Do seat belts explain socioeconomic differences in traffic accident mortality?

S. Harper¹ T.J. Charters¹ E.C. Strumpf¹,²
¹Epidemiology, Biostatistics & Occupational Health, McGill University ²Economics, McGill University

Objectives
- Estimate the impact of seat belt use on motor vehicle accident (MVA) mortality by education.
- Estimate the contribution of seat belt use to MVA mortality inequalities.

Background
- Strong social inequalities in MVA mortality:
  
  ![Figure 1: MVA mortality by education, 2010](image)

  
  - Seat belts reduce MVA mortality [1].
  - Mandatory seat belt laws increase seat belt use more among the lower educated [2].

Design: Instrumental Variables
- Main problem is endogeneity of seat belt use.
- We used mandatory seat belt law changes among 46 states between 1994 and 2010 to instrument for seat belt use:

  ![Diagram](image)

  
  - Belt law
  - Measured confounders
  - Belt use
  - Mortality
  - Unmeasured confounders

Statistical Methods
- Two-stage least squares (2SLS), by education.
- First stage: law \( \rightarrow \) belt use.
- Second stage: predicted belt use \( \rightarrow \) MVA.

\[
B_{jst} = \alpha + \beta j s t L_{jst} + \gamma j s t Z_{jst} + \delta_j + \theta_t + \epsilon (1) \\
MVA_{jst} = \alpha + \rho j s t \hat{B}_{jst} + \gamma j s t Z_{jst} + \delta_j + \theta_t + \epsilon (2)
\]

\( j \) indexes education groups, \( s, t \) index states and years, respectively.
\( B \) = seat belt use
\( L \) = presence of mandatory seat belt law
\( Z \) = age, gender, race, other policies

Results
- 1 point increase in belt use reduced MVA death rate by 0.25/100,000 among lowest educated.
- Generally null for higher educated.

Data (1994-2010)
Mortality rates and behaviors:
- US Vital Statistics (MVA mortality)
- Current Population Survey (rate denominators)
- US Behavioral Risk Factor Surveillance Surveys
  - Belt use by education
  - Demographic covariates (age, sex, race)

Policy data:
- NHTSA for policy changes (24 states upgraded from secondary to primary enforcement).
- Potential confounders of policy changes and mortality:
  - Vehicle miles traveled
  - Speed limit changes
  - Drunk driving law changes

Conclusion
Eliminating the current 10 point difference in seat belt use between the lowest and highest education groups would reduce the education difference in MVA mortality rates by about 17%.

References

Contact Information
- Email: sam.harper@mcgill.ca
- Phone: +1 (514) 398 2856
- Web: http://samharper.org
- Follow: @sbh4th

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