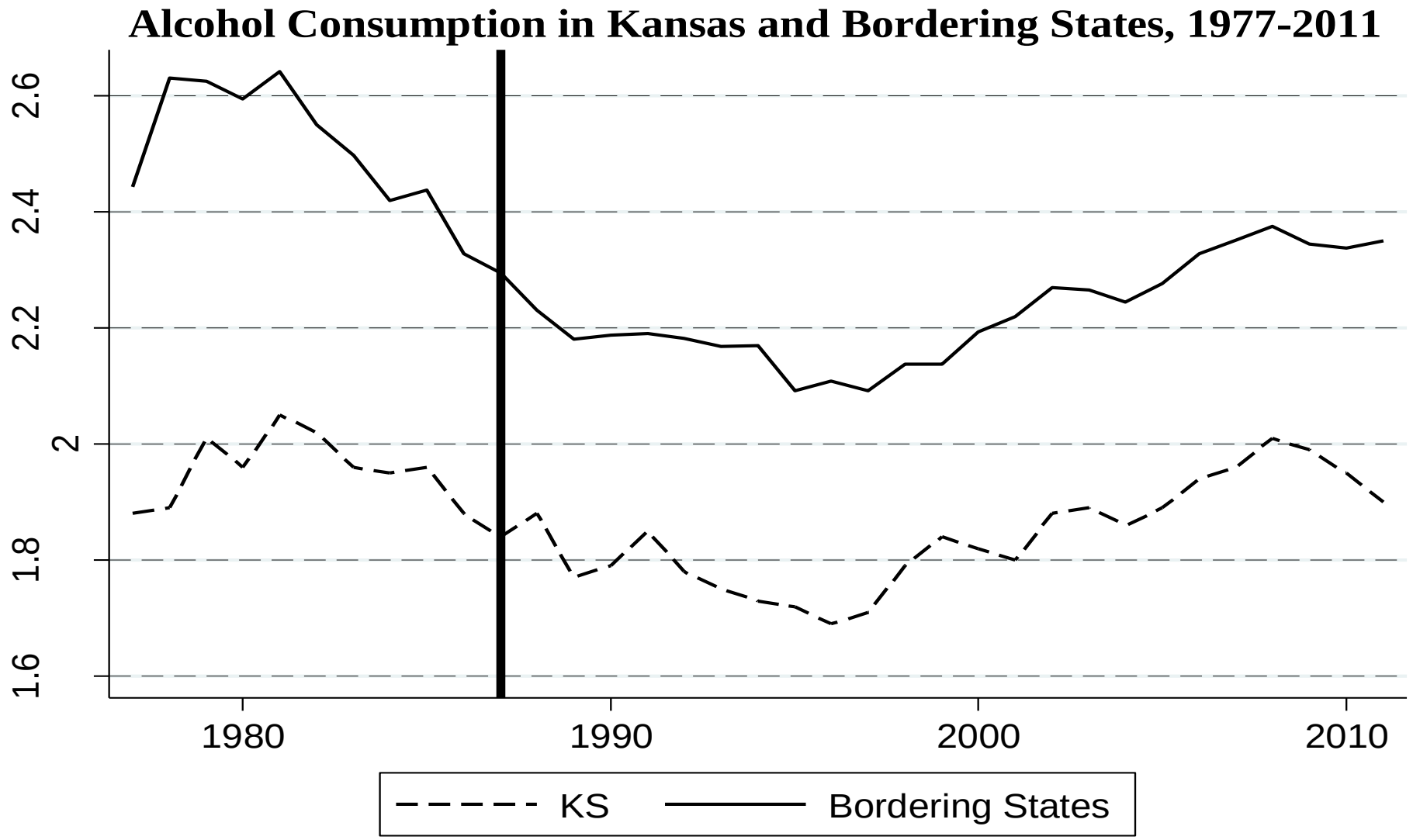
- These results are the first to link alcohol sales for on-premises consumption to an increase in criminal activity
- There are at least three potential mechanisms that could explain this relationship
  - First, our results could be due to increased consumption of alcohol, which has been linked to crime by an extensive literature
  - Second, the increase in crime may be the result of a shift in alcohol consumption from private homes to public venues such as bars and restaurants
    - Consistent with previous evidence that alcohol consumption in public catalyzes violent behavior (Graham and Wells 2001, 2003; Buddie and Parks 2003; Middleton et al. 2010)
    - A shift in where alcohol is consumed could affect which crimes are actually reported. If, for example, an assault that takes place at home is less likely to be reported than an assault that takes place in public, then our estimates could overstate the true impact of by-the-drink sales on violent crime

# Conclusions

  - Finally, more crime may be the result of an increase in late night foot traffic in areas around bars and restaurants, which could have increased the number of potential victims

- While we cannot distinguish between these mechanisms, our results provide evidence that restrictions on local alcohol availability can play an important role in crime prevention

# THANK YOU!




Note: Data on alcohol consumption are from the National Institute on Alcohol Abuse and Alcoholism.

| | Food Sales 30% Gross | Food Sales Not Required |
|---|---|---|
| Allen | 2000 | |
| Anderson | 1996 | |
| Atchison | 1986 | |
| Barber | | 2010 |
| Barton | 1986 | 2004 |
| Bourbon | 1992 | |
| Brown | | 2000 |
| Butler | 1986 | |
| Chase | 1988 | |
| Chautauqua | 2008 | |

back

| | Food Sales 30% Gross | Food Sales Not Required |
|---|---|---|
| Osborne | 2010 | |
| Ottawa | 2006 | |
| Pawnee | 1992 | |
| Phillips | 1996 | |
| Pottawatomie | 1986 | |
| Pratt | 2000 | |
| Rawlins | 2002 | |
| Reno | 1986 | |
| Chase | 1986 | |

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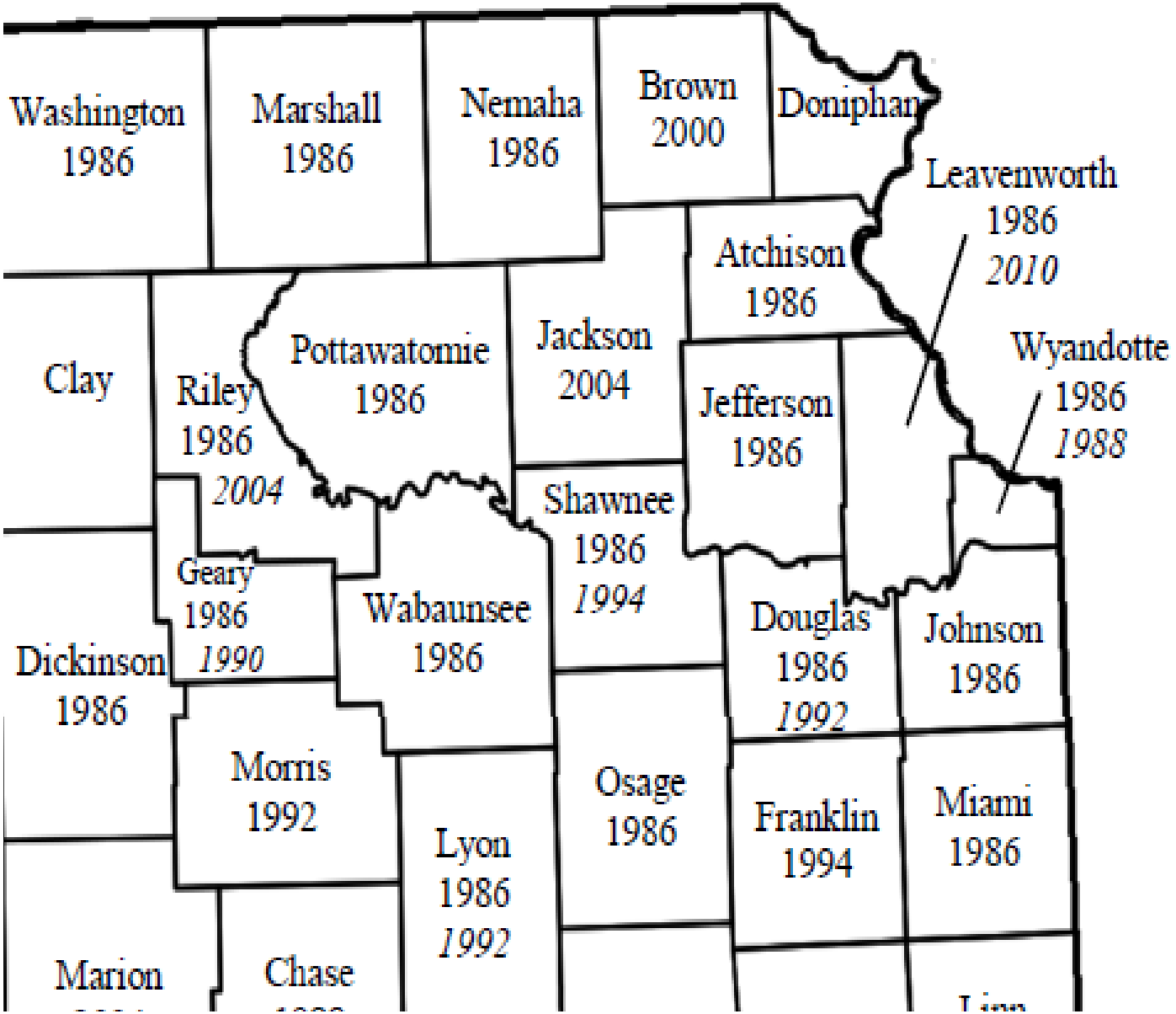
Washington
1986
Marshall
1986
Nemaha
1986
Brown
2000
Doniphan
Leavenworth
1986
2010
Atchison
1986
Clay
Riley
1986
2004
Pottawatomie
1986
Jackson
2004
Jefferson
1986
Wyandotte
1986
1988
Shawnee
1986
1994
Geary
1986
1990
Wabaunsee
1986
Douglas
1986
1992
Johnson
1986
Dickinson
1986
Morris
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Osage
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Franklin
1994
Miami
1986
Lyon
1986
1992
Marion
Chase

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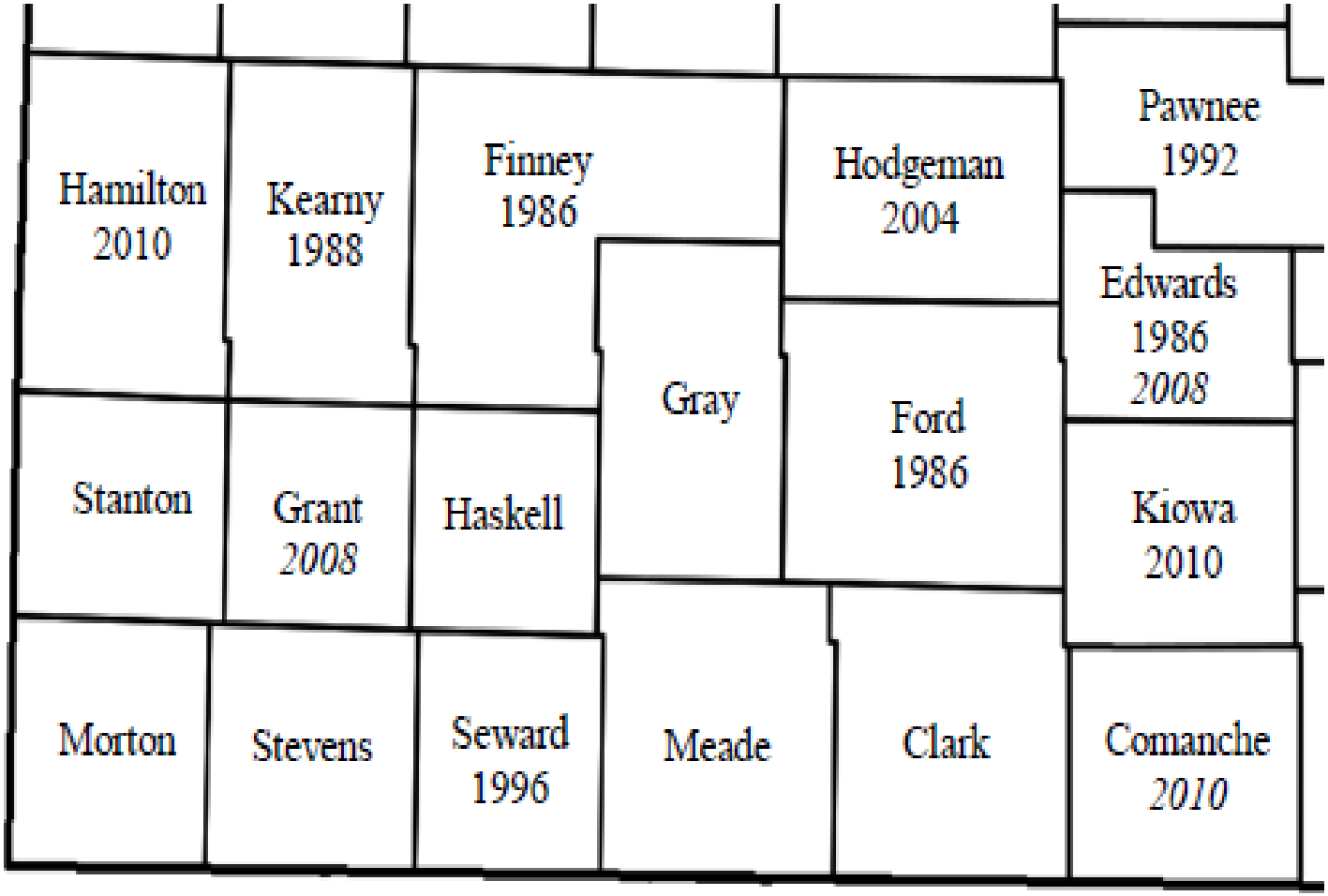
Hamilton
2010
Kearny
1988
Finney
1986
Hodgeman
2004
Pawnee
1992
Edwards
1986
2008
Gray
Ford
1986
Kiowa
2010
Stanton
Grant
2008
Haskell
Morton
Stevens
Seward
1996
Meade
Clark
Comanche
2010

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