Are tobacco taxes increasing smoking inequalities? Recent Canadian evidence

S. Harper\textsuperscript{1}  P. Manivong\textsuperscript{1}  E. C. Strumpf\textsuperscript{1,2}

\textsuperscript{1}Epidemiology, Biostatistics & Occupational Health, McGill University  \textsuperscript{2}Economics, McGill University

\begin{itemize}
  \item Tax incentives are effective at reducing smoking [1].
  \item Prior work suggests stronger effects of taxes among disadvantaged [2]:
  \item Educational inequalities in tobacco smoking are increasing in Canada:
\end{itemize}

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  \item Taxes are effective at reducing smoking [1].
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\section{Background}

\begin{itemize}
  \item We take advantage of recent changes in provincial cigarette taxes:
\end{itemize}

\begin{itemize}
  \item Policy data:
  \begin{itemize}
    \item Excise taxes and effective dates extracted from Canadian Tax Foundation
    \item Potential confounders of policy changes and smoking:
    \begin{itemize}
      \item Smoke-free policy laws
      \item Retail sales tax rates
      \item Unemployment rates
    \end{itemize}
  \end{itemize}

\begin{itemize}
  \item We used changes in tobacco taxes between 2002 and 2012 across Canadian provinces to identify the effect of taxes on smoking by education:
\end{itemize}

\begin{itemize}
  \item Common trends
  \item Smoking(t0)
  \item Province
  \item Smoking(t1)
  \item Unmeasured
  \item Taxes
\end{itemize}

\textbf{Bottom Line}

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

\section{Results: Smoking Frequency}

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

\section{Results: Smoking Participation}

$1$ tax increased smoking participation $2.4$
$(1.3, 3.5)$ points among lowest educated.

\section{Conclusion}

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

\section{References}


\section{Acknowledgements}

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\section{Contact Information}

- Email: sam.harper@mcgill.ca
- Web: http://samharper.org
- Follow: @sbh4th

\section{Statistical Methods}

\begin{itemize}
  \item Smoking participation: logistic model
  \item Smoking frequency: 2-part model:
    \begin{itemize}
      \item initiation \rightarrow logit
      \item frequency \rightarrow negative binomial
    \end{itemize}
  \item Model: regression-based difference-in-differences, by education:
  \begin{equation}
  Y_{ipt} = \alpha + \beta_T E_{ipt} + \gamma_p Z_{ipt} + \delta_p E_{ipt} + \theta_t E_{ipt}
  \end{equation}
  \begin{itemize}
    \item $E$ = individual education
    \item $T$ = excise tax on 200 cigarettes
    \item $Z$ = age, gender, language, other policies
    \item $\delta_p$ = province fixed effects
    \item $\theta_t$ = year fixed effects
  \end{itemize}
\end{itemize}

\begin{itemize}
  \item $1$ tax increased frequency by $2.8$ cigs/wk
  \item $(1.4, 4.3)$ among lowest educated
\end{itemize}

\begin{itemize}
  \item $1$ tax increased smoking participation $2.4$
  \item $(1.3, 3.5)$ points among lowest educated.
  \item Generally null effect on average.
\end{itemize}

\section{Empirical Methods}

\begin{itemize}
  \item Main problem: endogeneity of smoking.
  \item We used changes in tobacco taxes between 2002 and 2012 across Canadian provinces to identify the effect of taxes on smoking by education:
\end{itemize}

\section{Data (2002-2012)}

\begin{itemize}
  \item Canadian Tobacco Use Monitoring Surveys
  \begin{itemize}
    \item Smoking participation: weekly smoker
    \item Smoking frequency (cigs per week)
    \item Demographics (age, sex, marital, language)
  \end{itemize}
\end{itemize}

\section{Policy data:}

\begin{itemize}
  \item Excise taxes and effective dates extracted from Canadian Tax Foundation
  \item Potential confounders of policy changes and smoking:
  \begin{itemize}
    \item Smoke-free policy laws
    \item Retail sales tax rates
    \item Unemployment rates
  \end{itemize}
\end{itemize}

\section{Design: Quasi-experiment}

\begin{itemize}
  \item Main problem: endogeneity of smoking.
  \item We used changes in tobacco taxes between 2002 and 2012 across Canadian provinces to identify the effect of taxes on smoking by education:
\end{itemize}

\section{Prevalence of current smoking (%)}

\begin{itemize}
  \item Figure 1: Smoking prevalence by education, 1999-2012
\end{itemize}

\section{Provincial tax per carton ($)}

\begin{itemize}
  \item Figure 2: Provincial cigarette taxes, 2002-2012
\end{itemize}

\section{Smoking(t0)}

\begin{itemize}
  \item Smoking(t0)
  \item Province
  \item Smoking(t1)
  \item Unmeasured
  \item Taxes
\end{itemize}

\section{Results: Smoking Participation}

$1$ tax increased smoking participation $2.4$
$(1.3, 3.5)$ points among lowest educated.

\section{Conclusion}

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

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\section{Figure 1: Smoking prevalence by education, 1999-2012}

\section{Figure 2: Provincial cigarette taxes, 2002-2012}

\section{Figure 3: Effect of taxes on being a weekly smoker}

\section{Figure 4: Effect of taxes on smoking frequency