

Minimum Legal Age of Tobacco Sales Law as a Commitment Mechanism: A Regression Discontinuity Design

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INTRODUCTION

In **October 2007**, the minimum legal age of sale (MLA) of tobacco products was increased from 16 to 18 in England, Scotland and Wales.¹

Evidence suggests that the law is not properly implemented with 58% of individuals under 18 reporting buying cigarettes from stores in 2008 and 38% in 2016.²

OBJECTIVE

Evaluate the short- and long-term impacts of the change in UK's MLA on propensity to smoke in young people.

METHOD

Individuals were classified as treated if their month-year of birth was above the September 1991 cut-off, meaning they were turning 16 when the policy came into effect

Economic rationale for raising the Minimum Legal Age of Sale Law:

Behavioral research shows that individuals are unable to make consistent plans through time when it comes to consumption of addictive goods and believe they can stop at any time.³ Young people are more likely to be present-oriented and give more weight to immediate benefits and less weight to future costs.⁴

- MLA can act as a commitment mechanism for individuals with low self-control to stop them from initiating into smoking at an early age, a decision they might later come to regret.

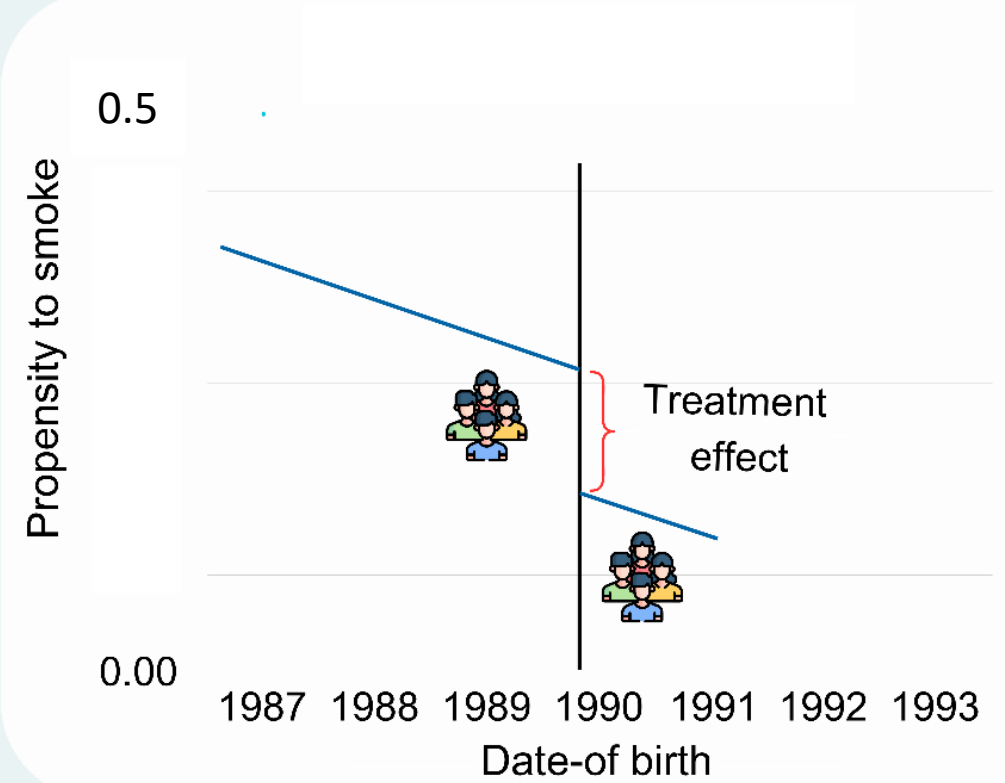
Regression Discontinuity Design:

- Individuals are assigned to treatment conditional on their values for some continuous variable (here date of birth) being above or below a certain cut-off score.⁵

Part 1: Short-term impact of the MLA reform

Individuals aged 16 -18 were selected from the British Household Panel Survey (BHPS) years 2005-2009 to construct a series of cross-sections of the British population.

Figure 1. Graphical representation of the identification strategy.



Two cut-off specifications of the month-year of birth were explored:

1. **September 1991** (individuals turning 16 by September 31st, 2007) - to measure the impact on smoking behaviour for those who could not yet legally buy cigarettes before the reform.
2. **November 1989** (individuals turning 16 by November 31st, 2007) - to include those who could legally buy cigarettes for some time before the reform.

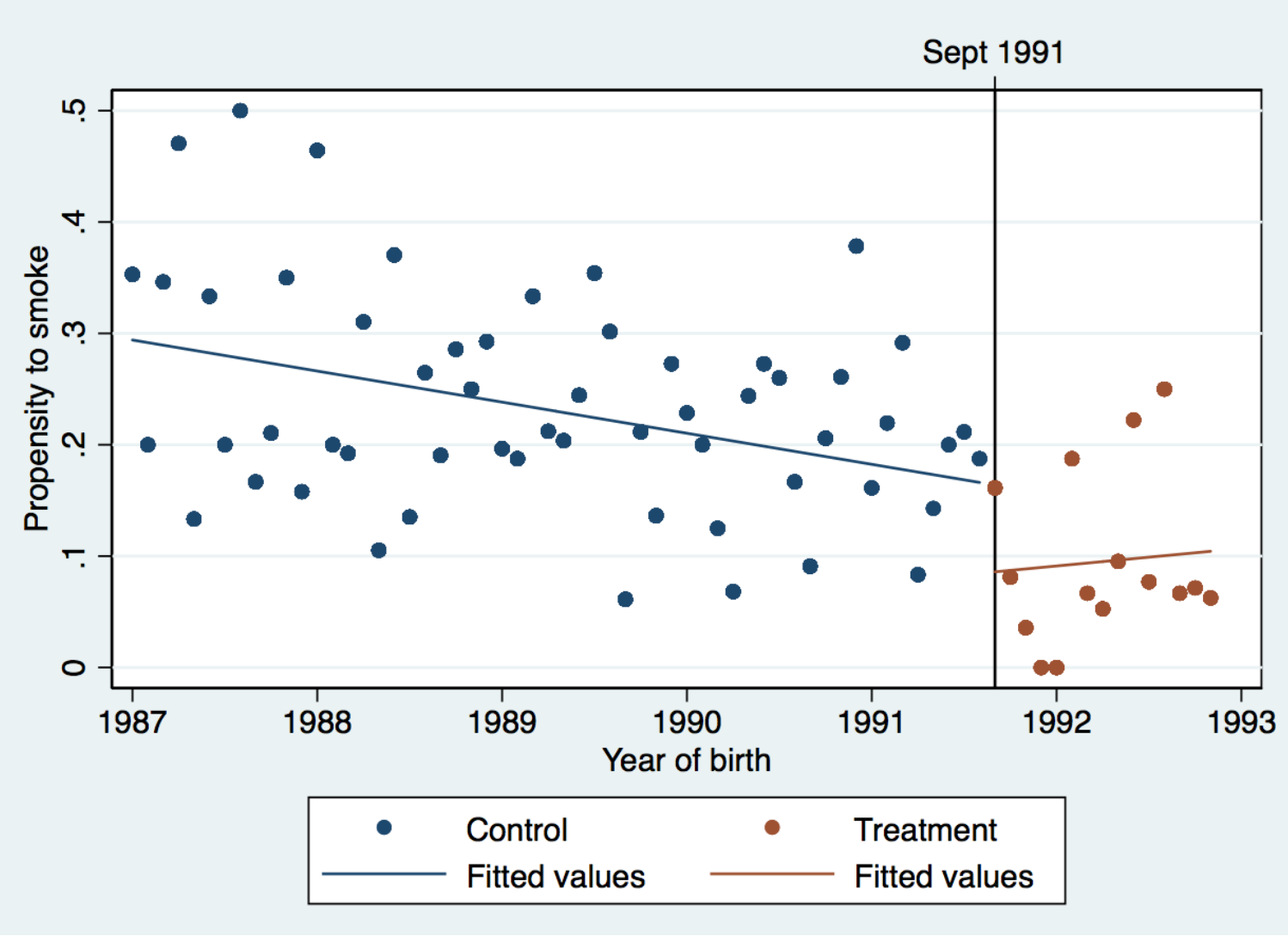
Part 2: Long-term impact of the MLA reform

Next, the impacted cohort was followed in subsequent years using data from Understanding Society (2010-2014) to see whether the reduction in uptake is maintained throughout adulthood or if the policy only had a temporary "access" effect. The effect of treatment assignment was measured in terms of failure to initiate smoking in adulthood. The sample was restricted to individuals under the age of 25 in line with consolidation of habits literature.⁶

RESULTS

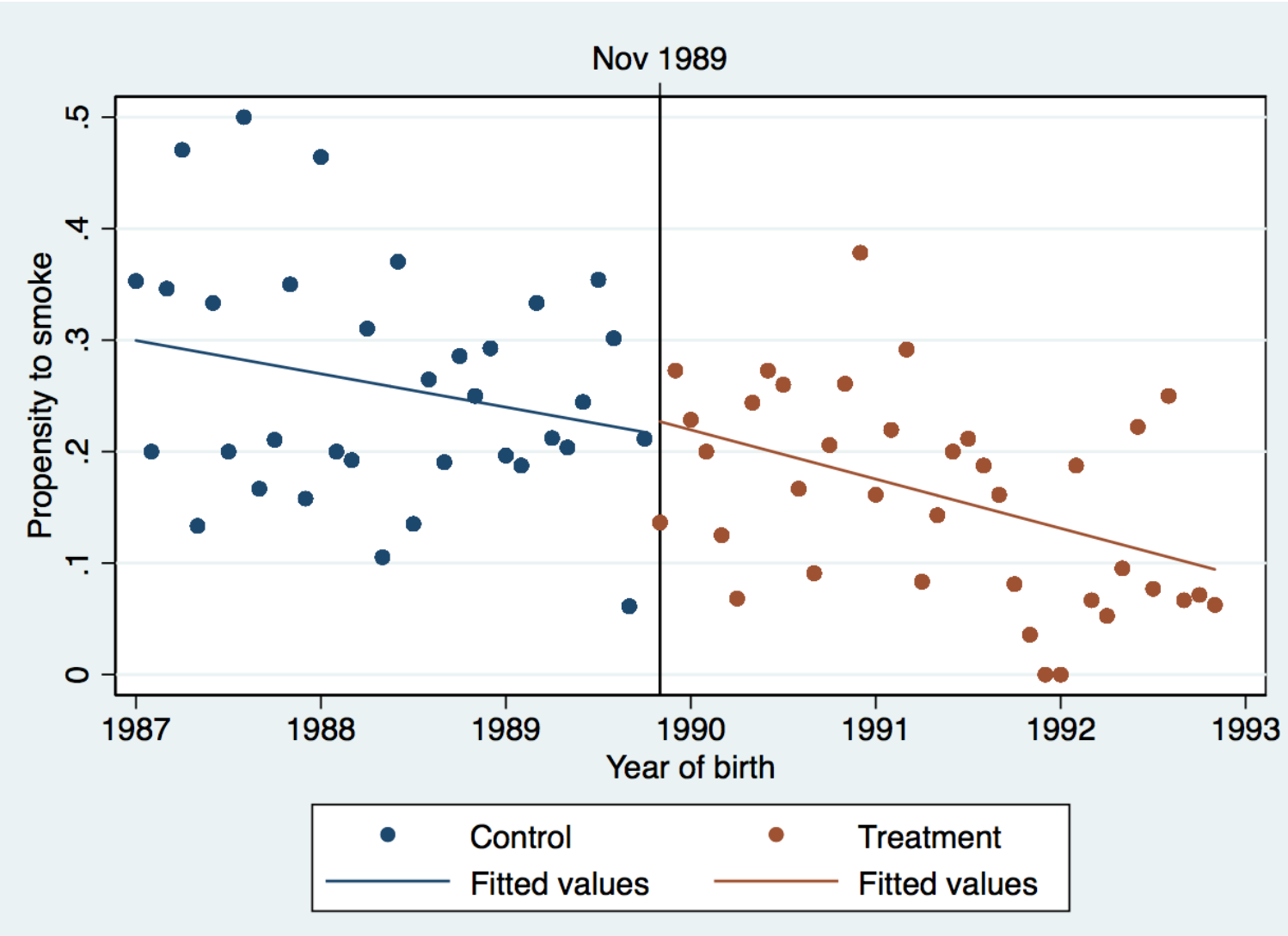
DESCRIPTIVE STATISTICS

Figure 2. Average propensity to smoke plotted against month-year of birth. Cut-off specification (1)



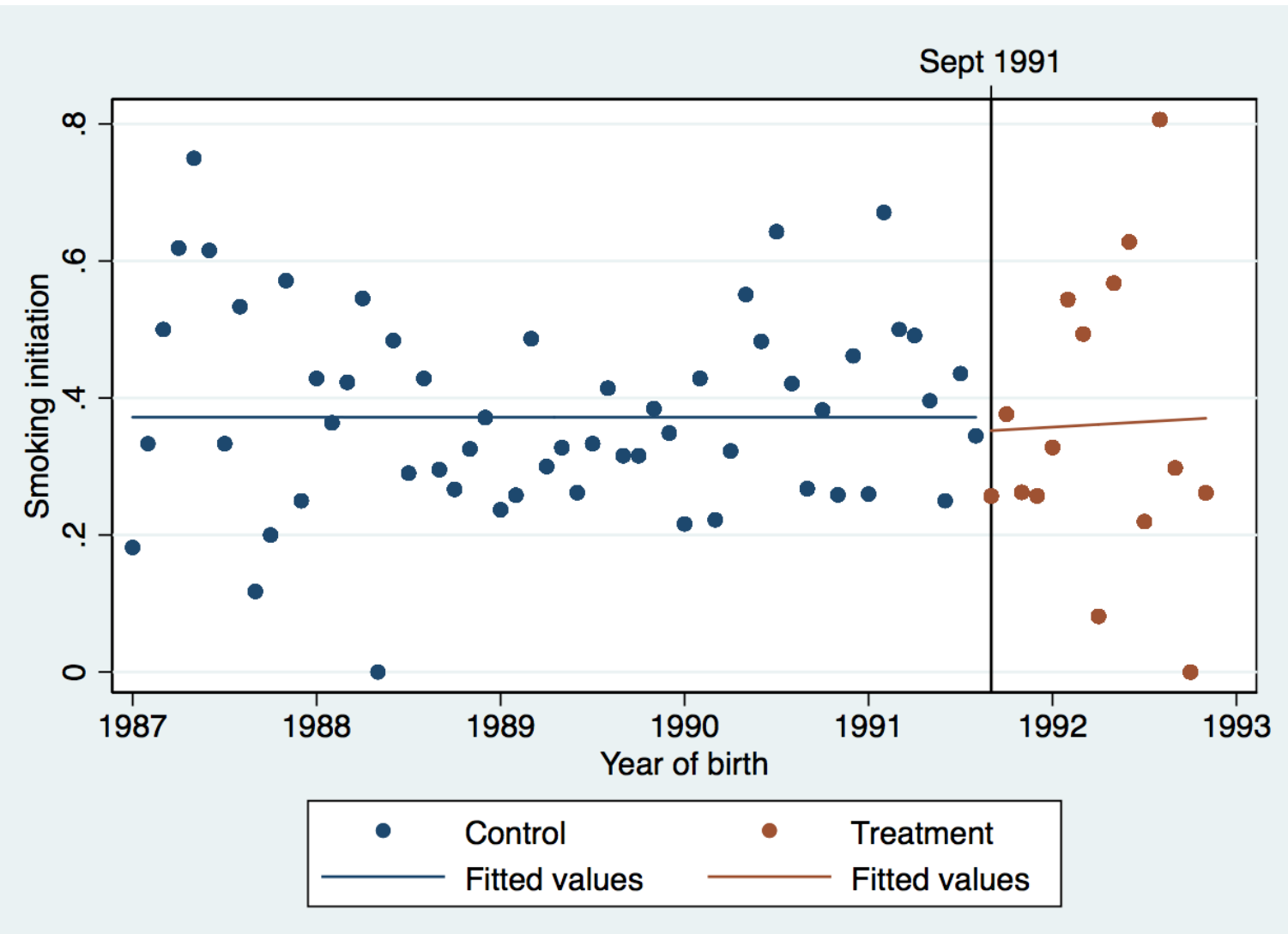
- The vertical line, set at month-year of birth cut-off, separates the treated from controls.
- The jump at the cut-off suggests that being assigned to treatment is associated with a 9-percentage point decrease in propensity to smoke among young adults.

Figure 3. Average propensity to smoke plotted against month-year of birth. Cut-off specification (2).



- The vertical line separates individuals born on or after November 1989 if they are observed in the post-reform period from individuals born earlier or observed in the pre-reform period.
- There is no discontinuity in propensity to smoke around the new cut-off.

Figure 4. Smoking initiation in adulthood of the continuing BHPS sample observed in 2010-2014.



- There is little evidence of a discontinuity in the probability of smoking initiation.
- The slope change to the right of the threshold seems to indicate that smoking initiation recovers after a slight dip.

INFERENCE

Results are interpreted as intention-to-treat effect of the policy due to non-compliance

SHORT-TERM IMPACT

Specification (1): Being impacted by the 2007 reform led to a 11.3 percentage point reduction in the propensity to smoke among young people who could not legally buy tobacco products before the reform.

Specification (2): No significant effect on propensity to smoke.

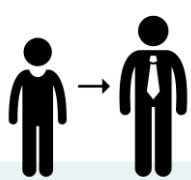
Table 4. Impact of 2007 MLA reform on propensity to smoke.

Variable	Propensity to smoke (SD)	
	Specification 1	Specification 2
2007 reform	-0.113** (0.051)	0.032 (0.034)

Note: The coefficient of the reform is statistically significant at the 2.8% level.

Coefficients for income levels were highly statistically significant with the highest income group having the lowest propensity to smoke relative to the lowest income group.

LONG-TERM IMPACT



Results from the second part of analysis were not statistically significant, suggesting the MLA reform only produced a temporary effect by restraining some individuals from initiating smoking at an early age.

VALIDATION

Potential threats to causality in the RDD analysis were examined as follows:

- Polynomial functions of the month-year of birth were tested to avoid misspecification of the relationship between the running variable and the outcome.
- No unanticipated discontinuities were found at other points than the cut-off.⁷
- McCrary density test showed no discontinuity in the density of dates of births at the September 1991 threshold, suggesting that there is no precise manipulation of the running variable.⁸

CONCLUSIONS

- This study's findings represent a lower bound of the effect of the policy, as the reform may have failed to help individuals who are most likely to be smokers. MLA may be more effective when introduced in combination with a tobacco possession law.
- Smoking behavior of older individuals is likely to be influenced by other factors than whether one was assigned to treatment at age 16-17 or not.
- Future research may consider incorporating social factors, such as peer effects and family history of smoking, to predict smoking behaviour.

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CONTACT INFORMATION

