Better Safe Than Safer:
The Economics and Politics of Safety

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Agenda

- Does government regulation improve safety?
- Would you drive if risk of dying were doubled?
- What is the best auto safety investment you can make?
- What is the worst safety device sold today?
- Should we sacrifice innocent lives for higher profits or a cleaner environment?

These are some of the questions we will answer in the next hour.
Think about an auto accident you’ve been in or one you’ve heard of.
John Adams in his book Risk, defines four broad categories of attitudes towards risk and their approximate proportions in society.

- **Egalitarians**: defer to reference groups [Volvo, SUV] [experts] “if everyone else is doing it …”
- **Fatalists**: submissive, superstitious & rationally ignorant [media] [external factors] “It wasn’t my fault”
- **Hierarchists**: command & control authoritarians [Ralph Nadar] [Law] “There oughtta be a law …”
- **Individualists**: cause-effect [skydivers, NTSB] [you] “100% personal responsibility at all times”
Back in the early 1960s, a hopelessly naïve and ignorant young man named Ralph Nadar looked at the following auto fatality data
A Sucker Born Every Minute

“… this mass trauma began rising sharply four years ago, reflecting new and unexpected ravages by the motor vehicle. A 1959 DOC report projected that 51,000 persons would be killed by automobiles in 1975. That figure will probably be reached in 1965, a decade ahead of schedule.” — Ralph Nader, *Unsafe At Any Speed* (1965)

He concluded in the introduction to his book, *Unsafe at Any Speed,*
The Myth of the 20th Century

“The time has not come to discipline the automobile for safety; that time came over four decades ago. But that is not cause to delay any longer what should have been accomplished in the 1920s.” — Ralph Nader, Unsafe At Any Speed (1965)

Notice how he wants to discipline the automobile by passing laws, exhibiting fatalist and hierarchical qualities
But the reality was quite the opposite when the data are adjusted for exposures.

Here we have an unregulated industry that reduced fatalities by 50% in its first 20 years, and then reduced it by another 50% in the next 20 years, all before anyone bothered to look at the data and draw any intelligent conclusions.
This 50% fatality reduction every 20 years continued undisturbed after *Unsafe At Any Speed* in 1965.

If you were driving 20 years ago, then by definition you were driving on roads that were twice as dangerous as they are today.
## 80 Year History of U.S. Auto Safety

<table>
<thead>
<tr>
<th>Year</th>
<th>Fatalities per 100M miles</th>
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<tbody>
<tr>
<td>1923</td>
<td>21.5</td>
</tr>
<tr>
<td>1943</td>
<td>11.5</td>
</tr>
<tr>
<td>1963</td>
<td>5.5</td>
</tr>
<tr>
<td>1983</td>
<td>2.7</td>
</tr>
<tr>
<td>1997</td>
<td>1.7</td>
</tr>
<tr>
<td>2003</td>
<td>1.4 (est.)</td>
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- Minimal regulation prior to 1965
- Fatalities decrease by 50% every 20 years
- No change in rate of safety improvement
- U. S. auto safety fell from 1st to 13th equal to 200,000 extra deaths over 20 years
- Regulation has negative value
Airline Fatalities Per 100M Miles

Ten Year Moving Average

Commercial airline fatality data through 1999
One could conclude that FAA regulation does have value.

FAA = Federal Aeronautics Administration
Skydiving is a completely unregulated sport, with two minor exceptions:

- The FAA requires all skydivers to carry a reserve parachute.
- Since 1997, all skydivers must wear a seatbelt on the plane ride up to 5,000 feet.
35 Years of Skydiving Safety

Fatalities per 1,000 USPA Members or per 100,000 skydives

- 1967  6.5 (est.)
- 1977  3.2
- 1987  1.7
- 1997  1.0

- No skydiving regulation
- Fatalities decrease by 40% every 10 years
- RSL and AAD devices
- USPA is a voluntary non-profit regulatory body with no enforcement power
- Equivalent to mortality risk of 40 year-old male

RSL = Reserve Static Line, which aids the deployment of the reserve parachute.

AAD = Automatic Activation Device

USPA = United States Parachute Association

The improvement in skydiving fatality rates is much better than automobiles, but slightly worse than commercial air travel.
Deaths to mothers in the process of childbirth. An unregulated activity that has benefited from advances in modern medicine.
Any woman can become pregnant, but doctors and hospitals are licensed by the states.

### 75 Years of Maternal Mortality

<table>
<thead>
<tr>
<th>Year</th>
<th>Deaths per 100,000 births</th>
</tr>
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<tbody>
<tr>
<td>1915</td>
<td>608</td>
</tr>
<tr>
<td>1918</td>
<td>916 (epidemic)</td>
</tr>
<tr>
<td>1932</td>
<td>633</td>
</tr>
<tr>
<td>1952</td>
<td>68</td>
</tr>
<tr>
<td>1972</td>
<td>22</td>
</tr>
<tr>
<td>1992</td>
<td>8</td>
</tr>
</tbody>
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- No regulation other than medical licensure
- No improvement in rate of mortality prior to 1930
- Fatalities decrease by 50%+ every 10 years
- Childbirth is 8 times more dangerous than 1 skydive
History of 20th Century Safety

In a *free and open society*, safety improves at the rate of 50% - 75% every 20 years, regardless of the activity, type of risk, or level of regulation.

Fire deaths. Coal mining accidents, etc. have all experienced similar fatality reductions in the 20th century.

I stress free and open society because auto fatalities were more than 10 times greater in the Soviet Union in 1990, and coal mining in Mainland China today results in thousands of fatalities annually.
Economics of Safety I: Money

The Ford Pinto Gas Tank

Cost: $137,000,000 =
  • 12.5M Vehicles @ $11 per vehicle

Benefit: $49,500,000 =
  • 180 Deaths @ $200,000 per death
  • + 180 Injuries @ $67,000 per injury
  • + 2,100 Vehicles @ $700 per vehicle

This is the most famous formula in auto safety history
Submitted as evidence in the 1979 reckless homicide Ford Pinto trial.
Arjay Miller, president of Ford Motor Company, had his Lincoln Continental burst into flames following a crash in the 1960s. He directed Ford engineers to investigate the problem, out of which was born this equation.
## Two-Sided Value Proposition

<table>
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<tr>
<th>Basic Cost Per Life Saved Benchmark</th>
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<tbody>
<tr>
<td>1971 NHTSA Est. Life Value of $200,725 =</td>
</tr>
<tr>
<td>$173,300 Lost income + 10,000 Pain &amp; suffering $11 \times 12,500,000 / 180 =</td>
</tr>
<tr>
<td>+ 7,500 Property loss [Cost of Safety Device * Number of Units] /</td>
</tr>
<tr>
<td>+ 7,700 Insur. &amp; Legal Lives Saved</td>
</tr>
<tr>
<td>+ 2,225 Hosp. &amp; funeral</td>
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See http://www.motherjones.com/mother_jones/SO77/worth.html
Where Do We Start?

- **Wrong:** Is your life worth $11, $200,725 or $760,000? (assumes advance knowledge and unlimited resources)

- **Right:** How many lives can you save with $760,000? (estimates relative risks based on personal preferences and limited resources)

The proper way to think about investments in safety.
Airbags kill one person for every 30 they save. This is probably the most dangerous safety device approved for public use.
## HCRA Cost Per QALY Savings

- Fire detectors & childhood immunizations < $0
- Ambulance defibrillators $39
- Beta-blockers for MI patients $850
- Chlorination of drinking water $3,100
- Age 55-64 (male) hypertension screening $31,000
- Automobile air bags $62,000 (28 years)
- Age 55-64 annual mammography $110,000
- Air force bomber ejection seats $1,200,000
- Age 20 cervical cancer screening $1,500,000

From “Five-Hundred Life-Saving Interventions and Their Cost-Effectiveness”
*Risk Analysis*, Volume 15, #3, 1995

MI = Myocardial Infarction – i.e. heart attack

HCRA = Harvard Center for Risk Analysis

QALY = Quality Adjusted Life Year
Economics of Safety II: Choice

“...A seat belt is a passive device. I always wear mine. But I'm very glad my car doesn't have an air bag because they weren't designed to save a person my size ... The government thought it was worth it to kill a hundred small people to save some larger number of unbelted males. As one of the small people, I have a big problem with this.” — Wendy Faulkner, Skydiver and Mathematician
Joan Claybrook On Air Bags

CNN Broadcast November 21\textsuperscript{st}, 1983

- “Air bags are really the best solution”
- “They’re much better than seat belts”
- “would protect all front seat occupants”
- “fit all different sizes and types of people from little children up to 95\textsuperscript{th} percentile males”
- “work beautifully and automatically … gives you more freedom than being forced to wear a seat belt”
## Deflating The Air Bag Myth

<table>
<thead>
<tr>
<th>1970’s Expectations</th>
<th>Today’s Realities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Might not be powerful enough for large males</td>
<td>Deadly for occupants &lt;5’ 2” and &gt; age 65</td>
</tr>
<tr>
<td>Instead of seat belts</td>
<td>Dangerous without seat belts (boxer punch)</td>
</tr>
<tr>
<td>Marketed as a pillow</td>
<td>Fatal Warning Label</td>
</tr>
<tr>
<td>Significant reduction in fatalities</td>
<td>&lt; $1/3$ of expected value due to increased belt use</td>
</tr>
<tr>
<td>Reduced injuries</td>
<td>Injury neutral *</td>
</tr>
</tbody>
</table>
Testimonial From The Field

“I’ve been in on a thousand car accidents, and I can always tell who was wearing a seat belt and who wasn’t. The guy not wearing the seat belt is talking to me; the guy wearing his seat belt is worried about his car.” — Robert Rhynearson, Skydiver & Paramedic
**SUVs vs. Sub-Compacts**

- About 50% of auto fatalities occur in single vehicle crashes
- Driver behavior is most important safety factor
- Size/weight/mass is most important vehicle safety factor
- Adding 165 pounds to vehicle mass
  - Reduces risk to occupants of heavier car by 11.3%
  - Increases risk to occupants of lighter car by 6.9%
  - Reduces overall fatality risk by 2.2%

Crash Helmets

- Blunt head trauma leading cause of auto fatalities
- Helmets reduce impact by roughly 14 MPH
- Transfer impact force from head to spine
- After a seat belt, the best investment in auto safety is a crash helmet.
- “There is no safety on a motorcycle. But cyclists think the helmet gives them immunity” — CPD

Also see, Pure Cop, by Connie Fletcher, pp. 171-220
Crash Helmets Can Also Kill

“We could all be 'saved' by a large variety of equipment and body armor we don't wear. We could all wander around looking like hockey goalies and save thousands of injuries a year. But any device can become the tool for your undoing. Every button, lever, switch, knob or snap is something that can get stuck in the wrong position. You have to weigh what every gadget you buy could do for you, against what it can do to you. A helmet in a car can save your head. It can also increase fatigue, interfere with glasses, make your head heavier in a rear-end collision and decrease peripheral vision.”—Kevin O’Connell Skydiver & Scuba Diver
Do you want to live in the slow and safe (but poor) world of the horse and buggy with the Amish, or the fast and dangerous (but fabulously wealthy) world of automobiles in modern society?

Safety is always a moving target. The Nash Equilibrium of game theory holds that you must change your behavior in reaction to the behavior of others.

K&B Syndrome = Ken & Barbie Syndrome, which is the deceptive illusion among wealthy people that they are socially above the need for safety training and immune from the risks of the common man.
Economics of Safety V
Identification & Representation

- Thalidomide vs. Timolol
- AADs vs. MADD
- Skydiving vs. Scuba Diving
- Guided Tours vs. BASE Jumping

Timolol was kept off the U. S. market by the FDA for a decade, causing 10,000 needless deaths annually. See http://www.daviddfriedman.com/Academic/Medicine_Commodity/Medicine_Commodity.html

We can count the lives saved by AADs, but have to estimate the lives saved by the efforts of MADD.

Skydiving appears dangerous because we can easily imagine the ugly scene when a parachute fails to open. However, scuba diving may be more dangerous, but we are fooled because it’s more difficult to imagine one’s lungs exploding when a diver rises too fast to the surface.

It’s OK to die in hiking the Grand Canyon on guided tours, but illegal for a BASE jumper to jump off a cliff in the same park.
Economics of Safety VI
Socialized Witch-hunts

- Privatizing the risks while mutualizing the rewards (drug research)
- The safer things get, more resources are available to focus on the diminishing risks (Firestone Tires, SUVs & UPC scanners)
- The harshest punishments are levied on the safest industries (Disneyland)

Measured by per capita exposures, Disneyland has to be the safest plot of real estate on the entire planet, yet is was regulated after one person died in the park after 40 years of operation.
Strip mining is opposed by environmental groups, but is much safer for miners.

If the $450 million Intel spent needlessly recalling the Pentium chip was invested in safety measures with the ROI of seat belts, 3,000 lives could have been saved.

NHTSA = National Highway Traffic & Safety Administration

Witch-hunted Victims

- DDT
- Asbestos
- Strip mining
- *Mother Jones* predicted 900 Ford Pinto fire fatalities; only 28 actually occurred
- *60 Minutes* expose on Audi 5000 sudden acceleration; Audi exonerated by NHTSA
- Intel Pentium microchip: $450 million write-off = 3,000 lives @ seat belt cost
A Fatalist’s Epitaph

“He was never a poster child for safety. Those of us who knew him for a long time are kind of surprised he lasted this long. He had more equipment problems than everyone else I know put together. We were talking about gear and checking things out before the jump. He said, ‘Hell Bob, it’s just like Gary Westmoreland always said, either your number’s up and you’re gonna die, or it isn’t.’ That’s a quote. He was proud of his attitude. This guy was an accident waiting to happen, and it did.” — October 4th, 1997 Skydiving Fatality Report Xenia, Ohio

About the Drive Home: The Most Dangerous Part of Skydiving

“WARNING: Driving your kids to soccer practice is a dangerous activity that can result in SERIOUS INJURY OR DEATH!”

“We tell them they can die; but do we tell them they can *REALLY* die?” — Rhonda Lea Kirk, Skydiver