

A Policy Evaluation of Home Detention Sentencing: Evidence from 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 NZ.

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. The results in this 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.

Research Question: Did the 2007 expansion of New Zealand's home detention sentence reduce the recidivism rate for convicted offenders?

Result: No statistically significant evidence that a home detention sentence reduces reoffending propensities for offenders at the margin of home detention eligibility.

Outline

- Literature
- The 2007 reform
- Data
- Identification strategy
- Empirical results and robustness tests
- Conclusion

Literature I

- Becker's (1968) neoclassical model of crime:

$$EU_i = P_i U_i(Y_i - f_i) + (1 - P_i) U_i(Y_i)$$

- The present study considers the responsiveness of crime to changes in the severity of criminal sanctions (f_i).
 - Ehrlich (1975) reports significant negative elasticities for the relationship between murder rates and the probability of execution by capital punishment in the United States (*AER*).
 - Abrams (2012) demonstrated that sentence enhancements for gun-related crime in the United States resulted in a 5 percent reduction in gun robberies within the first three years (*AEJ: Applied Economics*).
 - Using Italian data, Drago *et al.* (2009) found that as an offender's expected sentence length increases by one month, the propensity to recommit a crime decreases by 1.25 percent (*JPE*).

Literature II

Ministry of Justice (2011) evaluated the 2007 home detention reform.

- Calculated the difference in average recidivism rates for offenders on home detention and offenders in short-term imprisonment:

$$Effect = E(Y_i(1) | D_i = 1) - E(Y_i(0) | D_i = 0)$$

- Recidivism was compared from the date of sentencing for home detention offenders and the date of release for imprisoned offenders. Offenders on home detention had a recidivism rate 28.8 percentage points less than imprisoned offenders.
- Not only does this cover two different time periods, the report discusses how the composition of these groups largely differ across gender, age and ethnicity.

I contribute to the deterrence literature and the Ministry's report by identifying a credible comparison group to recover an econometrically-robust causal estimate for the effect of home detention on recidivism in New Zealand.

New Zealand's 2007 sentencing reform

Two offenders with identical characteristics and identical circumstances commit the same crime.



Offender 1

Sentenced **before** 1 October 2007:

- **24-month** imprisonment sentence
- **loses their job**
- **surrounded by inmates**
- gets a criminal record
- costs the taxpayer \$249 per day



Offender 2

Sentenced **after** 1 October 2007:

- **12-month** home detention sentence
- can **keep their job**
- **surrounded by family**
- gets a criminal record
- costs the taxpayer \$58 per day

Data

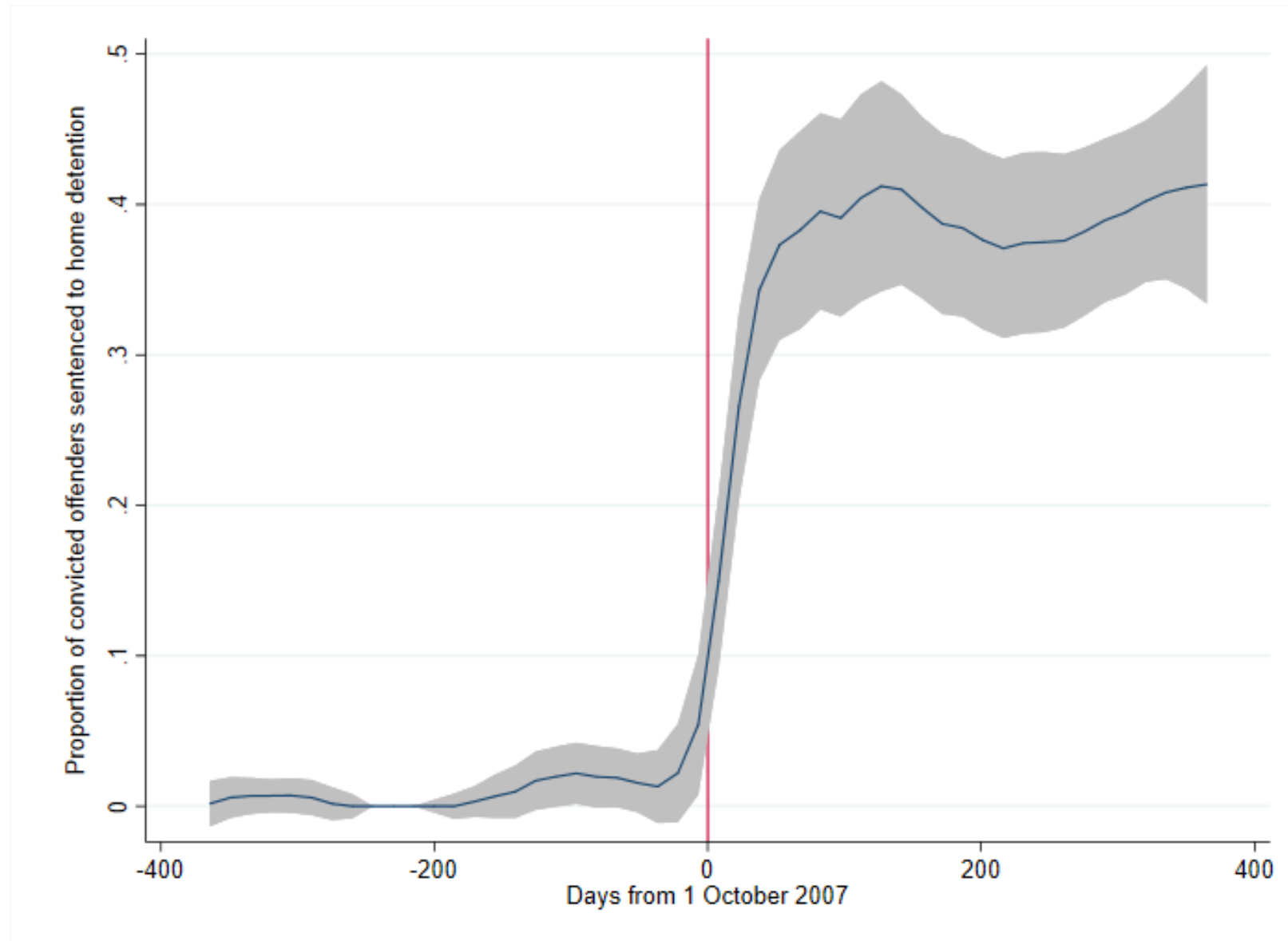
Population-wide linked administrative data from Statistics New Zealand's Integrated Data Infrastructure.

- Recidivism
 - *Ministry of Justice Court Charges Data*
 - Considered in one, two and five year periods, measured from the start of an offender's initial sentence.
- Labour market outcomes
 - *Inland Revenue Tax Data*
 - Average employment rates, average wages and salaries and benefit receipt.

Population of interest

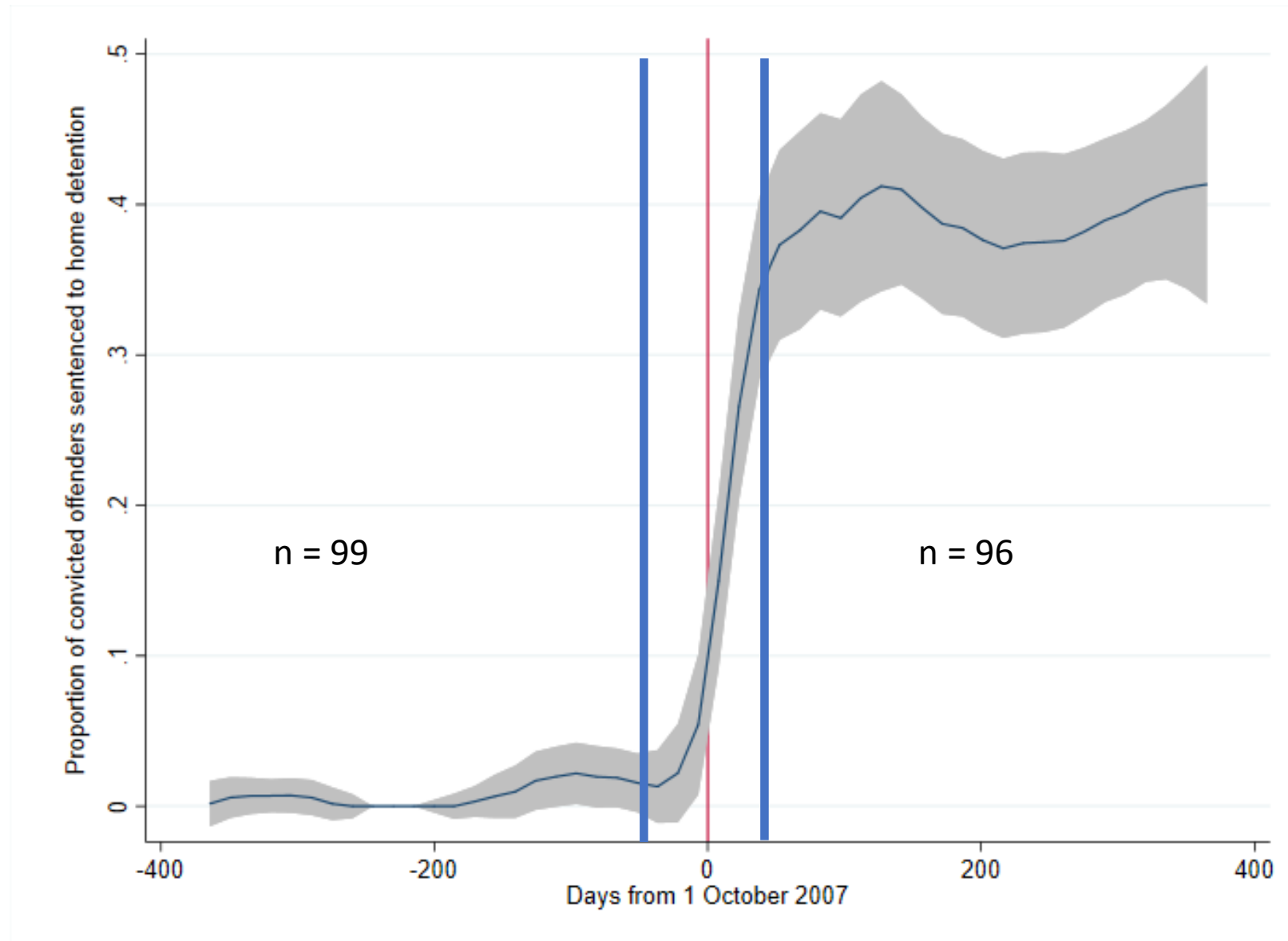
1. Convicted offenders;
2. Observed at their earliest sentencing date;
3. For their most serious sentence received at this time;
4. If the sentence was short-term imprisonment, home detention, community detention or intensive supervision.

Figure 1. Proportion of convicted offenders sentenced to home detention by sentencing date



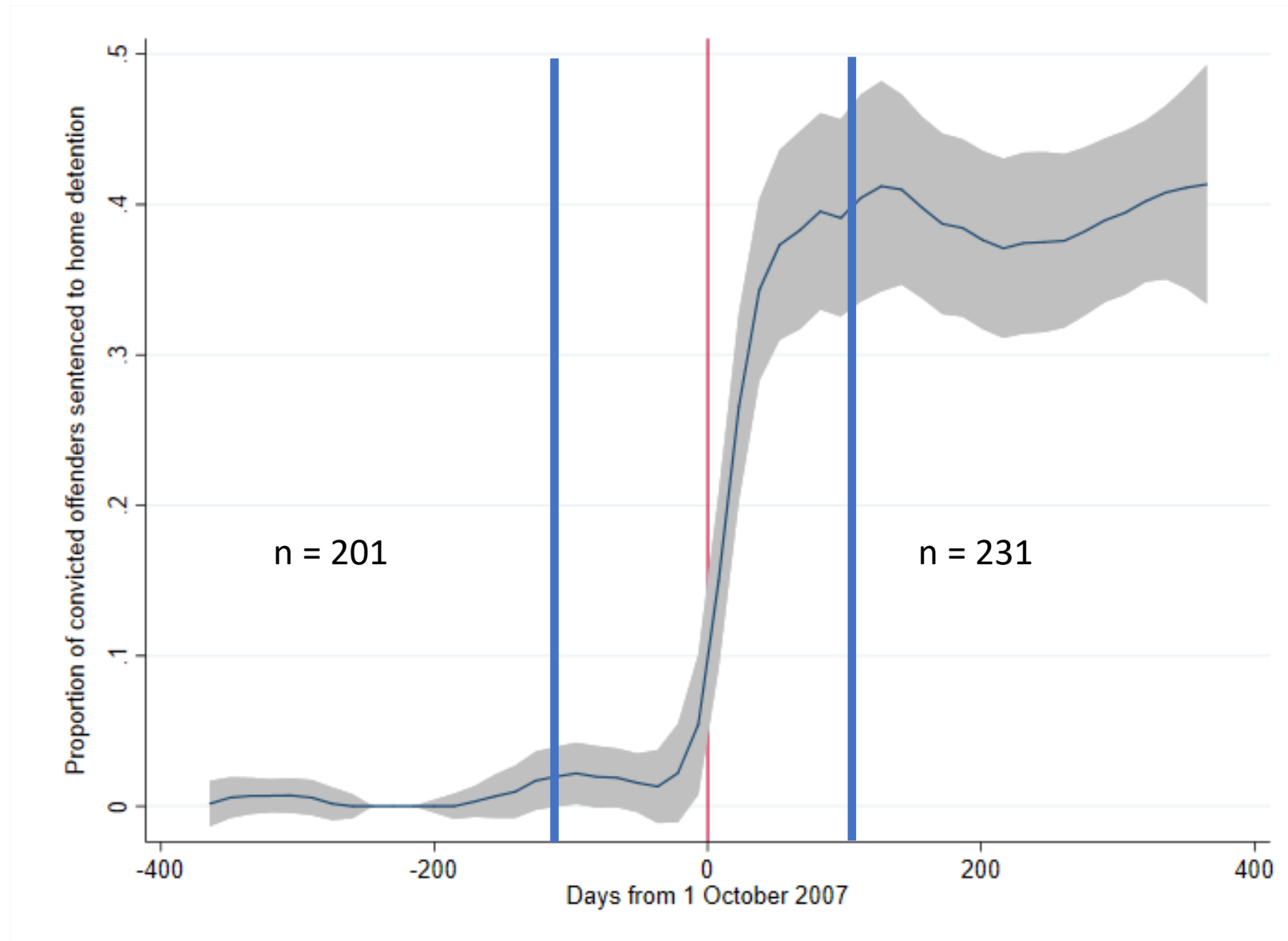
Source: Own calculations based on data in Statistics New Zealand's IDI.

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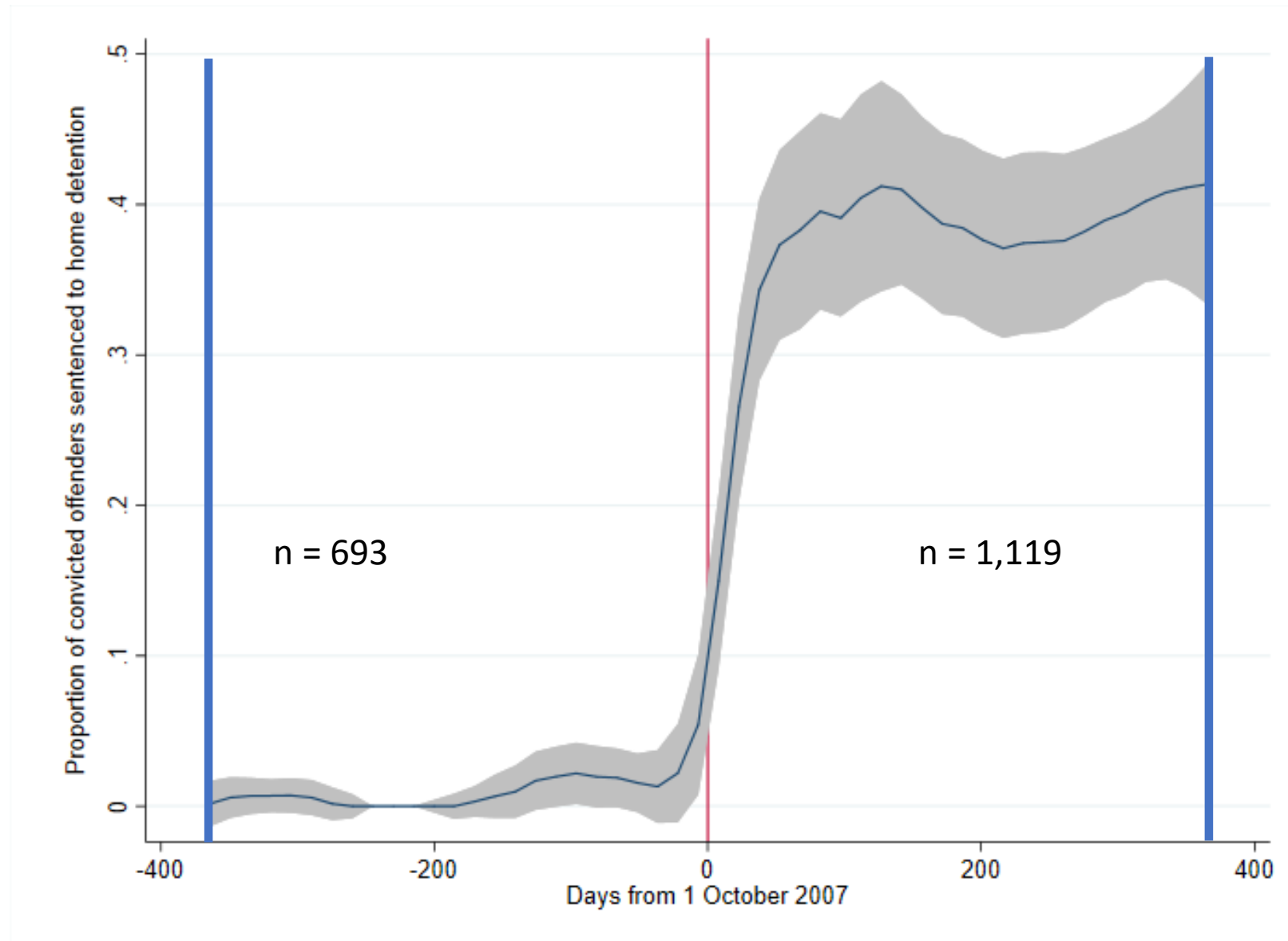
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Identification Strategy

The causal effect of interest is a local average treatment effect (LATE)

$$LATE = E(Y|Z_0^+) - E(Y|Z_0^-)$$

- The LATE represents the average treatment effect for the individuals at the margin of home detention eligibility.
- If the observable and unobservable characteristics of individuals marginally above (Z_0^+) and marginally below (Z_0^-) the 1 October 2007 cut-off are not statistically significantly different from each other, **treatment assignment is as-if random.**
- Covariate continuity is established with mean-difference t-tests.

Covariate balance for sampled offenders sentenced 365 days before and after 1 October 2007

	<i>Control group</i>		<i>Treatment group</i>		<i>t-stat</i>
	<i>N</i>	<i>Mean (SD)</i>	<i>N</i>	<i>Mean (SD)</i>	
<i>Demographic</i>					
Male	684	0.75 (0.43)	1,104	0.73 (0.44)	0.91
Age	669	29.9 (12.7)	1,104	29.0 (12.7)	1.46
European	687	0.58 (0.49)	1,116	0.56 (0.50)	1.24
Māori	687	0.26 (0.44)	1,116	0.26 (0.44)	0.09
Pacific Peoples	687	0.10 (0.29)	1,116	0.11 (0.31)	-0.83
Asian	687	0.04 (0.18)	1,116	0.04 (0.20)	-0.84
MEELA	687	0.02 (0.14)	1,116	0.03 (0.17)	-1.49
<i>Crime</i>					
Category 1	693	0.28 (0.45)	1,119	0.28 (0.45)	0.35
Category 2	693	0.04 (0.19)	1,119	0.06 (0.23)	-1.64
Category 3	693	0.18 (0.38)	1,119	0.19 (0.40)	-0.98
Category 4	693	0.32 (0.47)	1,119	0.30 (0.46)	0.77
Category 5	693	0.16 (0.37)	1,119	0.15 (0.36)	0.38
Category 6	693	0.02 (0.14)	1,119	0.02 (0.13)	0.65
<i>Education</i>					
Low decile	222	0.47 (0.50)	381	0.43 (0.50)	0.97
Medium decile	222	0.35 (0.48)	381	0.42 (0.49)	-1.56
High decile	222	0.18 (0.39)	381	0.16 (0.37)	0.75
<i>Earnings</i>					
Gross 2006 WS	693	51,066 (161,004)	1,119	62,598 (258,002)	-1.06
Gross 2005 WS	693	54,724 (169,087)	1,119	55,338 (241,006)	-0.06

Notes: WS are earnings from wages and salaries. BEN are earnings from benefit receipt. Gross WS year mix observes wages and salaries earnings from 2006 for the treatment group and 2005 for the control group. All earnings variables are measured in NZD. Standard deviations are in parenthesis. Equality of means are tested by the t-stat where statistically significant differences are indicated with ** if $p < 0.01$ and * if $p < 0.05$.

Source: Own calculations based on data in Statistics New Zealand's IDI.

A common technique to estimate the LATE is a **fuzzy regression discontinuity design (FRD)** where:

$$\tau_{\text{FRD}} = \widehat{\text{Wald}} = \frac{E(Y|Z = 1) - E(Y|Z = 0)}{E(D|Z = 1) - E(D|Z = 0)} = \frac{\text{Reduced Form}}{\text{First Stage}}$$

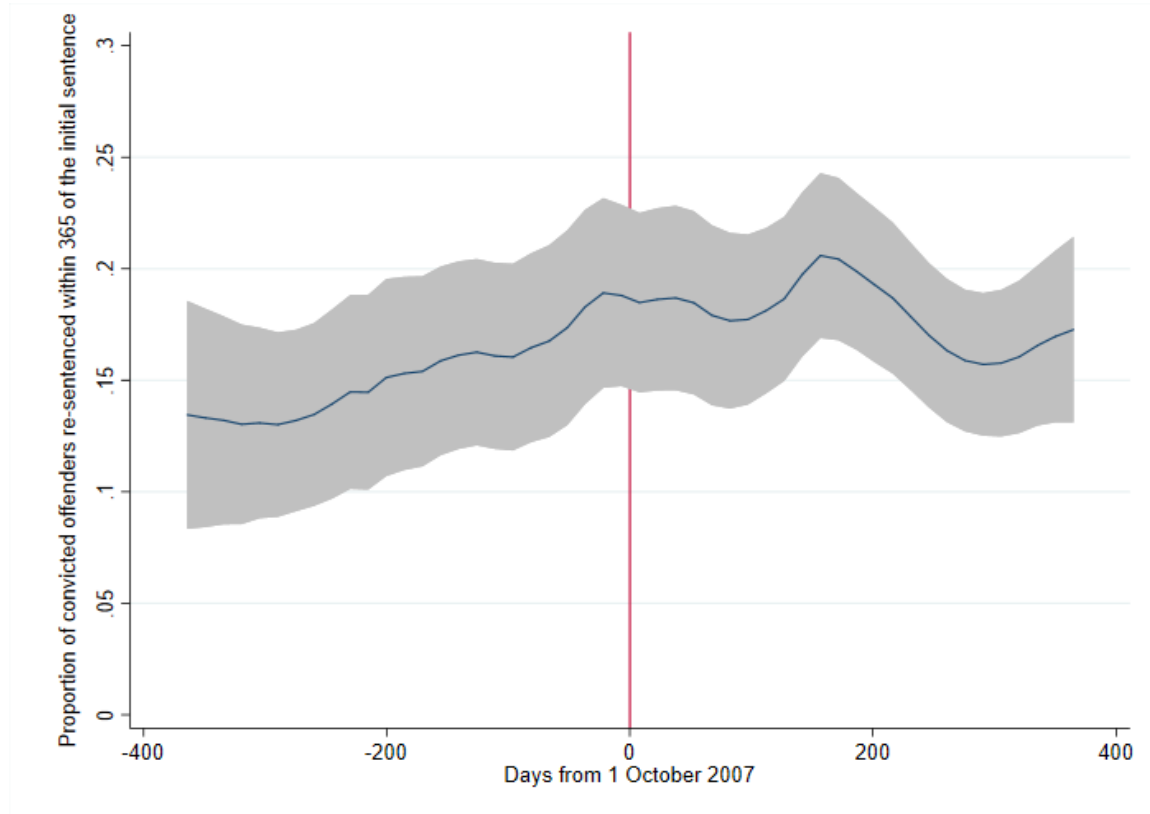


Figure 2. Proportion of convicted offenders that were reconvicted within 365 days of starting their sentence

Source: Own calculations based on data in Statistics New Zealand's IDI.

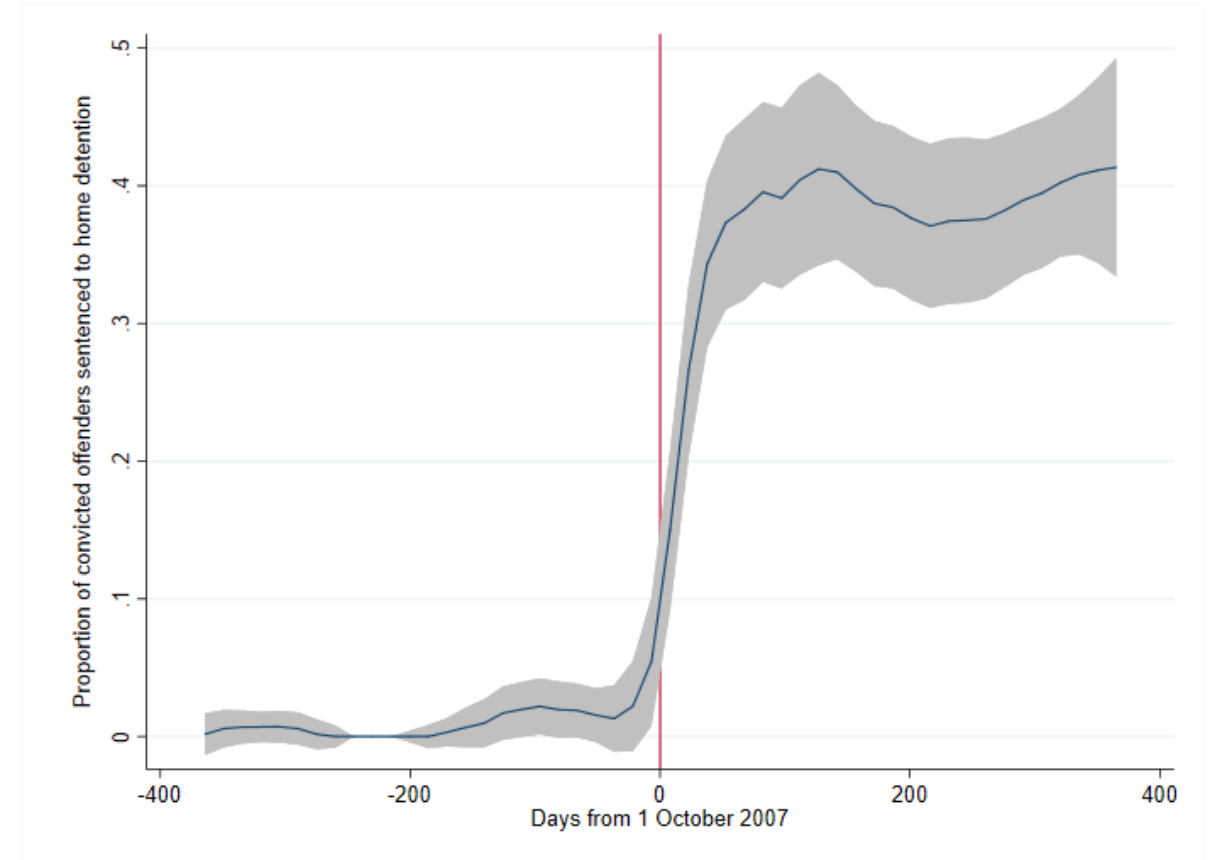


Figure 1. Proportion of convicted offenders sentenced to home detention by sentencing date

Source: Own calculations based on data in Statistics New Zealand's IDI.

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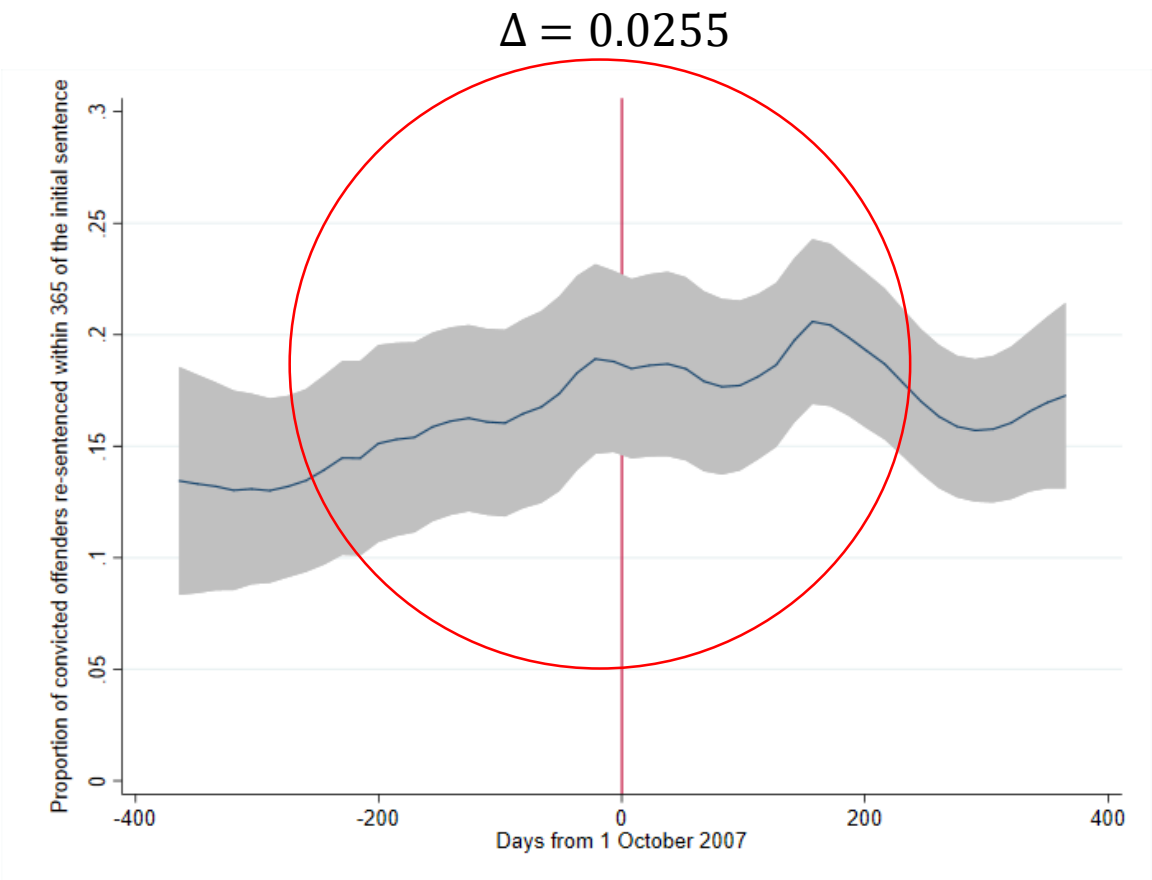


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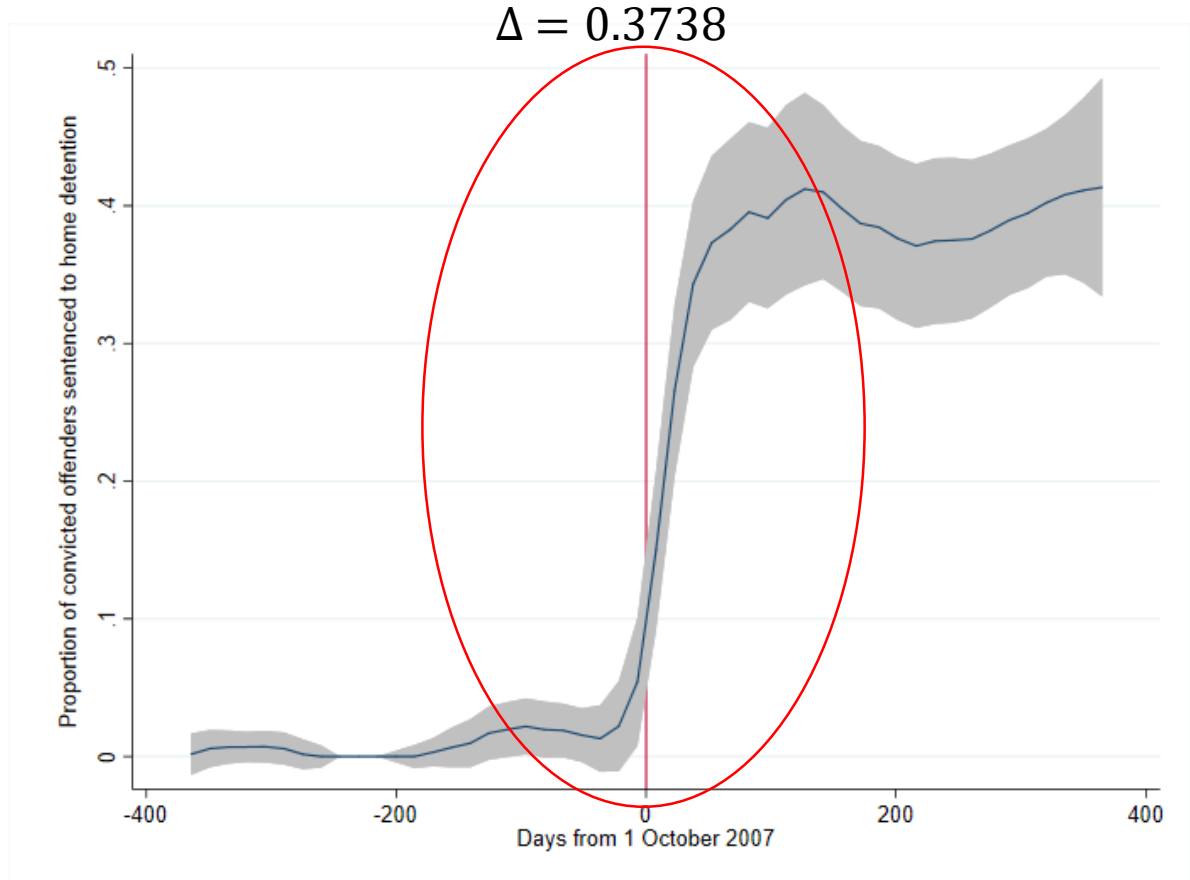


Figure 1. Proportion of convicted offenders sentenced to home detention by sentencing date

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Empirical Results: Recidivism

This study finds no statistically significant evidence that a home detention sentence reduces the probability of reoffending for offenders at the margin of home detention eligibility.

Observing the population of interest within a 365-day bandwidth produces the following LATE estimates:

Table 2. LATE estimates of home detention on offender recidivism

	(1) <i>Wald estimator</i>	(2) <i>2SLS</i>	(3) <i>FRD</i>
365-day recidivism	0.068	0.069	0.059
730-day recidivism	0.092	0.084	0.101
1,825-day recidivism	0.056	0.038	0.075

Notes: The Wald Estimator in column (1) and the 2SLS estimation in column (2) impose uniform weighting on observations within the 365-day bandwidth. The FRD estimations in column (3) optimise a triangular kernel weighting function for all specifications. Asterix indicate the significance level of the LATE estimate, depicted by ** if $p < 0.01$ and * if $p < 0.05$.

Source: Own calculations based on data in Statistics New Zealand's IDI.

Robustness tests

Test	Result	LATE (lower)	LATE (upper)
Bandwidth selection with 2SLS	All 5 bandwidths show no evidence of a significant negative effect of home detention on recidivism	-0.036	0.172 **
FRD model specification	Imposing either weighted kernel and/or a bandwidth on the FRD model does not change the result.	-0.001	0.455
Criteria of offender sample	Both a broader and narrower definition of the population of interest show no evidence of a significant negative effect of home detention on recidivism.	-0.014	0.137*
Definition of recidivism	Measuring recidivism from release date has no impact.	0.017	0.066
Type of reoffence	Differences in reoffending rates are not attributable to reconvictions arising from breaches to home detention conditions.	N/A	N/A

Notes: Asterix indicate the significance level of the LATE estimate, depicted by ** if $p < 0.01$ and * if $p < 0.05$.

Source: Own calculations based on data in Statistics New Zealand's IDI.

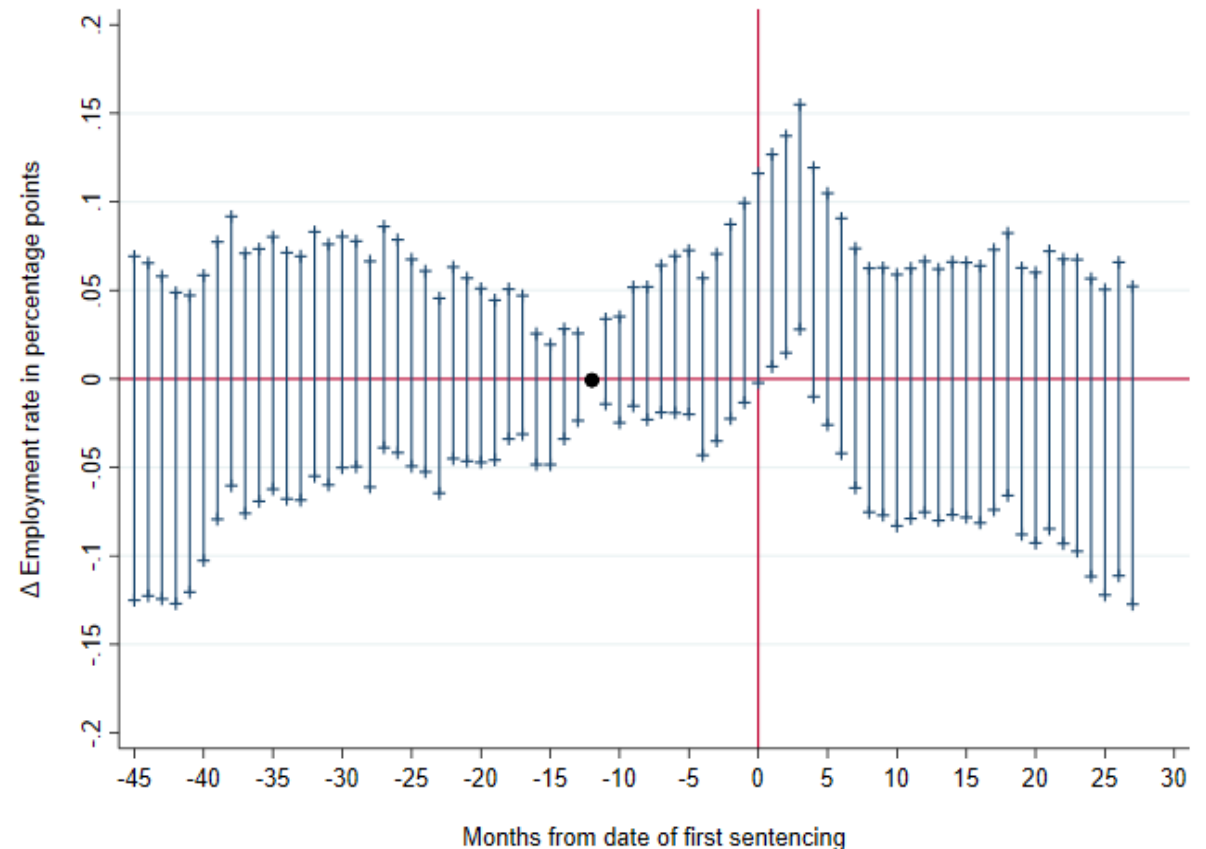
Labour market outcomes

Difference-in-differences (DD) estimates are recovered for average employment rates, average earnings and benefit receipt.

Results show no statistically significant differences in the labour market positions of the treatment and control groups, relative to one-year pre-sentencing.

The inclusion of calendar month fixed effects remove labour market trends over time, allowing the estimates to be interpreted as causal.

Figure 4. The average effect of the home detention reform on monthly employment rates



Notes: The figure shows the effect of the home detention reform on average monthly employment rates, measured by the percentage point change in the employment rate between the treatment and control groups relative to month -12, shown by the black marker. The vertical lines represent the 95 percent confidence interval of each estimate, as calculated by Equation 12.

Source: Own calculations based on data in Statistics New Zealand's IDI.

Conclusion

- Utilising the discontinuity in home detention receipt arising from the 2007 sentencing reform, this study estimates the local average treatment effect of home detention on recidivism and labour market outcomes.
- In contrast to the Ministry of Justice, there is no significant evidence that a home detention sentence reduces the probability of reoffending for offenders at the margin of home detention eligibility.
- There is no significant evidence that a home detention sentence increases average employment or wages and salaries earnings within one, two or five years from sentencing. Benefit receipt is the same regardless of home detention receipt.

While the administration of a home detention sentence presents a cost-savings solution to the prison overpopulation issue, results from this research provide little evidence justifying home detention as a criminal justice sanction that advances offender's reintegration abilities.

Thank you