

## **Beer, booze, and brawls:**

### **Evidence on the causal effect of alcohol on crime for Prussia, 1882-1912**

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#### ***Short Abstract:***

This paper analyzes the causal effect of alcohol on crime based on unique panel data from Prussia for the years 1882 to 1912. Using exogenous variation in beer consumption induced by lagged weather conditions (that affected spring barley yield) we identify a quantitatively and qualitatively significant effect of beer consumption on violent crimes. Our estimates suggest that a one percent increase of beer consumption leads to a 0.7 percent increase of violent crimes. The finding is driven by the effect of beer on assaults, battery, and brawls. In contrast, we do not find an effect on major violent crimes, as robbery or homicide. The data further indicate that beer consumption has in general no effect on property crime. Yet, for adolescent criminals we do find a positive effect of beer on property crime.

#### ***Longer Abstract:***

Our study provides historical evidence on crime in Prussia. We collected a new data set of convictions for more than 20 different types of crimes committed in the 37 Prussian districts (*Regierungsbezirke*) between 1882 and 1912. In addition, we compiled data on beer production from the official tax records (*Brauststeuer*) for 14 Prussian provinces, an administrative unit comprising several districts. At that time, transportation costs for beer were substantial and market integration was weak. Beer brewers were mainly competing for local markets. Hence, province level beer production serves as a good proxy for beer consumption in a province.

A descriptive analysis of the crime data reveals that violent and property crime rates have increased between the 1880s and the turn of the century. Subsequently, property crime rates displayed a further increase whereas violent crime rates stagnated at a high level. The increase in crime is mirrored in the beer data: per capital beer production, which accounted for a major part of total alcohol consumption at that time, increased dramatically between the 1880s and the turn of the century, modestly declining thereafter (in part, due to tax reforms). The beer boom in the late 19th century was mainly due to the dispersion of new technologies (cooling machines) and the success of bottom-fermented beers (*Pils*).

Within-differentiated, de-trended panel data indicate a strong correlation between beer and crime rates suggesting a close association between the two. However, it would be naive to make causal interpretations of this correlation. As is well understood in the literature, the alcohol-crime link is hard to identify due to reversed causality, omitted variable problems and measurement issues. We solve the identification problem by employing a novel instrumental variables (IV) approach. Our IV strategy rests on the fact that beer production in the 19th century was sensitive to grain inputs, which were in turn affected by weather shocks. More specifically, we use one year lagged data on (regional) rainfall and temperature as instruments. We first demonstrate that ‘bad’ weather during the past years sowing and harvesting period for spring barley had a negative impact on barley yield, barley prices and – ultimately – present year beer production.

Using exogenous variation in beer production induced by lagged weather conditions (and, as an alternative IV, lagged barley yield) we estimate the impact of beer on different crime rates. Our estimates suggest that a one percent increase of beer consumption leads to a 0.7 percent increase in violent crimes. Qualitatively and quantitatively, this result is very stable with respect to different specifications and alternative IVs. The effect is mainly driven by the strong effect of beer on simple and aggravated assault and battery. More severe violent crimes (e.g., robbery and homicide), however, are not affected by beer consumption. Turning to property crimes, we do not find any effect from beer consumption. However, once we consider crime rates among specific parts of the population, we do find a significant effect of beer consumption on property crimes – mainly petty larceny and theft – among young criminals.

Our data allow us to run several robustness checks and plausibility tests. Making use of other crime categories, for instance, we show that beer has a significant positive effect on vandalism and property damage. In contrast, there is no effect on arson, bribery, infanticide, etc. Moreover, we demonstrate that the overall effect of beer is driven by male criminals (and beer drinkers).

The project makes two contributions to the literature: First, we present the first study investigating the *causal* effect of beer consumption on crime using historical data. We show that – in contrast to writings of 19th century scholars – beer consumption was not causal for

all types of crime, but only for some violent crimes. Our historical evidence might also be informative to the returning debate on whether the prohibition in the US could have had any beneficial effect on crime. Moreover, the evidence on the alcohol-crime link mainly comes from studies on modern, industrialized countries. Our historical data might be more informative to evaluate the crime impact of drinking in developing countries, which nowadays host the most rapidly growing alcohol markets. It seems to be a relevant question to analyze the relation between alcohol consumption and crime in these fast-changing societies that transformed, as Prussia, from mainly agrarian into mainly industrial countries.

Second, we introduce a novel identification in the alcohol-crime literature. The few studies that tackle the identification problem mainly used changes in alcohol taxation or temporal and legal sales restrictions to break the simultaneity, we work with exogenous weather changes which - in our case - affect input prices and alcohol output. The use of truly exogenous changes in weather seems a promising new IV that might also be applicable in studies using modern data.