

Party foul? Effects of the Minimum Legal Drinking Age on Late Adolescent Crime in New Zealand

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Disclaimer

The results in this paper are not official statistics, they have been created for research purposes from the Integrated Data Infrastructure (IDI) managed by Statistics New Zealand. The opinions, findings, recommendations and conclusions expressed in this paper are those of the author(s) not Statistics NZ.

Access to the anonymised data used in this study was provided by Statistics NZ in accordance with security and confidentiality provisions of the Statistics Act 1975. Only people authorised by the Statistics Act 1975 are allowed to see data about a particular person, household, business or organisation and the results in this [report, paper] have been confidentialised to protect these groups from identification.

Careful consideration has been given to the privacy, security and confidentiality issues associated with using administrative and survey data in the IDI. Further detail can be found in the Privacy impact assessment for the Integrated Data Infrastructure available from www.stats.govt.nz.

The results are based in part on tax data supplied by Inland Revenue to Statistics NZ under the Tax Administration Act 1994. This tax data must be used only for statistical purposes, and no individual information may be published or disclosed in any other form, or provided to Inland Revenue for administrative or regulatory purposes.

Any person who has had access to the unit-record data has certified that they have been shown, have read, and have understood section 81 of the Tax Administration Act 1994, which relates to secrecy. Any discussion of data limitations or weaknesses is in the context of using the IDI for statistical purposes, and is not related to the data's ability to support Inland Revenue's core operational requirements.

Motivation

- Minimum legal drinking ages (MLDAs) are front-line policies to protect young persons from the harms associated with alcohol
- Alcohol abuse in late adolescence (16-20):
 - possible neurologic damage and social impairment, putting individuals at risk for mental health, substance abuse, and social problems in adulthood (Brown *et al.*, 2007; Petit *et al.*, 2014).
 - Binge drinking common among late adolescents and is associated with poor school performance and health risk behaviors including riding with an intoxicated driver, risky sexual activity, being a victim of intimate partner violence, attempting suicide, and using illicit drugs (Miller *et al.*, 2007).

Motivation

- In addition to protecting from physical harm, MLDA's may also deter criminal behavior
 - Late adolescents who drink heavily condemn criminal behavior less, have relaxed perceptions of the risk of getting caught, and are more likely to resort to violence during a confrontation (Lanza-Kaduce, Bishop, and Winner, 1997; WHO, 2012).
 - Individuals aged 18-24 who report getting drunk at least once a week:
 - five times as likely to have been involved in a fight or a violent crime in the past year.
 - seven times as likely to have damaged property during a drinking episode in the previous year (Richardson and Budd, 2006).

Motivation

- In NZ, approximately one-third of police apprehensions involve alcohol (NZ Police, 2010)
- Harmful alcohol use is estimated to cost NZ nearly \$6.4 billion annually (Berl, 2009)
- We examine how late adolescents in NZ react to legal access to alcohol at age 18, including whether it has a meaningful impact on crime

Research Questions

- Do NZ youth respond to the legal availability of alcohol by drinking more?
- Does the MLDA affect alcohol-related crime—or crime in general?
- Previous research in high-crime countries finds that MLDAs may be used to significantly decrease crime. Does this result hold for low-crime countries, such as NZ?

Preview of Findings

- NZ youth respond to legal access to alcohol by drinking more, binging more, and committing more alcohol-related offenses
- Those just above the MLDA:
 - commit more public order offences, property damage crimes, traffic crimes, and weapons crimes
 - commit fewer burglary/unlawful entry crimes, drug crimes, and violence and sexual assault crimes
 - Policies that restrict access to alcohol may be an effective way to reduce crime, even in countries where crime is low to begin with

Literature

- BRIEF overview of select MLDA papers:
 - Using regression discontinuity (RD) in the U.S. and Australia
 - In U.S., MLDA increases alcohol consumption, decreases marijuana use, and increases mortality via motor vehicle accidents, alcohol-related deaths, and suicide (Carpenter and Dobkin, 2009; Yörük and Yörük, 2011).
 - Australians increase any drinking and frequency of drinking in previous 30 days due to the MLDA (Thomason, 2014)
 - Lowering NZ's MLDA from 20 to 18 in 1999 did not change drinking behavior for young adolescents. Some evidence of increased alcohol-related hospitalizations (Stillman and Boes, 2013, 2017).

Literature

- BRIEF overview of select MLDA papers:
 - The effect of the MLDA on crime in California and Queensland
 - California: increases arrest rates by 6%, due mostly to assaults, alcohol-related offenses, and nuisance crimes (Carpenter and Dobkin, 2015)
 - Queensland: increases in acts intended to cause injury, public order offenses, traffic offenses, and offenses against justice procedures. Also, lowers rates of burglary/unlawful entry (Thomason, 2014).

Literature

- Contribution to literature:
 - First look (anywhere) at causal effects of the MLDA on crime using a full census of police-investigated offenses and court charges for an entire country
 - First look at MLDA effects on crime in a relatively low-crime country
 - Previous findings, mainly from U.S. studies, may not be valid in countries with much lower crime rates (esp. violent crime rates)
 - Our results inform whether alcohol and drug use are substitutes or complements for young New Zealanders

Data

- New Zealand Health Survey (NZHS)
 - to examine whether late adolescents in NZ increase their drinking when they become able to legally purchase and consumer alcohol
- Survey waves from 2010 to 2017
- Respondents answer several questions related to intensity/frequency of drinking, as well as alcohol-related injuries and problem drinking
- We restrict the sample to 3,261 respondents between ages 16-19.

Table 1. Descriptive statistics, youth drinking behaviour, Ages 16-19, 2010 - 2017

	variable
log of monthly alcohol consumption	1.817 (1.426)
any drinking in the past year	.814
binge drinking in previous year	.518
needed a drink in the morning to get going after a night of drinking	.016
blacked out due to heavy drinking in the previous year	.144
ever injured yourself or others due to your drinking	.182
AUDIT: low-risk drinker	.702
AUDIT: hazardous/harmful drinker	.153
AUDIT high-risk drinker	.145
observations	3,261

Source: New Zealand Health Survey, Ministry of Health. Standard errors are in parentheses.

Data

- NZ Police offense data and MOJ court charges data from 2010 to 2017
- Crime rates are calculated per 100,000 person-months by dividing the total number of offenses committed by persons at a particular age (in months) by an estimate of the total number of persons that age living in NZ at that time
 - Denominator derived using Department of Internal Affairs (DIA) births/deaths records
 - Sample limited to 16-22 year-olds
 - For details on Australia and New Zealand Standard Offence Classification (ANZSOC) categories click [here](#)

Table 3. Descriptive statistics, New Zealand crime rates, 2010 - 2017

	offenses	court charges
total alcohol-related	138.6 (133.6)	109.0 (114.1)
against justice	49.2 (53.0)	111.2 (116.8)
burglary, unlawful entry	34.5 (42.5)	25.4 (36.6)
dangerous acts	82.7 (66.6)	60.1 (62.2)
drugs	55.6 (54.3)	22.6 (38.1)
fraud, deception	10.7 (21.7)	8.7 (21.3)
property damage	64.7 (59.2)	37.6 (46.5)
public order	182.8 (146.4)	52.2 (79.7)
theft	98.5 (77.9)	58.6 (61.2)
traffic	163.9 (118.4)	167.3 (133.0)
weapons	20.9 (31.0)	12.5 (24.2)
violence and sex	108.4 (76.5)	58.8 (59.1)
observations		7,008

Empirical Model

- (Sharp) regression discontinuity (RD)
 - The running variable is age in months (centered so age at 18 equals zero)
- Models estimated by local linear regression using the triangular kernel
 - No quadratics (or higher) to avoid polynomial smoothing bias (Cattaneo, Titiunik, and Vasquez-Bare, 2017; Imbens and Gelman, 2017)
 - The triangular kernel function is used as it is shown to be optimal for estimating conditional means at boundary points (Fan and Gijbels, 1996)

Empirical Model

- Data-driven bandwidths following Calonico, Cattaneo, and Titiunik (2014) determine the local window of regressions
 - Bandwidth are solved for by minimizing the integrated mean squared error of the regression
 - These have superior statistical properties compared to arbitrarily fixing bandwidths
- Under certain conditions, RD offers a causal interpretation
 - There can be no self-selection around the cutoff; there can be no other discontinuities in outcomes nearby; there can be no other treatments occurring simultaneously

Empirical Model

- Alcohol use models:

$$y_{it} = \alpha_0 + \alpha_1 above_{it} + \alpha_2 age_{it} * below_{it} + \alpha_3 age_{it} * above_{it} + \mathbf{X}\boldsymbol{\theta} + \delta_t + v_i$$

where $above_i = 1[age_i \geq 18]$; $below_i = 1[age_i < 18]$

- \mathbf{X} is a vector of controls including gender, ethnicity, neighbourhood deprivation, and household income
- Standard errors are clustered on the running variable (Lee and Card, 2008)
- Includes cohort fixed effects

Empirical Model

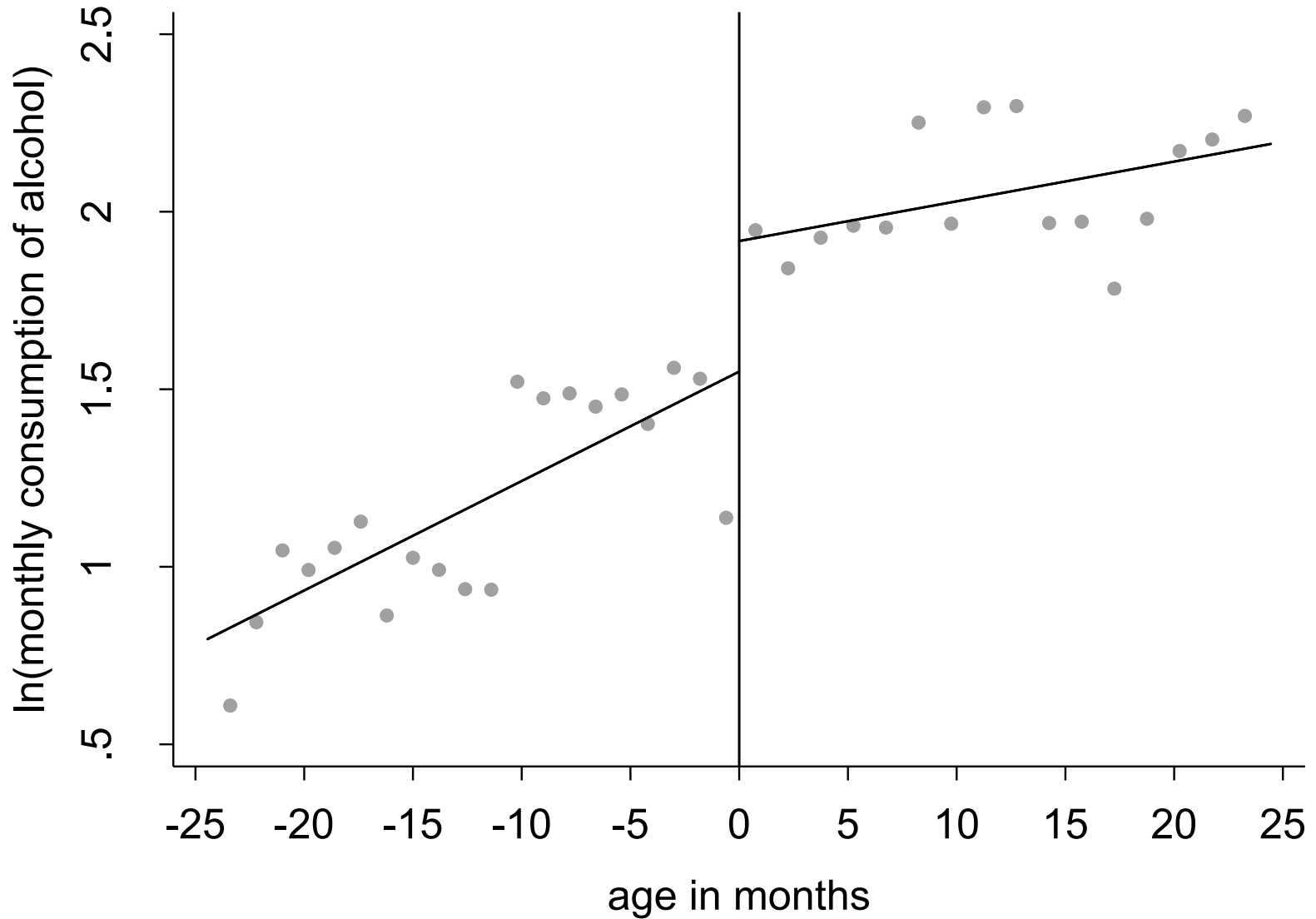
- Crime models:

$$rate_{cta} = \beta_0 + \beta_1 above_{cta} + \beta_2 age_{cta} * below_{cta} + \beta_3 age_{cta} * above_{cta} + \mathbf{W}\boldsymbol{\Gamma} + \delta_t + \delta_a + \varepsilon_{ct}$$

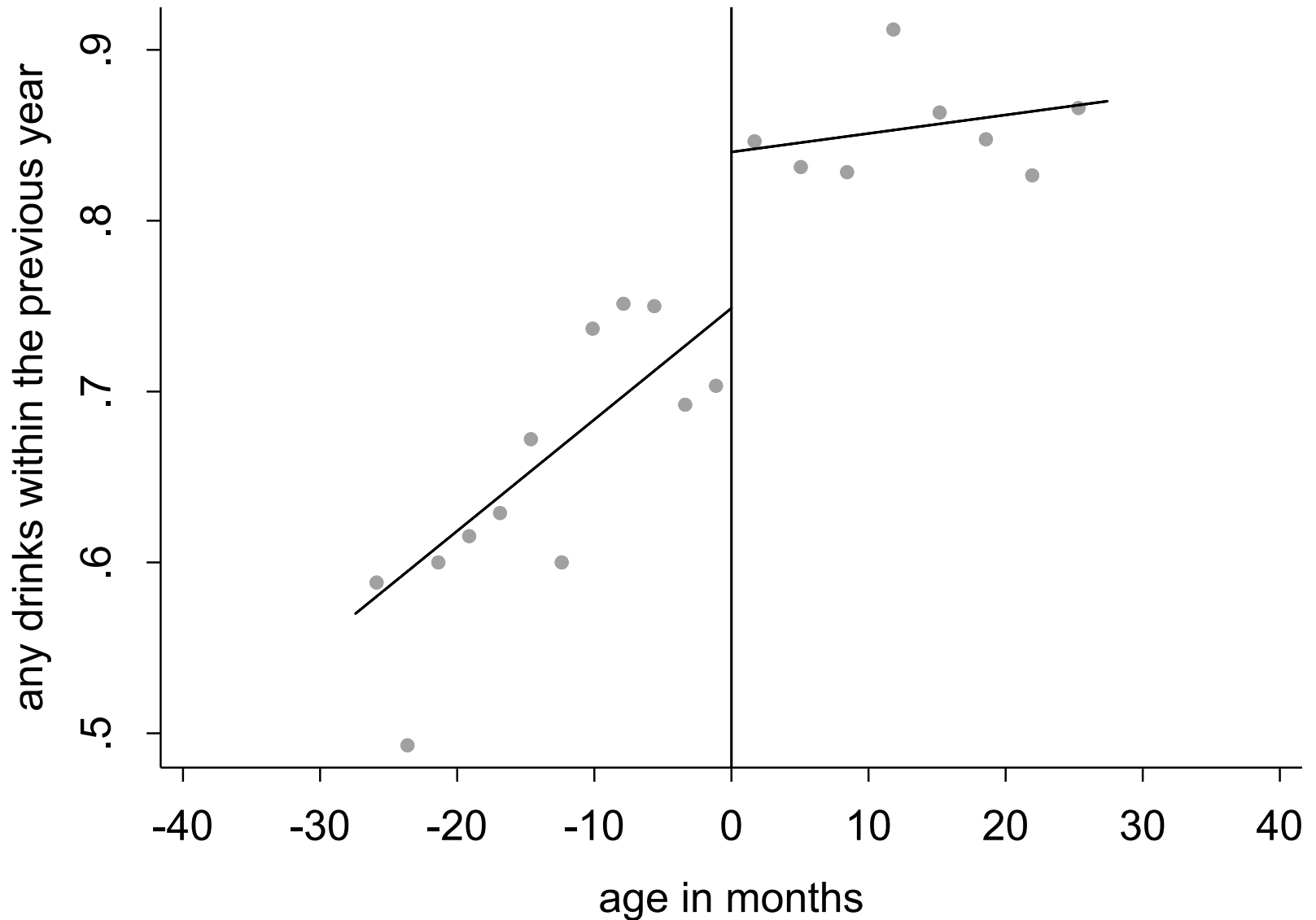
where $above_i = 1[age_i \geq 18]$; $below_i = 1[age_i < 18]$

- \mathbf{W} is a vector of controls including proportion of cohort male, cohort ethnicity proportions, and cohort parental educational attainment proportions
- Includes year and territorial authority fixed effects

Graphical Results (Alcohol Consumption)



Graphical Results (Any Drinking)



Graphical Results (Binge Drinking)

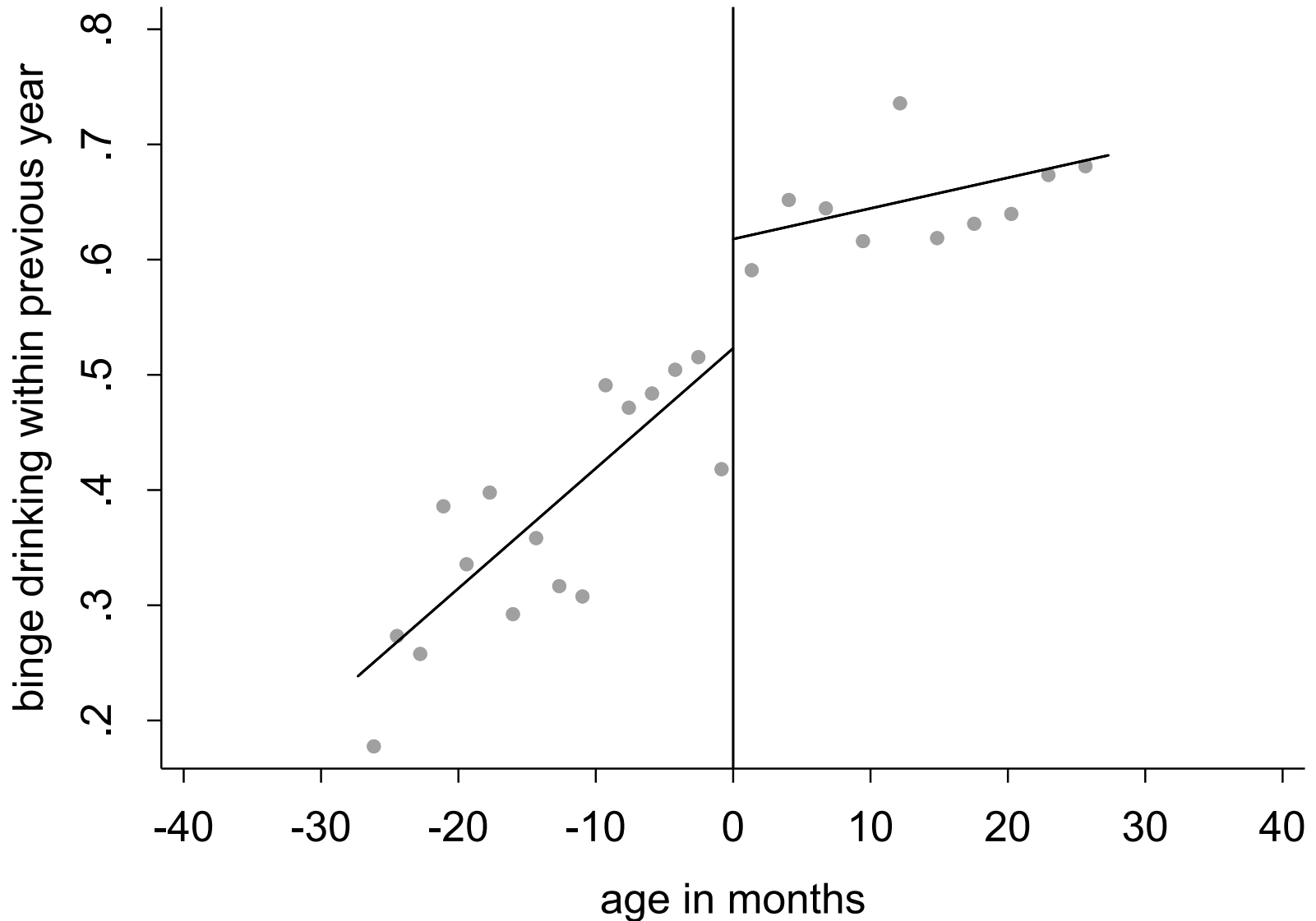
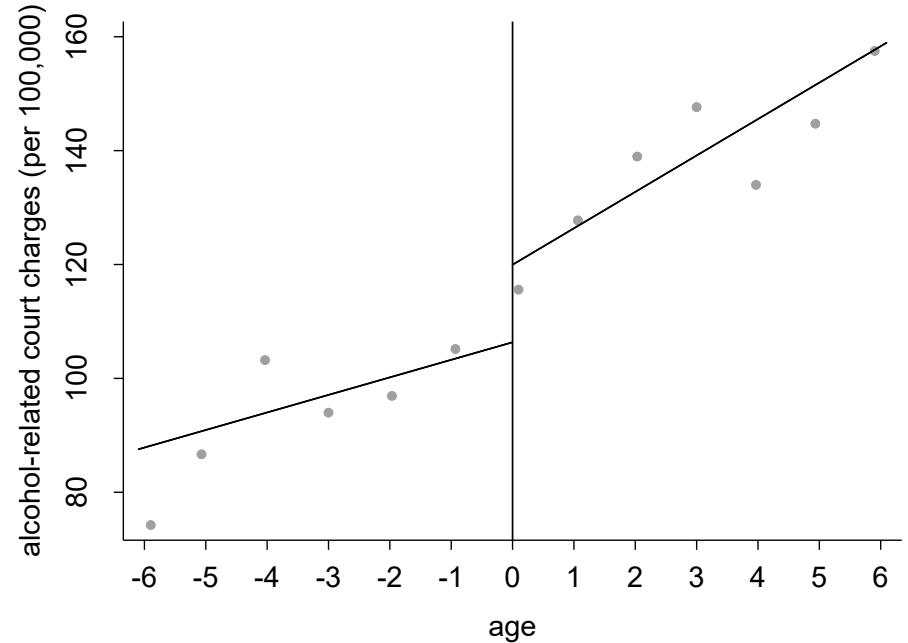
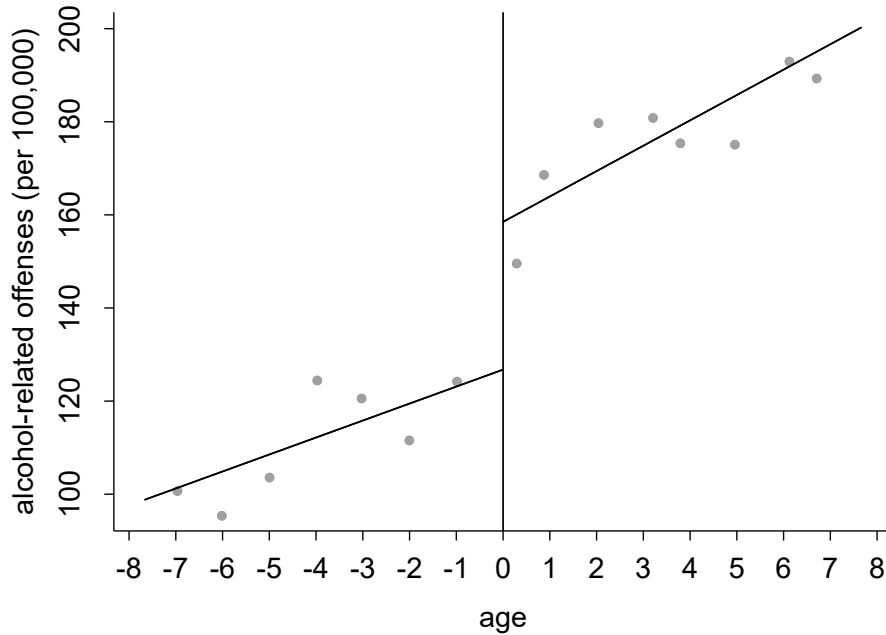


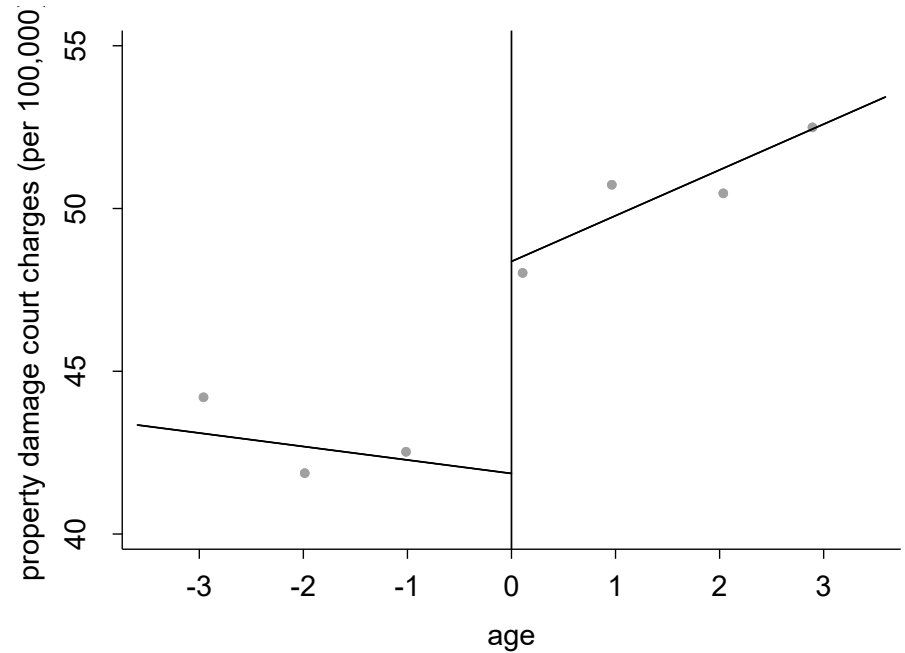
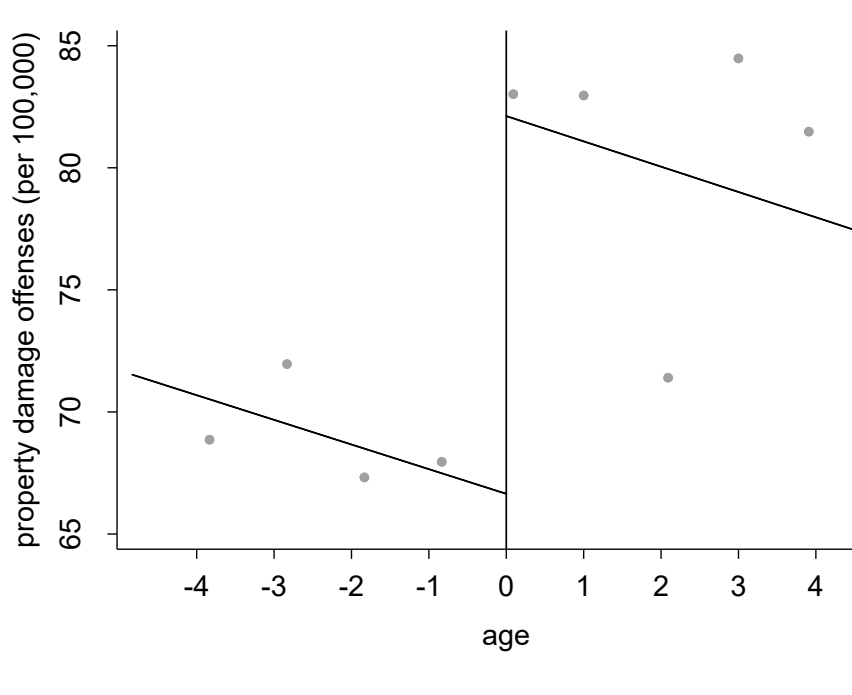
Table 3. Regression discontinuity estimates of the NZ MLDA on youth drinking behavior, 2010-2017

	birthday month included	birthday month removed
log of monthly alcohol consumption <i>percent change</i>	.388*** (.130) 38.8	.402*** (.143) 40.2
any drinking in the past year <i>percent change</i>	.118*** (.028) 14.5	.114*** (.032) 14.0
binge drinking in the past year <i>percent change</i>	.106*** (.035) 20.5	.114*** (.039) 22.0
felt you needed a drink in the morning to get going after a night of drinking in the past year <i>percent change</i>	.045*** (.017) 281.3	.047** (.023) 293.8
blacked out due to heavy drinking in the previous year <i>percent change</i>	.083 (.073) 57.6	.091 (.085) 63.2
ever injured yourself or others due to your drinking <i>percent change</i>	.014 (.024) 7.7	.010 (.033) 5.5
AUDIT: low-risk drinker <i>percent change</i>	-.012 (.028) -1.7	-.001 (.036) -0.1
AUDIT: hazardous/harmful drinker <i>percent change</i>	-.045** (.021) -29.4	-.053** (.023) -34.6
AUDIT high-risk drinker <i>percent change</i>	.067*** (.024) 46.2	.065** (.030) 44.8

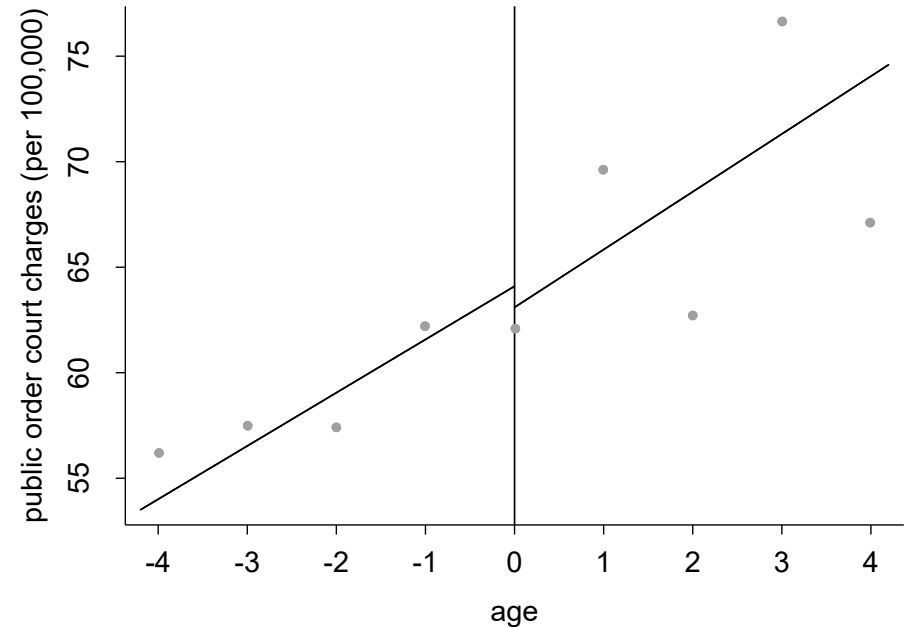
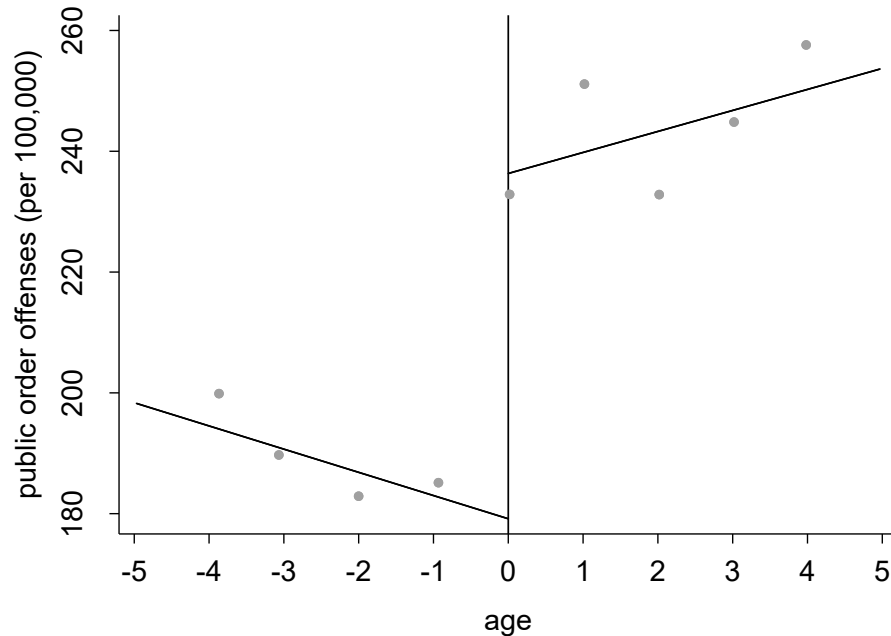
Graphical Results (Alcohol-Related)



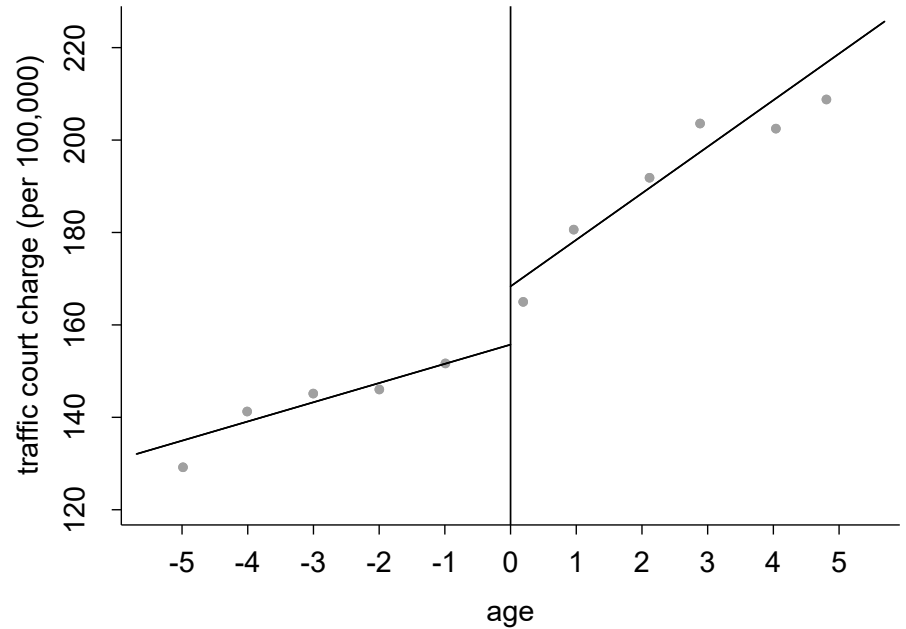
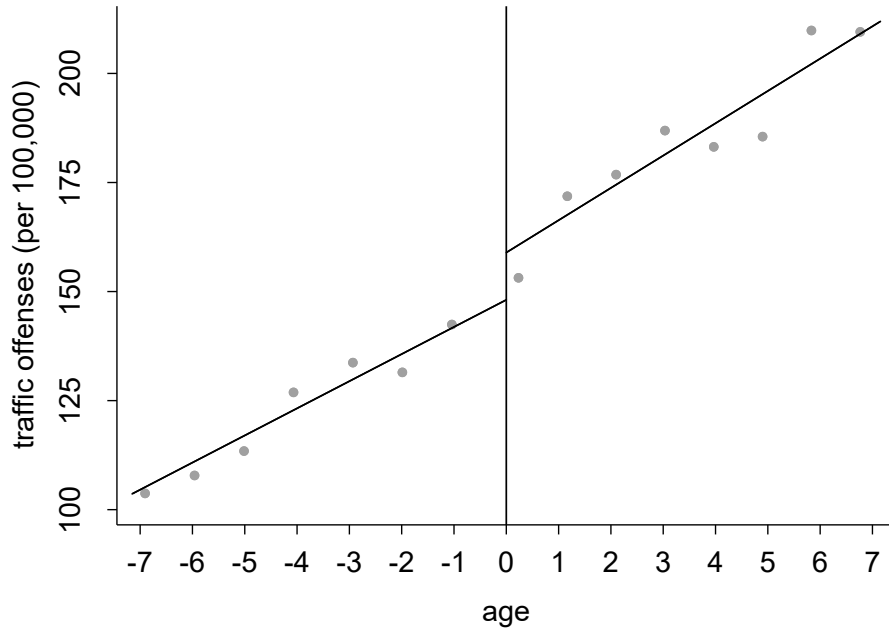
Graphical Results (Property Damage)



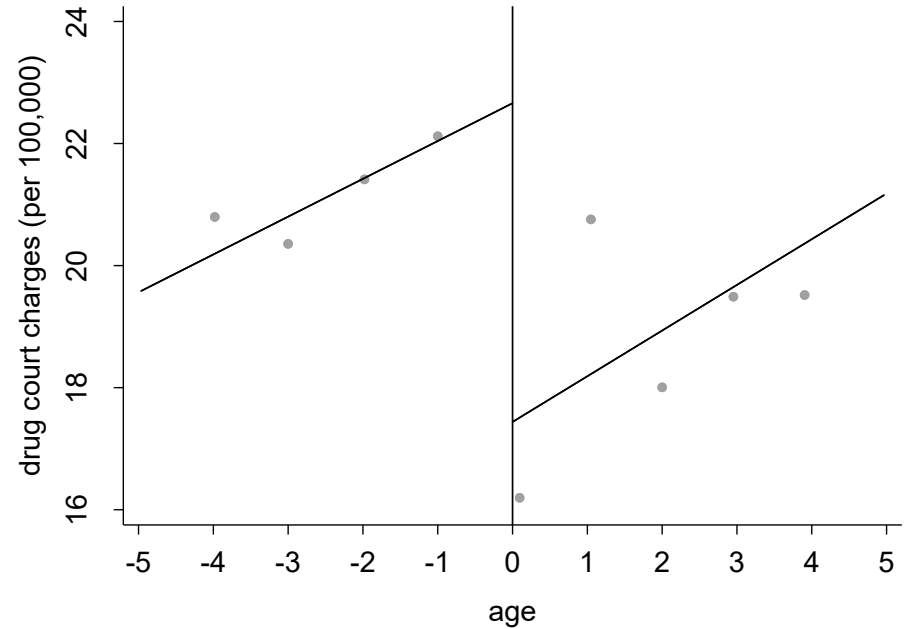
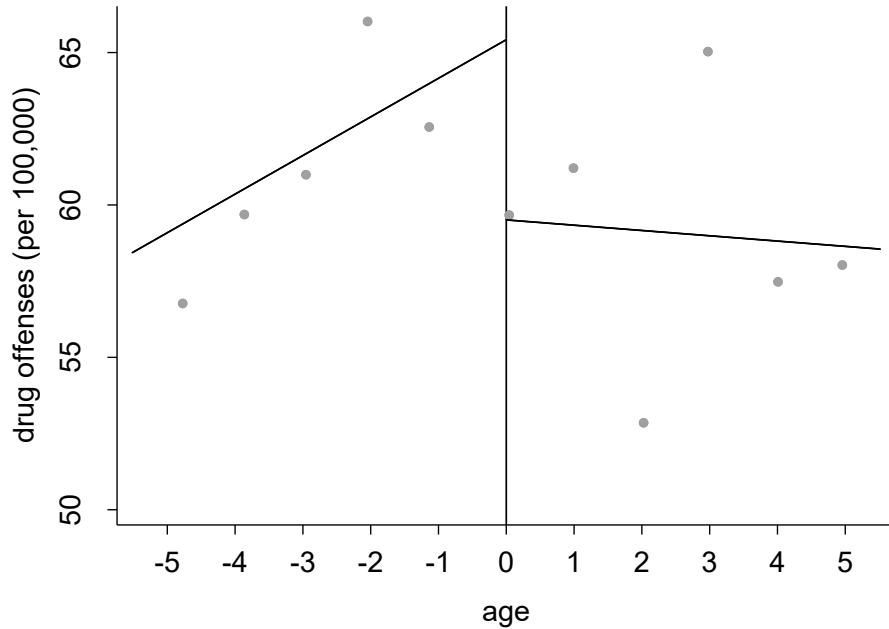
Graphical Results (Public Order)



Graphical Results (Traffic)



Graphical Results (Drugs)



Graphical Results (Dangerous Acts)

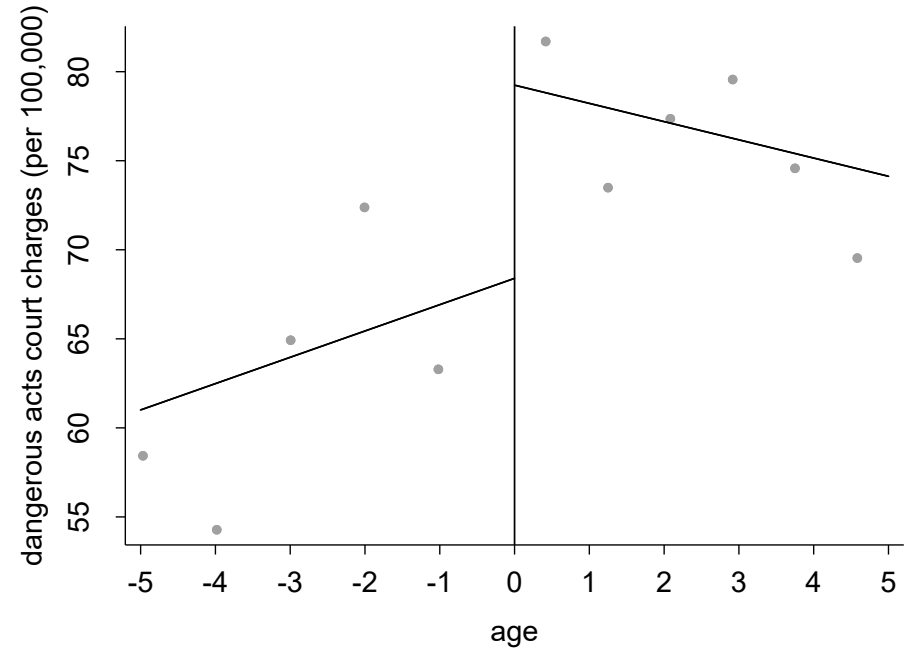
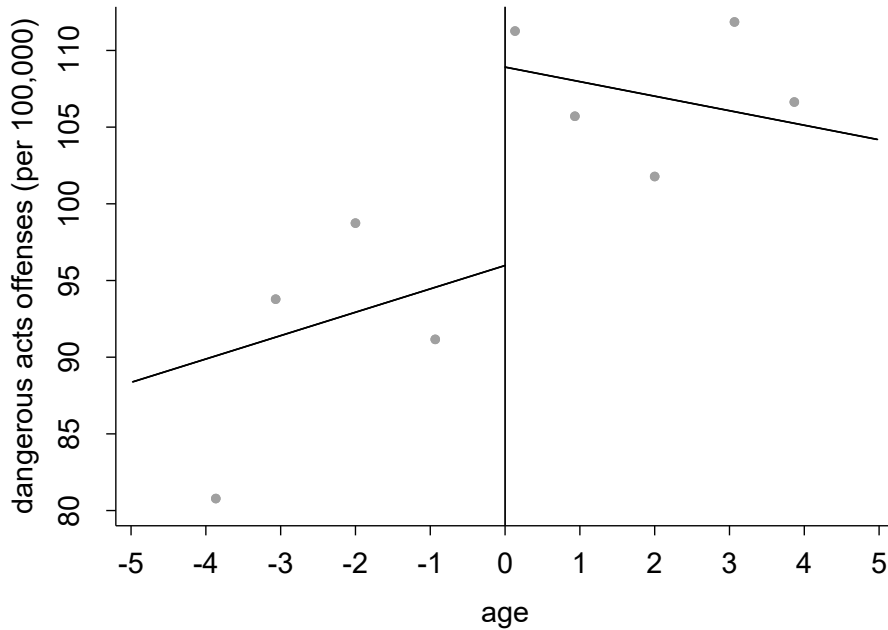


Table 4. Regression discontinuity results of the NZ MLDA on crime, 2010-2017

	offenses	court charges
total alcohol-related	31.48*** (7.47)	13.28*** (5.09)
<i>percent change</i>	22.82	12.18
against justice	8.40*** (1.56)	2.27 (5.76)
<i>percent change</i>	17.1	2.04
burglary, unlawful entry	-14.59*** (3.86)	-15.24*** (2.29)
<i>percent change</i>	-42.27	-60.10
dangerous acts	13.02* (7.41)	10.70 (8.04)
<i>percent change</i>	15.74	17.79
drugs	-4.85* (2.94)	-5.84*** (1.87)
<i>percent change</i>	-8.72	-67.36
fraud, deception	.23 (1.28)	2.18 (1.62)
<i>percent change</i>	2.20	25.14

Table 4. Regression discontinuity results of the NZ MLDA on crime, 2010-2017 (continued)

	offenses	court charges
property damage	14.95*** (2.28)	4.83*** (1.46)
<i>percent change</i>	23.10	12.86
public order	60.06*** (7.95)	1.85 (2.58)
<i>percent change</i>	32.85	3.54
theft	-11.19* (5.98)	-6.25 (7.42)
<i>percent change</i>	-11.36	-10.67
traffic	9.28** (4.52)	12.83*** (3.02)
<i>percent change</i>	5.66	7.67
weapons	8.78*** (3.30)	5.08*** (1.15)
<i>percent change</i>	42.1	40.67
violence and sex	-5.62 (4.16)	-15.09*** (2.18)
<i>percent change</i>	-5.18	-25.68

Results

- Crossing the MLDA causes late adolescents in NZ to drink more, binge drink more, and increase their risk for alcoholism according to AUDIT scores
- After gaining legal access to alcohol, late adolescents commit:
 - more more alcohol-related crimes, property crimes, public order offenses, traffic crimes
 - fewer burglaries, drug offenses, and are found guilty of fewer sexual and violent crimes

Conclusions

- MLDA matters
 - Even for countries with relatively low crime rates, such as NZ, where the MLDA is set has a direct effect on alcohol use and criminal behavior for late adolescents
- Estimating models of court charges using data before the MLDA change in 1999 will be informative of whether a higher MLDA changes how late adolescents react to the legal purchase and consumption of alcohol

Future Work

- Re-evaluate the effect of the 1999 law change using a difference-in-discontinuities
 - This will remove any potential confounding effects of becoming a legal adult in NZ (at age 18)
- Push on results
 - Test external validity of RD LATE using recently developed methods (Dong and Lewbel, 2015; Bertanha and Imbens, 2019)
 - May allow us to extrapolate MLDA effects to other parts of the age distribution

Thank You

- Thank you for your time
- Questions?
- Contact the author at:
 - christopher.erwin@aut.ac.nz