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ABSTRACT:

The Insurance Institute for Highway Safety began performing frontal crash testing of vehicles in the US in 1995. Test scores demonstrate continuous improvement in models redesigned after 1995, with no evidence of earlier improvements. We analyze the relationship between year of vehicle redesign and the probability of driver death in severe head-on collisions. Redesign year is likely endogenous, so we instrument by predicting redesign year using typical time between redesigns. The instrument uncovers a pattern similar to the crash test results: fatality risk in frontal collisions was flat before 1995, but declining thereafter. The impact of these improvements is a 10% reduction in the probability of driver death in head-on collisions with a value of approximately $500 per vehicle.

DISCUSSION:

- The death rate for drivers in frontal collisions has declined more than the overall death rate.
- The variables in our model explain about 60% of the observed decrease in driver death rate in frontal collisions.
- The improved safety trend evident for cars with redesign years after 1995 is potentially attributable to an increased focus on frontal collision crashworthiness resulting in part from the IIHS crash testing program started that year.
- What is the value of the improved frontal collision safety? A back-of-the-envelope calculation:
  - 10% reduction in probability of death
  - Mean vehicle occupancy: 1.5
  - Total miles driven by a typical car: 150,000
  - Reduction in probability of death: 10%
  - Cost savings: $270 per vehicle
  - Benefits in single and >2 car crashes might double this to $540 per vehicle
- How much does improved frontal collision safety add to the cost of a car? We don’t know, but stay tuned…

REFERENCES: