

# Are tobacco taxes increasing smoking inequalities? Recent Canadian evidence

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## Objective

Estimate the differential impact of cigarette taxes on smoking by education.

## Background

- Taxes are effective at reducing smoking [1].
- Prior work suggests stronger effects of taxes among disadvantaged [2]:
- Educational inequalities in tobacco smoking are increasing in Canada:

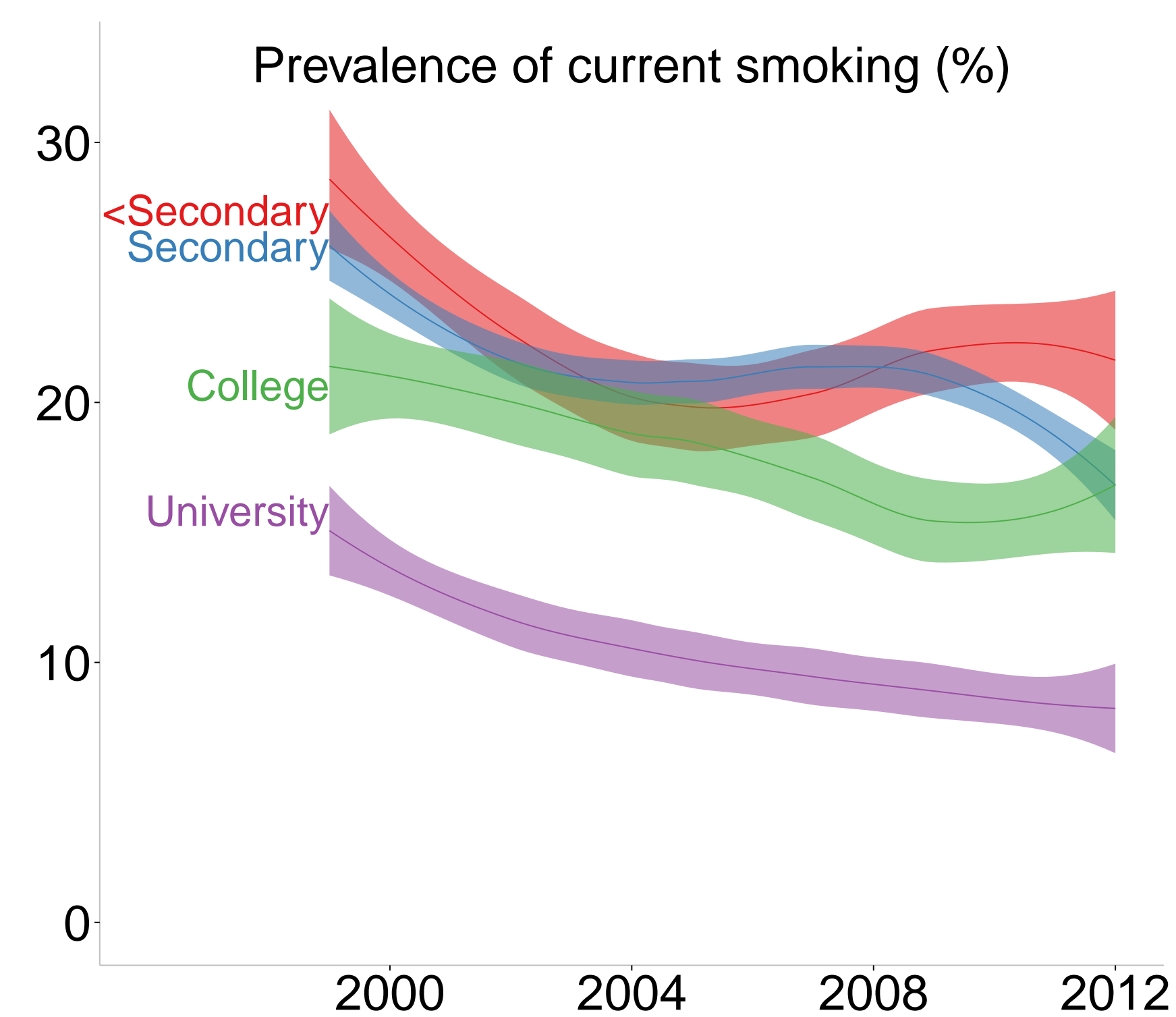


Figure 1: Smoking prevalence by education, 1999-2012

- We take advantage of recent changes in provincial cigarette taxes:

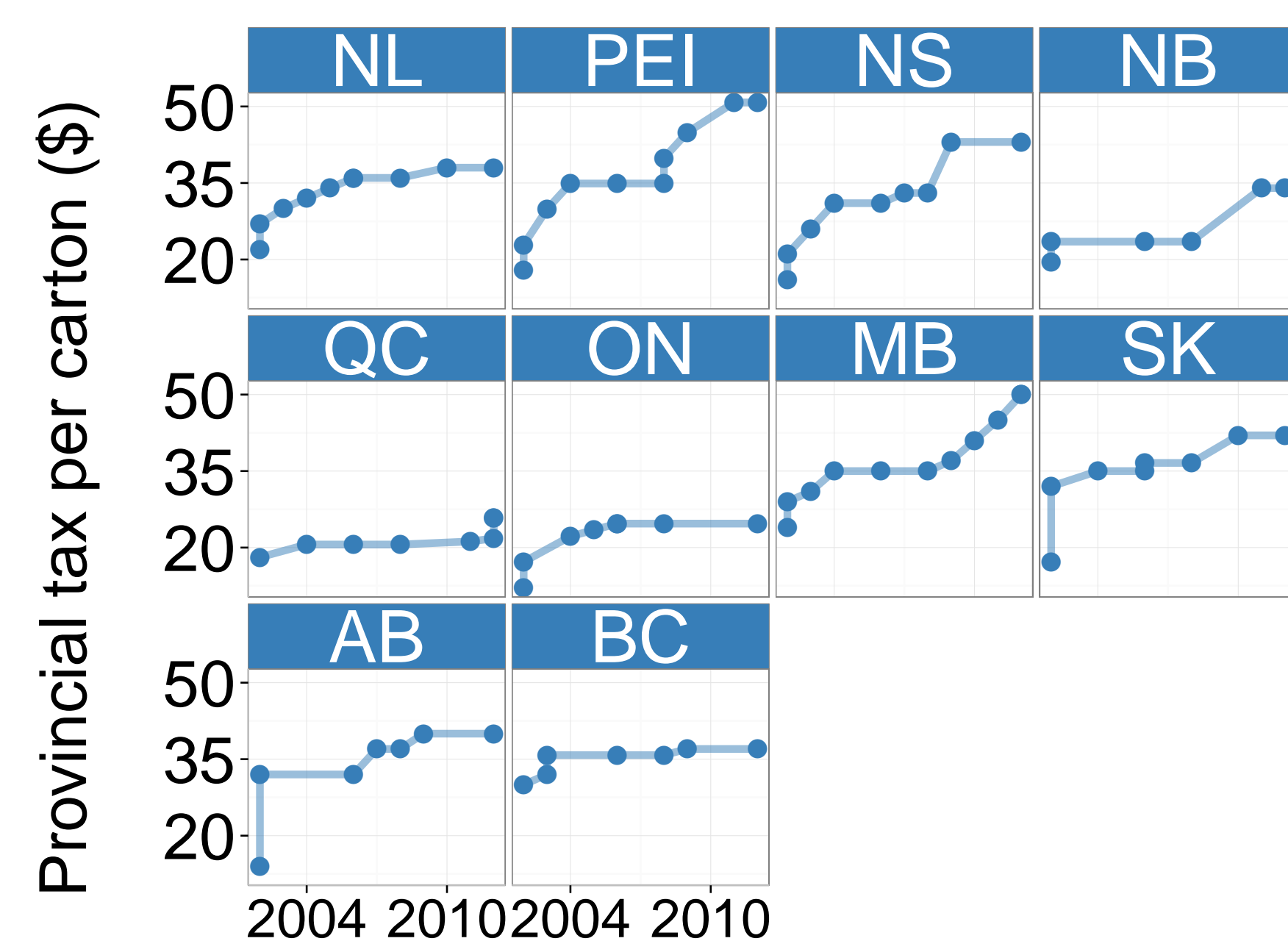
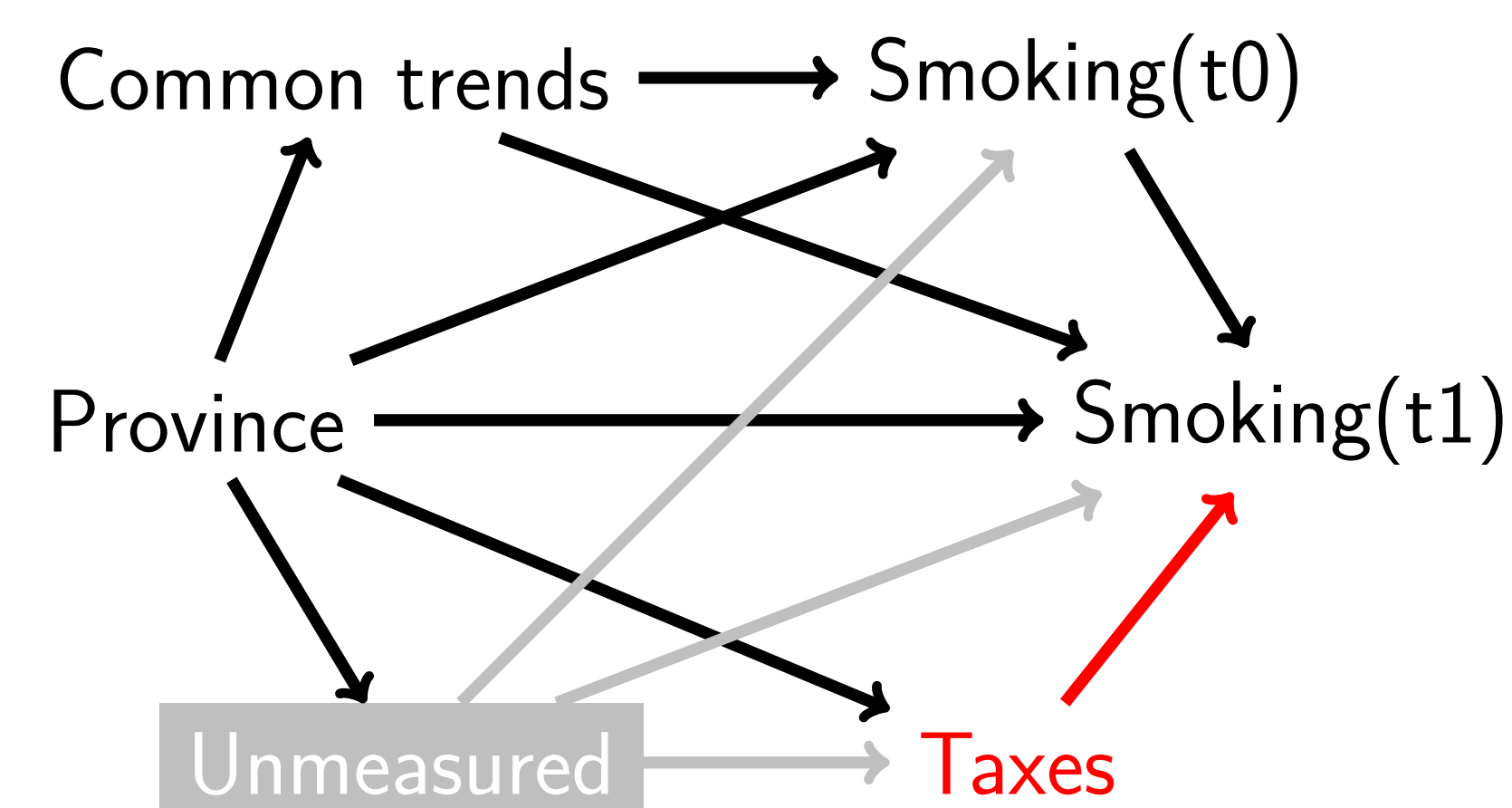


Figure 2: Provincial cigarette taxes, 2002-2012

## Design: Quasi-experiment

- Main problem: endogeneity of smoking.
- We used **changes** in tobacco taxes between 2002 and 2012 across Canadian provinces to identify the effect of taxes on smoking by education:



## Statistical Methods

- Smoking participation: logistic model
- Smoking frequency: 2-part model:
  - initiation  $\rightsquigarrow$  logit
  - frequency  $\rightsquigarrow$  negative binomial
- Model: regression-based difference-in-differences, by education:

$$Y_{ipt} = \alpha + \beta_{pt}T_{pt}E_{ipt} + \gamma_{ipt}Z_{ipt} + \delta_p E_{ipt} + \theta_t E_{ipt}$$

$E$  = individual education  
 $T$  = excise tax on 200 cigarettes  
 $Z$  = age, gender, language, other policies  
 $\delta_p$  = province fixed effects  
 $\theta_t$  = year fixed effects

## Results: Smoking Frequency

- \$1 tax increased frequency by 2.8 cigs/wk (1.4,4.3) among lowest educated

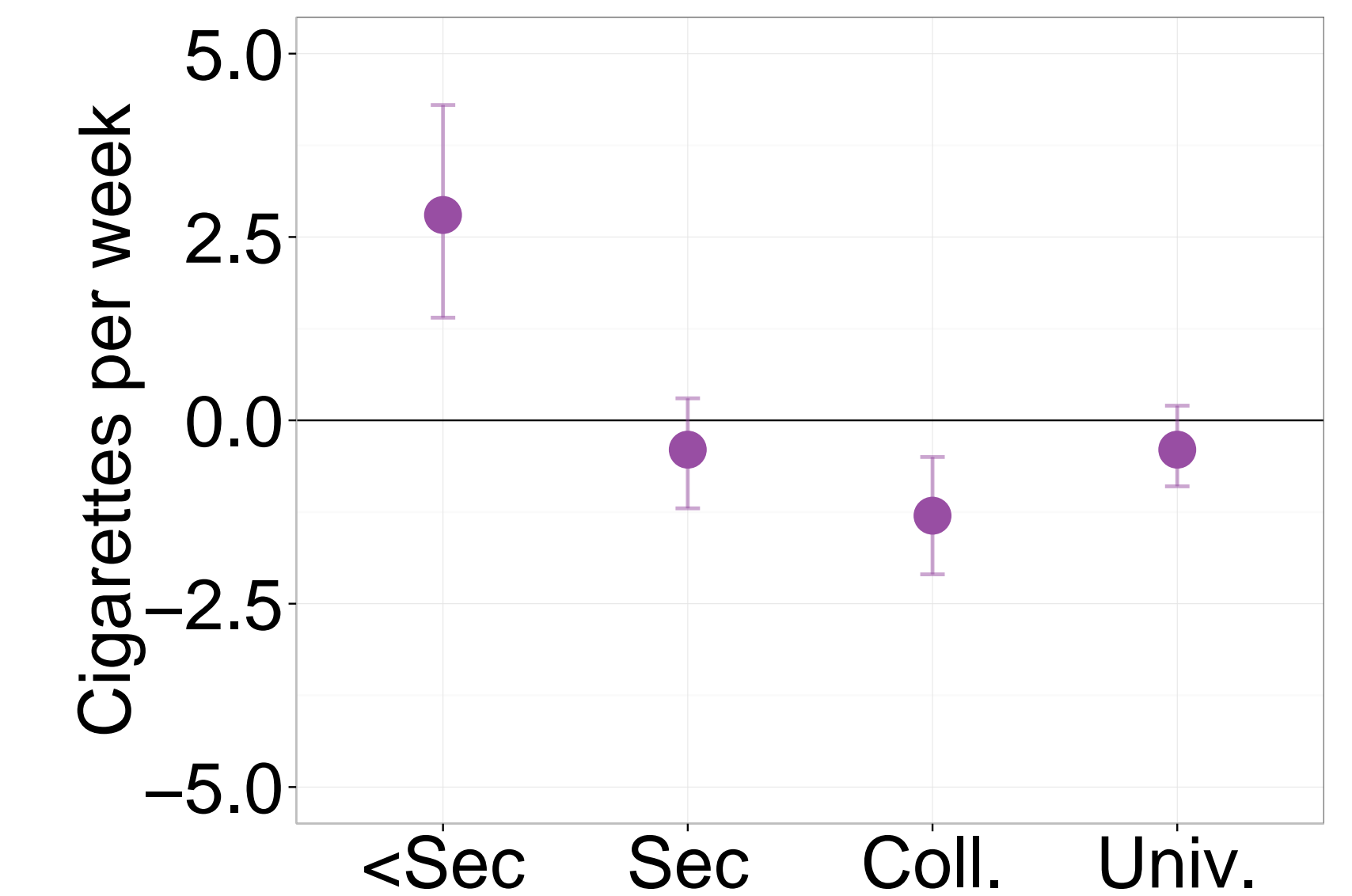


Figure 4: Effect of taxes on smoking frequency

## Bottom Line

**Increasing taxes on cigarettes appears insufficient to reduce the education gap in smoking.**

## Conclusion

Recent cigarette tax increases do not appear effective at reducing average smoking and may contribute to widening inequalities.

## References

- Chaloupka FJ et al. Effectiveness of tax and price policies in tobacco control. *Tobacco Control*. 2011;20:235-8.
- Goldin J, Homonoff T. Smoke Gets in Your Eyes: Cigarette Tax Salience and Regressivity. *American Economic Journal: Economic Policy* 2013;5:302-36.

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## Data (2002-2012)

### Smoking behaviors:

- Canadian Tobacco Use Monitoring Surveys
  - Smoking participation: weekly smoker
  - Smoking frequency (cigs per week)
  - Demographics (age, sex, marital, language)

### Policy data:

- Excise taxes and effective dates extracted from Canadian Tax Foundation
- Potential confounders of policy changes and smoking:
  - Smoke-free policy laws
  - Retail sales tax rates
  - Unemployment rates

## Results: Smoking Participation

- \$1 tax increased smoking participation 2.4 (1.3,3.5) points among lowest educated.
- Generally null effect on average.

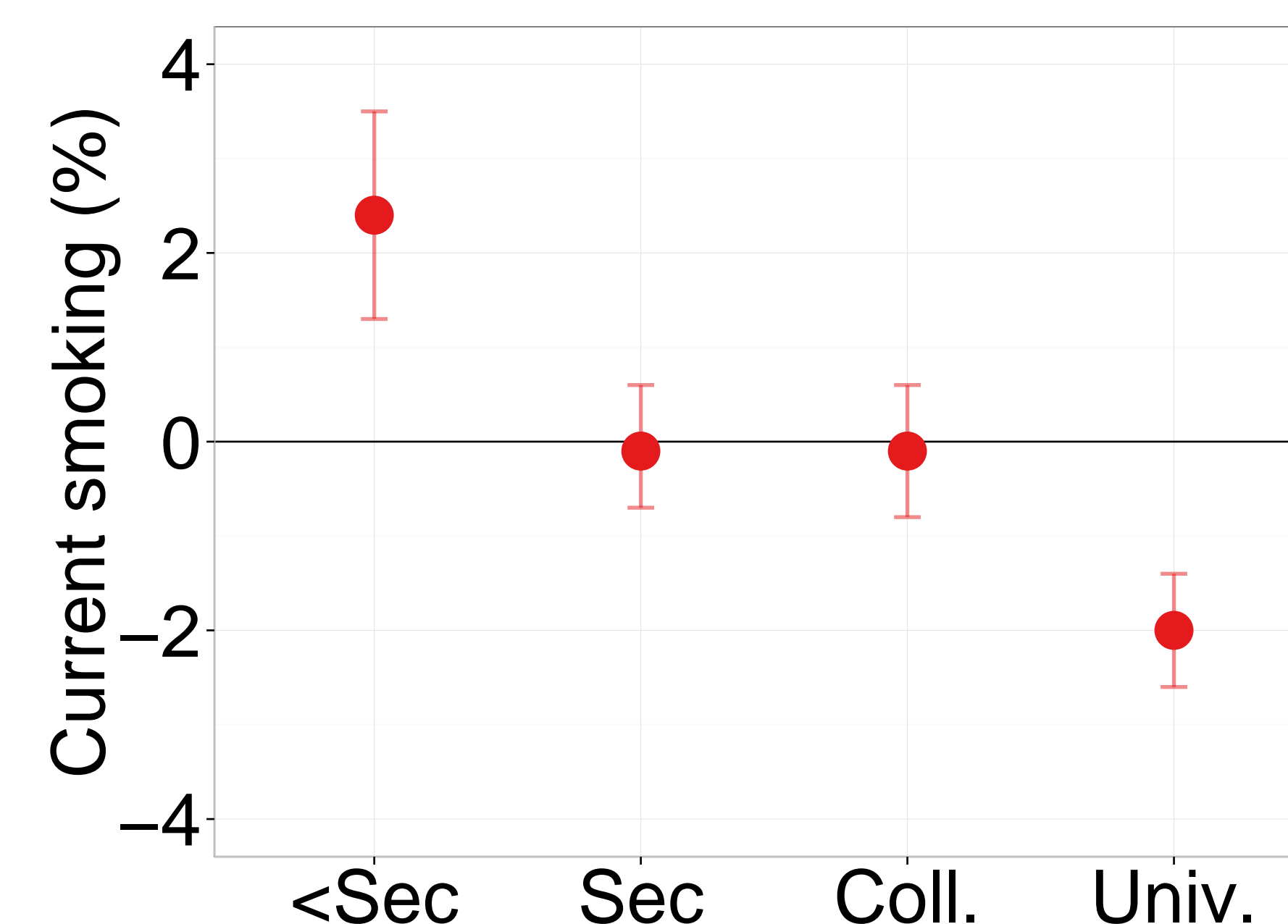


Figure 3: Effect of taxes on being a weekly smoker