

# Punishment and Deterrence: Evidence from Drunk Driving

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## Abstract

The article uses a regression discontinuity design to assess the impact of stricter punishments on reducing the recurrence of driving under the influence (DUI). Specifically, it evaluates how the heightened penalties associated with surpassing legal blood alcohol content (BAC) thresholds affect the likelihood of recidivism.

## Introduction

The Machine Learning Cross-Validation approach our group employed for the study to estimate the effect of legal BAC thresholds on DUI recidivism, ensuring the selection of an optimal bandwidth that balances bias and variance, thereby enhancing the precision and reliability of the findings.

## Methodology

The original study utilized a regression discontinuity design to estimate the impact of BAC thresholds on the probability of recidivism. Our empirical analysis attempts to recreate and/or improve the findings of the paper using a Cross-Validation approach.

## Findings

This analysis indicates that exceeding BAC thresholds has a negative effect on recidivism, with a stronger deterrent impact observed at the 0.08 BAC level compared to the 0.15 level.

Table: RDD Estimates for the Effect of Exceeding the 0.08 BAC Threshold on Recidivism

Independent Variable	Coefficient	Standard Error	P-value
Constant	5.4709	0.826	0.000
DUI	-0.0236	0.004	0.000
Observations	90074		
R-squared	0.004		
bandwidth	0.05		

Table: RDD Estimates for the Effect of Exceeding the 0.15 BAC Threshold on Recidivism

Independent Variable	Coefficient	Standard Error	P-value
Constant	5.5586	0.680	0.000
DUI	-0.0065	0.003	0.050
Observations	90074		
R-squared	0.003		
bandwidth	0.05		

Table: RDD Estimates for the Effect of Exceeding the 0.08 BAC Threshold on Recidivism

Independent Variable	Coefficient	Standard Error	P-value
Constant	6.0302	1.093	0.000
DUI	-0.0158	0.006	0.005
Observations	90074		
R-squared	0.005		

## Discussion

Optimizing bandwidth to 0.027 for the 0.08 BAC threshold yielded a reduced DUI effect on recidivism from -0.0236 to -0.0158 with a slight increase in model accuracy. For the 0.15 BAC threshold, adjusting the bandwidth to 0.069 also decreased the DUI effect from -0.0065 to -0.0054, reflecting a more conservative and potentially more accurate estimate.

## Conclusions

Our contribution demonstrates the effectiveness of using machine learning cross-validation to refine bandwidth selection in regression discontinuity designs, providing precise estimates of the deterrent effects of legal BAC thresholds on DUI recidivism.

## Literature Review, References, and Appendix

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