

Brewing change? The effect of Maryland's 2011 state alcohol tax increase on violent crime and property crime

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Abstract

We study the effect of Maryland's 2011 statewide alcohol tax hike from 6% to 9% on violent crime and property crime levels. This is motivated by the desire to understand if secondary intended outcomes are achieved by this policy change. An expected effect of this policy would be a reduction in alcohol consumption and subsequently, a reduction in alcohol-related crime. If this were the case, policy makers could use this as further justification for increased taxation on alcohol. We use FBI state crime data from 2007 to 2015 and perform a difference-in-differences regression using Pennsylvania as a control state to determine whether Maryland's alcohol taxation decision led to a statistically significant reduction in violent crime and property crime in the state. In comparing the states, we expect to reduce the effect of other variables, to properly highlight the effects of the tax change. We conclude that generally, post-tax, Maryland experienced a slight downward trend in crimes rates, but our conclusion was muddled by a series of factors which include high variation in data and exogenous shocks.

I. Introduction

Alcohol consumption is a significant contributor to a variety of socioeconomic costs. Besides its proven negative health effects, alcohol plays a key role in a variety of crimes and attempts to curb consumption can potentially lead to an array of positive effects. It is widely accepted that increases in alcohol taxes result in higher prices, which in turn lead to reductions in drinking (Wagenaar, Salois, & Komro, 2009). As such, taxation is a crucial tool for policymakers. A wealth of studies have sought to establish a direct and causal relationship between alcohol taxation and crime, yet there remains no clear consensus on the significance of this relationship. Cultural and economic contexts also vary the degree to which alcohol tax hikes impact crime reduction; the effects of rate boosts vary greatly in Scandinavia, Australia, and even between different US regions (Booth, Meier, Shapland, Wong, & Paisley, 2011). While policymakers may find past studies helpful in estimating how taxation might reduce crime in their respective communities, the variability of existing research makes this effect difficult to pinpoint without natural experiments that allow for more targeted analysis. In the US, these natural experiments are hard to find as states infrequently change their taxes on alcohol.

One such opportunity lies in Maryland's decision to increase its state sales and use tax rate in 2011, which offers a unique chance to explore the potential behind alcohol taxation in the northeastern US (Maryland General Assembly). While Maryland's policy change had the primary

goal of increasing fiscal revenues for public infrastructure projects, our goal is to identify whether violent crime (murder and nonnegligent manslaughter, rape, robbery, and aggravated assault) and property crime (burglary, larceny-theft, motor vehicle theft, and arson) levels were also affected by this decision. We begin by performing a comprehensive literature review on the link between alcohol taxation/pricing and crime. We continue by presenting the FBI dataset that was used, and we walk through our methodology. We continue to explain the difference-in-differences model used and our reasoning behind our decisions. Finally, we conclude by presenting our results, and discuss the limitations in our approach and the implications behind our findings.

II. Research Question

Was there an observable effect of Maryland's 2011 alcohol sales tax increase on violent and property crime rates?

III. Literature Review

Based on the understanding that increases in alcohol prices/taxes lead to a reduction in alcohol consumption (Wagenaar, Salois, & Komro, 2009), we will focus on reviewing past literature examining the relationship between alcohol tax increases and crime rates. Numerous studies have been conducted that examine this relationship. The paper “Violence reduction through restrictions on alcohol availability” which uses panel data over eight years, finds that higher beer excise taxes could reduce robbery and rape crimes (Cook & Moore, 1993). The study “Assessing the impact of alcohol taxation on rates of violent victimization in a large urban area” uses an agent-based model to find that alcohol taxation can have important effects on reducing alcohol-related violent crimes (Keyes, Shev, Tracy, & Cerdá, 2019).

In addition, the report “Alcohol Pricing, Consumption and Criminal Harm: A Rapid Evidence Assessment of the Published Research Literature”, provides a comprehensive review of existing studies by analyzing 36 key papers in this field. Notably, this report examines studies on both increases and decreases in alcohol prices/taxes and their impact on crime rates, offering insights into the methodologies used in these studies and summarizing their findings (Booth et al., 2011).

3.1 Methodologies used

The reviewed studies employ two main types of methodologies to evaluate the relationship between alcohol taxes/pricing and crime rates: observational studies and modeling studies. Each offers unique strengths and limitations.

- **Observational studies** analyze real-world data on alcohol prices and crime rates. Key approaches include:
 - **Cross-Sectional Studies:** they examine relationships at a single point in time across different regions or populations. While these studies highlight associations (for

example, areas with higher alcohol prices often have lower crime rates), they cannot establish causality.

- **Time-Series Studies:** they track changes in alcohol prices and crime rates over time, allowing researchers to identify trends and correlations.
- **Natural Experiments:** they leverage real-world policy changes, such as tax increases or decreases, to assess their impact on crime. By comparing pre- and post-policy periods or analyzing affected and unaffected regions, natural experiments provide stronger causal evidence than other observational methods. However, results may be influenced by local factors and lack global generalizability.
- **Modeling Studies:** these studies use simulations to predict the likely impact of alcohol pricing changes on crime rates based on historical or contemporary data. While they allow for exploration of multiple factors simultaneously (price elasticity, crime rates, and consumption patterns for example), they cannot establish causality and are highly dependent on the quality of input data.

Among these methodologies, natural experiments stand out as the most effective for evaluating causality because they analyze real-world policy changes. However, their findings are context-dependent, emphasizing the need for region-specific analyses.

3.2 Key results

The reviewed studies demonstrate a relationship between alcohol pricing and crime rates, with significant variations by crime type, the direction of price change, and geographical context:

- **Alcohol Tax/Price Increases:**
Increases in alcohol taxes or prices were generally associated with reductions in **overall crimes**. Specific findings include:
 - **Violent crime and sexual assault:** Strong evidence shows that higher alcohol taxation/prices lead to reductions in violent crime and sexual assault.
 - **Criminal damage:** Evidence on the impact of alcohol tax/price increase on criminal damage primarily comes from modelling studies, which consistently predict reductions in these offences. While an older observational study supports these findings, the evidence base is weaker compared to that for violent crimes and sexual assault.
 - **Homicide, domestic violence, and robbery:** Evidence for these crimes was inconclusive, with no consistent findings.
 - Some crime types, such as **anti-social behavior**, lack evidence entirely.
- **Alcohol Tax/Price Decreases:**
The evidence base for tax or price reductions is smaller but highlights several significant outcomes. These findings include:
 - **Overall crime:** Tax reductions were generally associated with increased overall crime rates.

- Scandinavian studies found no significant changes in **violent crime, domestic violence or robbery** following tax reductions and even observed a reduction in **public order offences**. In contrast, non-Scandinavian studies suggested increases in **violent crime and drunk and disorderly behavior**, though the evidence for the latter is not strong.
- **Homicide and anti-social behavior:** The effects of tax or price reductions on homicide were inconclusive, and no evidence was found linking price reductions to changes in anti-social behavior.
- **Policy Context Matters:**
The contrasting findings across regions highlight how the effects of alcohol pricing policies are highly context-specific, influenced by cultural, economic, and regulatory factors. The evidence underscores the importance of conducting region-specific studies to guide policymakers effectively. Without such localized research, the broader applicability of findings from one context may lead to policies that fail to address the unique dynamics of alcohol consumption and crime in another.

3.3 Proposed study for Maryland

The IAS report underscores the importance of alcohol pricing policies in reducing crime. While natural experiments are the gold standard for evaluating these effects, their context-dependent findings necessitate region-specific research. Maryland's 2011 alcohol tax increase provides a unique opportunity to fill a critical gap in the literature. Maryland presents an ideal opportunity for a natural experiment. In 2011, Maryland implemented a significant increase in alcohol taxes. While numerous studies have examined the impact of this tax increase on other outcomes, such as alcohol sales and consumption (Esser, Waters, Smart, & Jernigan, 2016), its relationship with crime rates has not been studied. This represents a critical gap in the literature, as evaluating the impact on crime could provide valuable insights for policymakers.

Building on the methodologies reviewed in the IAS report, we propose conducting a natural experiment to evaluate the impact of Maryland's 2011 alcohol tax increase on crime rates. This approach aligns with best practices identified in the report, offering the following advantages:

- **Causal Inference:** By comparing crime rates before and after the 2011 tax increase and analyzing trends in Maryland relative to a similar state without tax changes (Pennsylvania), we can identify potential causal relationships.
- **Localized Analysis:** This study will account for Maryland-specific contextual factors, ensuring findings are relevant and actionable for state policymakers.

IV. Data Description

The data used was collected from the FBI's Uniform Crime Reporting (UCR) database, specifically from Table 8: Offenses Known to Law Enforcement, filtered by city (FBI, 2010). The UCR database contains data from more than 18,000 law enforcement agencies across the United States which voluntarily submit their crime data to the FBI. Our study focuses specifically on crime

data from Maryland and Pennsylvania and includes violent and property crime yearly data at the county level.

The FBI’s UCR data, available in annual Excel files, required initial cleaning to prepare it for analysis. This included removing irrelevant rows, adding state identifiers and year columns, and ensuring proper formatting. We merged the datasets for the years 2004–2015 in R, converting character variables to numeric formats. The data includes violent and property crime types, though sexual assault was excluded from the violent crime variable (*vcrime*) due to inconsistent reporting. This resulted in violent crime encapsulating murder and nonnegligent manslaughter, robbery, and aggravated assault and property crime encapsulating burglary, larceny-theft, motor vehicle theft, and arson. The values of each of these types of crimes were summed to create the violent crime variable (*vcrime*) and the property crime variable (*pcrime*). Violent crime and property crime were summed to create a total crime variable (*totcrime*). Crime rates for all variables—violent, property, and total—were calculated by dividing crime counts by population, yielding the respective rate variables (*vcrimerate*, *pcrimerate*, and *totcrimerate*).

V. Empirical Model

5.1 Key state characteristics

Given our difference in differences approach, choosing a comparable region to Maryland was important to establish a credible basis for our assumptions. A good control group would give us more confidence to attribute any deviations following 2011 to Maryland’s alcohol tax increase. Thus, the decision to use Pennsylvania as a control group stemmed from various key characteristics it shared with Maryland. Geographic proximity is a key characteristic shared by both groups, which subjects the two states to a similar exposure to national or regional shocks. Both states also had very similar demographic and socioeconomic characteristics that followed similar trends, as shown in Table 1. For instance, unemployment, income, education, and poverty levels followed similar trends in the years prior to the tax increase. Maryland and Pennsylvania also had similar alcohol consumption levels, according to CDC survey data on alcohol consumption trends (BRFSS Prevalence & Trends Data). Additionally, Pennsylvania saw no policy changes on alcohol taxation during this period and held sales and use tax rate equal to Maryland’s before the hike, at 6% (Maryland General Assembly). These similarities led us to conclude that Pennsylvania was a reasonable control group for comparison with Maryland.

Table 1: Key characteristics in Maryland (MD) and Pennsylvania (PA)				
State characteristics	2008	2009	2010	2011
MD Unemployment rate	4.5	7.6	7.8	7.3
PA Unemployment rate	5.4	8.0	8.2	7.7
MD Median household income	87,120	88,120	86,950	90,470
PA Median household income	70,290	66,130	65,430	65,560

MD Percent of population with high school degree or higher	88.0	88.2	88.1	88.9
PA Percent of population with high school degree or higher	87.5	87.9	88.4	88.6
MD Estimated percent of people living in poverty	8.2	9.2	9.9	10.2
PA Estimated percent of people living in poverty	12.1	12.5	13.4	13.7
MD Percent of adults who have had at least one drink in last 30 days	54.6	54.6	54.2	57.8
PA Percent of adults who have had at least one drink in last 30 days	56.2	56.1	54.6	57.2

(FRED), (BRFSS Prevalence & Trends Data)

5.2 Parallel Trend

Prior to running the difference-in-differences regression, it is imperative to check whether a parallel trend was shared by the dependent variable for the treatment and the control group before the treatment was effective. Otherwise, the diff-in-diff method loses its validity; it would imply the possibility of the treatment group differing from the control even if there was no treatment involved: in this case, even without the increase in sin tax, the number of crimes would have differed for Maryland compared to the other control State, had the parallel trend not held.



Figure 1: Pennsylvania and Maryland

Even with fixed effect regressors that account for the region-invariant and time-invariant confounders we intend to employ, the parallel trend assumption is pivotal for diff-in-diff regression. Thus, we compared the average total crime of Maryland over time to that of its neighboring States: Pennsylvania, whose trends from 2004 to 2011 appeared most parallel to that of Maryland, was

then selected as the control group of our diff-in-diff regression. Though we will be using other dependent variables in the regression, the average total crime rate is the variable we are most interested in and encapsulates the aggregation of the different forms of crime.

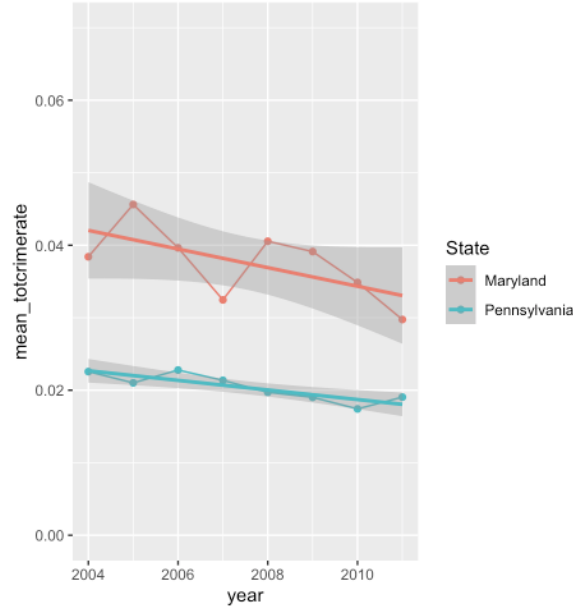


Figure 2: Parallel Trends

5.3 Regression Specification

We use a difference-in-differences regression specification as follows:

$$Y_{irt} = \beta_0 + \beta_1(Tax_r \times Year2007_t) + \beta_2(Tax_r \times Year2011_t) + \beta_3(Tax_r \times Year2015_t) + \gamma_r + \delta_t + \varepsilon_{irt}$$

where $Tax_r = \begin{cases} 1 & \text{if } r \text{ is treated} \\ 0 & \text{otherwise} \end{cases}$, $Year(X)_t = \begin{cases} 1 & \text{if } t=X \\ 0 & \text{otherwise} \end{cases}$ where r is region (State) and t is time (Year) in our panel data, and thus γ_r , δ_t are the regional and temporal fixed effects respectively, and the dependent variable γ_{irt} is a city-specific (i) crime count/crime rate,

$$Y_{irt} \in \{totcrime, totcrimerate, vcrime, vcrimerate, pcrime, pcrimerate\}.$$

Still, comparing the data from two regions brings about complications; in such a regression, the dependent variable would likely be influenced by a multitude of confounding factors such as the average income, police quantity/budget, population density, gun prevalence (especially for homicides), or alcoholism rate of the region.

Furthermore, given the timespan of our dataset looking over 2007-2011-2015, the data we employ may be heavily affected by the infamous 2008 recession. However, it is not clear to what extent each region had responded to the recession, and it is possible that the effect of change in alcohol tax on alcohol consumption (and thus the hypothesized reduction of violent crimes) is not singled out. Thus, the data we observed may be affected by the reduced alcohol consumption from decreased consumer confidence, rather than from the effectiveness of the alcohol tax.

This justifies using fixed effects variables: in the regression, with regional (γ_r) and temporal (δ_t) fixed effects accounted for, we assume the error ε_{irt} has the conditional expectation of 0. More formally,

$$E[\varepsilon_{irt} | (Tax_r \times Year2007_t), (Tax_r \times Year2011_t), (Tax_r \times Year2015_t), \gamma_r, \delta_t] = 0$$

In other words, we assume that those confounding factors unique to the region and time-invariant would be accounted for, once we dragged the regional fixed effect γ_r out of the error term, and similarly for those unique to the time and region-invariant, once we dragged the temporal fixed effect δ_t . We can then assume whatever error that remains would have the conditional expectation of 0: the effect of alcohol tax on crime numbers/crime rates is singled-out, the coefficients of our regression β_1 , and β_3 , yielding meaningful values.

5.4 Coefficients of Interest

In our analysis, we are interested in the slope coefficients of the regression. In particular, we are interested in β_2 and β_3 : β_1 in our regression is essentially a variable that detects the failure of parallel trends. If $\beta_1 \neq 0$, we have a problem—it would indicate the possibility that the treated region would have differed from the control even if there was no treatment involved. The following table summarizes our expectations for the slope coefficients:

Table 2: Slope coefficients						
	totcrime	totcrimerate	pcrime	pcrimerate	vcrime	vcrimerate
$Tax_r \times Year2007_t (\beta_1)$	0	0	0	0	0	0
$Tax_r \times Year2011_t (\beta_2)$	<0	<0	<0	<0	<0	<0
$Tax_r \times Year2015_t (\beta_3)$	<0	<0	<0	<0	<0	<0

As discussed, $\beta_1 = 0$ for all dependent variables, the crimes in the treated region not differing from the control before the treatment (2009). We anticipate $\beta_2 < 0$ for all dependent variables, the short-term effectiveness of the treatment. It is easy to see why this should be the case: the increase in sin tax would increase the effective price of alcohol, economic agents would consume alcohol less, and, as hypothesized, the numbers/rates of violent crimes would decrease. We anticipate similar results for β_3 . The only difference is that β_3 will account for the longer-term effects of the treatment and prove the lasting effectiveness of the sin tax policy.

VI. Results

6.1 Crime Levels

Table 3: Crime levels			
** indicates significance at the 1% level, and * at the 5% level			
	Total Crime	Violent Crime	Property Crime
$Tax_r \times Year2007_t$	-158.65** [0.425]	-28.78371 ** [0.13196]	-129.8689** [0.288859]
$Tax_r \times Year2011_t$	-90.6774** [0.425]	-21.35278** [0.13196]	-69.3247** [0.288859]
$Tax_r \times Year2015_t$	13.6041* [0.425]	2.92024* [0.13196]	10.6838* [0.288859]
R^2	0.052986	0.035675	0.047545

Our analysis of the regression results, which estimate the effect of the tax policy implemented in April 2011, reveals a significant impact on total, violent, and property crime levels. The negative trends in 2007 and 2011 in the absolute levels of all three crimes indicate a faster decrease in crime levels in Maryland than in Pennsylvania. These results are all significant at the 1% level, underscoring the crucial role of the tax policy in crime reduction. However, the positive value in 2015 could indicate a rebound effect or reflect the impact of some external event. Another potential explanation for this could be the diminishing returns from the alcohol tax. Despite the statistical significance of our results, it is worth noting that our model has an incredibly low R^2 . This means that the change in tax rate does not provide an explanation for the variance in any of the crime variables.

6.2 Crime Rates Per Capita

Table 4: Crime Rates			
** indicates significance at the 1% level			
Regressions	Total Crime Rate (1)	Violent Crime Rate (2)	Property Crime Rate (3)
$Tax_r \times Year2007_t$	-0.004965 ** [0.000073]	-0.001030 ** [0.000011]	-0.003936** [0.000061]
$Tax_r \times Year2011_t$	-0.005356 ** [0.000073]	-0.000822** [0.000011]	-0.004534** [0.000061]
$Tax_r \times Year2015_t$	-0.006317** [0.000073]	-0.000966** [0.000011]	-0.005352** [0.000061]
R^2	0.056055	0.046229	0.046229

Moving forward, we adjusted for population to examine whether the variations in crime levels were due to demographic changes. Observing crime rates per capita rather than crime levels, we observed that the persisting negative coefficients for 2007 suggest pre-existing crime trends differences between the treatment (Maryland) and control (Pennsylvania) groups, challenging the parallel trends assumption. These baseline differences in reductions of crime rates (by around -0.004965) could be attributed to broader trends unrelated to the tax policy.

A low R^2 in our models further suggests that a significant portion of the variation in crime rates remains unexplained by the included variables, including the tax policy. While this does not invalidate the observed trends or the policy's impact, it does highlight that other unobserved factors may also be influencing the outcomes. This limitation should be considered when interpreting the results, as it suggests caution in attributing all observed changes to the policy alone.

Following the implementation of the tax policy in April 2011, we observed a noticeable increase in the magnitude of crime reductions compared to 2007. For instance, the total crime rate sank by -0.005356, an increase in effect size compared to 2007 (-0.004965). This sharp decrease suggests that the tax policy significantly accelerated the reduction in crime rates starting in 2011. By 2015, the reductions in crime rates were even more pronounced, with the total crime rate decreasing by -0.006317, indicating that the tax policy's effects became more robust over time. Comparing the evolution of violent crime to property crime (as defined earlier), the violent crime rate has decreased by less than the property crime rate, suggesting that the tax policy had a more substantial impact on the latter.

Hence, our analysis suggests that the tax policy implemented in Maryland in 2011 has reduced crime rates, particularly for property crimes. Compared to Pennsylvania, the sharper declines in Maryland post-2011 provide compelling evidence supporting the effectiveness of the policy. The cumulative nature of the reductions through 2015 underscores the policy's enduring impact on improving public safety, instilling confidence in its future effectiveness. However, the negative values in the coefficients of 2007 instill some doubts regarding the causal effect of the tax policy on the reduction of crime.

VII. Discussion

7.1 Limitations

One of the limitations in our results stems from the lack of ability to strongly establish parallel trends. While a difference in difference approach makes the most sense given our study, finding a similar district to Maryland, with similar volatility in crime rate turned out to be an issue. States that were culturally similar to Maryland, and on similar aggregate crime trends experienced much lower volatility in crime rate from year to year, leading to parallel trends only being established in a long-term period, but not at all in the short run, hurting the validity of the results. It is hard to say that Maryland's tax strategy influenced the crime rate, when the best comparative state of Pennsylvania experienced only minor swings in crime rates unlike Maryland, leading to poor forecasting of the “alternative future” of the state. As we know, high variance makes accurate and precise prediction hard. Because of the extreme fluctuation in crime rate of Maryland, estimating a model of the crime rate on very few data points gave very little indication of the trend

that Maryland was on. This unstable counterfactual, compounding with the seemingly low effect on the trendline of crime in Maryland leads to quite foggy results, where an argument of strong effect in either direction does not seem warranted.

Further, data was only collected on a yearly basis leading to few data points both before and after the tax (before 2004, data was largely unusable due to poor collection and sorting) this led to any trends that were established having weak basis. make it c

The validity of the parallel trend assumption may have been compromised by a series of exogenous shocks that occurred during the study period. For instance, the civil unrest in Maryland following the murder of Freddie Gray by the police likely contributed to temporary spikes in crime rates. Similarly, broader macroeconomic events, such as the 2008 financial crisis, may have influenced crime trends independently of the policy under evaluation. As Santaularia et al. (2022) highlight, the financial crisis had uneven effects on crime across different counties, further complicating the analysis. These disruptions make it challenging to isolate the policy's true impact on crime. To address these challenges, future research should consider incorporating additional control variables or conducting sensitivity analyses to better disentangle the effects of these external events from the policy's outcomes.

7.2 Next steps

Building on the findings and limitations of this study, there are several ways future research could enhance our analysis and provide clearer insights.

1. *Alcohol-specific violent and property crimes:* A key area for improvement would be focusing on alcohol-specific violent and property crimes. While this study looked at overall violent and property crimes, targeting offenses explicitly linked to alcohol consumption, such as vehicular manslaughter caused by drunk driving, could provide a clearer understanding of the tax's direct impact on alcohol-induced behaviors. For instance, studies like that of Wagenaar, Livingston, and Staras (2015) analyze data specifically on alcohol-related traffic fatalities, providing a more precise assessment of the relationship between alcohol taxation and such incidents.
2. *Control states:* Including multiple control states, rather than relying solely on Pennsylvania, would enhance the reliability of the findings. A larger and more diverse control group could mitigate issues stemming from unobserved factors unique to Maryland or Pennsylvania. One interesting observation from Table 1 is the difference in median household income between Maryland and Pennsylvania. Including additional control states like Virginia and New Jersey that also hold similar characteristics to Maryland could help address these issues.
3. *More granular data:* The current analysis was constrained by the annual aggregation of crime data. Future research could utilize more granular data, such as monthly or quarterly reports, to better capture short-term variations and trends that align more closely with the timing of policy implementation. One interesting source of data that came up during our analysis that we could have used is crime reports that include data on police calls. These reports contain more detailed data that specify whether alcohol was involved in the crime and higher numbers of data points.

Another option is complementing FBI crime data with additional sources, such as emergency room admissions for alcohol-related injuries or police dispatch logs, which could offer more robust evidence of the relationship between the tax and alcohol-related harms.

4. *Demographic and socioeconomic groups:* Exploring how the policy impacts varied across different demographic or socioeconomic groups could provide additional insights. For example, did the tax disproportionately affect low-income communities, or was its impact more pronounced in urban versus rural settings? More detailed data could help address this next step.
5. *Extended Time-Horizon:* Lastly, extending the study period beyond 2015 would allow for an evaluation of the policy's sustained impact. This could help identify whether the observed reductions in crime persisted, plateaued, or reversed over time.

Implementing these next steps would help address the current study's limitations and provide policymakers with more actionable insights into the relationship between alcohol taxation and crime reduction.

VIII. Conclusion

Our investigation into the impact of Maryland's 2011 alcohol tax increase on violent and property crime rates suggests a potential relationship negative relationship between alcohol taxes and crime rates. Crime rates in Maryland showed a general decline following the tax hike, consistent with existing literature linking increased alcohol prices to reduced consumption and related harms. Our results are nuanced, however, and the robustness of these findings is limited by data constraints, challenges in establishing parallel trends, and the influence of external factors such as the broader economic environment during the study period. Our inclusion of Pennsylvania as a control improved the validity of our results but does not fully expurgate these limitations.

Our analysis highlights the potential of alcohol taxation as a policy tool to mitigate crime, though policymakers should interpret these findings with caution and consider region-specific studies to tailor interventions effectively. Further research is needed to confirm the relation between alcohol taxes and crime, and to explore whether the effect of alcohol taxes can be generalized to other sin taxes. Researchers should consider using additional control states and exploring the interplay of sin taxes with other determinants of crime. These efforts will help clarify the causal mechanisms and enhance the reliability of conclusions regarding the broader societal impacts of alcohol taxation.

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