

Railroads

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	1950	1980	2010
Employee on Duty Fatalities	358	97	20
Employee-Hours (mil)	2,722	1,011	437
Fatalities per 10mil Employee-Hours	1.32	0.96	0.46
Passenger Fatalities	180	4	3
Passenger-miles (mil)	31,790	10,995	18,098
Crossing User Fatalities	1,568	832	260
Train-miles (mil)	1,389	718	704
Fatalities per mil train-miles	1.13	1.16	0.37
Vehicles Registered (mil)	49	161	256
Fatalities per mil vehicles	31.81	5.15	1.02

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Vehicles Registered (mil)	49	161	256
Fatalities per mil vehicles	31.81	5.15	1.02
Trespasser Fatalities	1,124	457	451
Train-miles (mil)	1,389	718	704
Fatalities per mil train-miles	0.81	0.64	0.64
Population (mil)	152	227	309
Fatalities per mil population	7.38	2.01	1.46

Important dates . . .

1970 Federal Railroad Safety Act

1972 *Operation Lifesaver* starts

1973 Federal-Aid Highway Act (section 130)

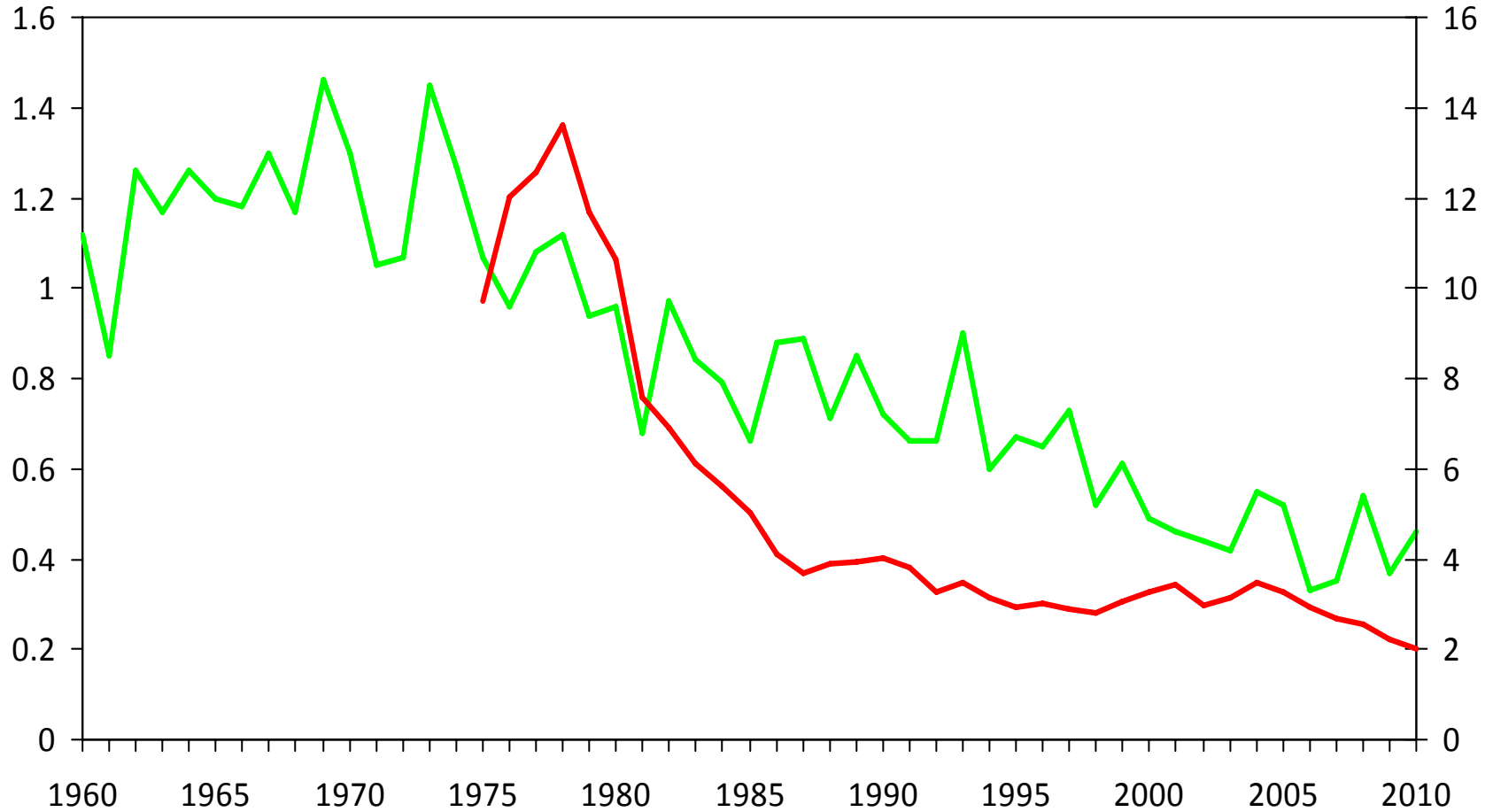
1974 Hazardous Materials Transportation Act

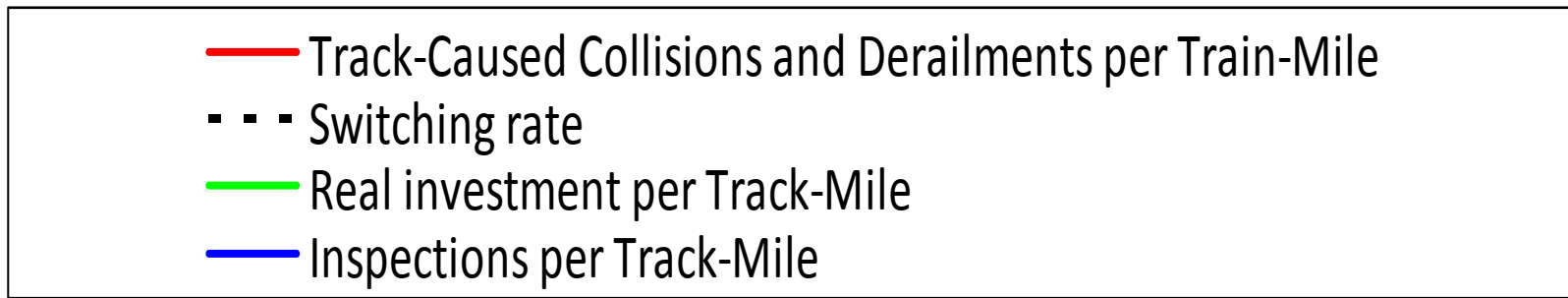
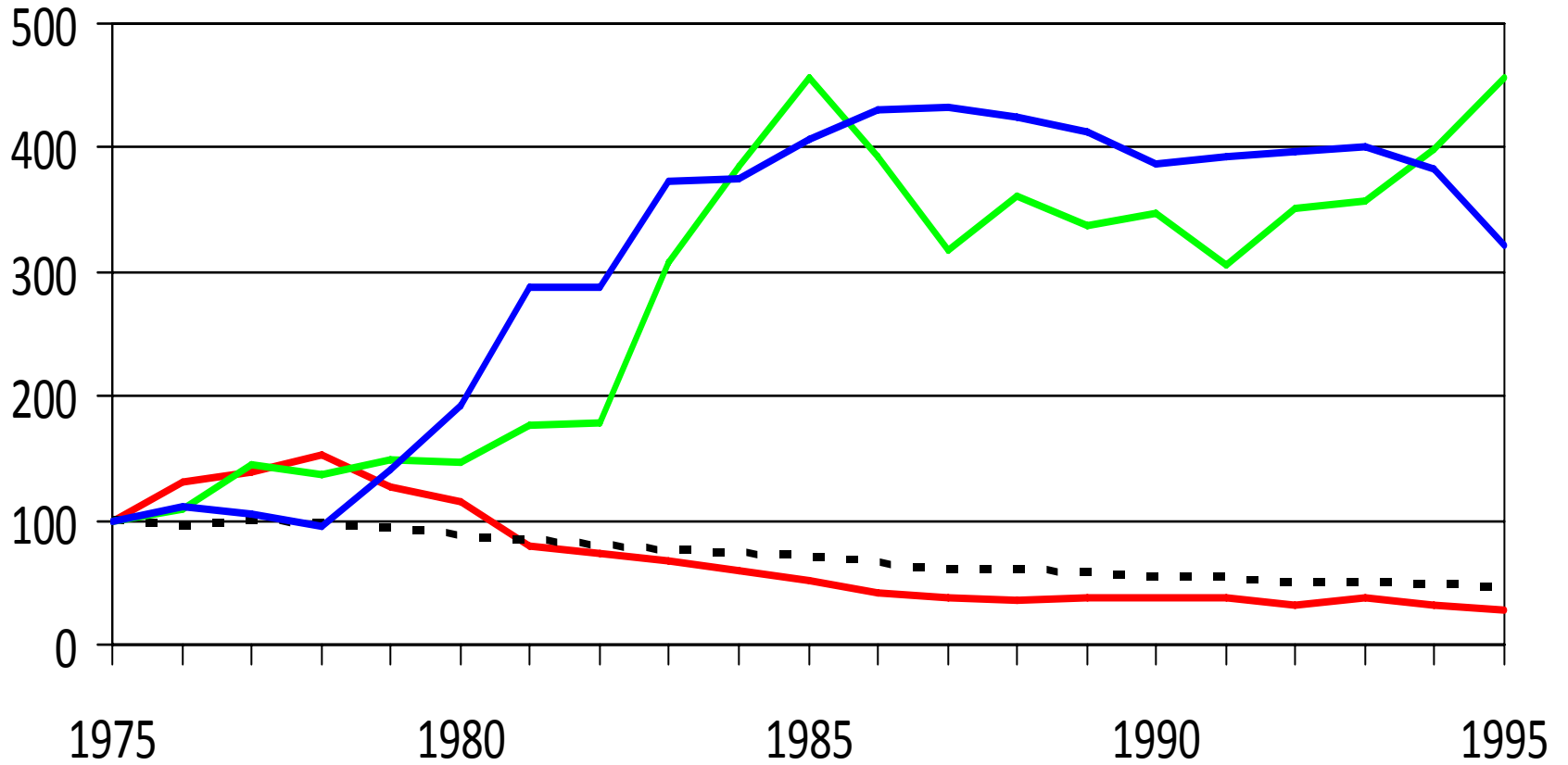
1976 Railroad Revitalization and Regulatory
Reform (4R) Act

1980 Staggers Railroad Act

Employee Fatalities per 10 mil. Employee-Hours (left axis)

Collisions and Derailments per mil. Train-Miles (right axis)





Crossings . . .

Shannon Mok and Ian Savage (2005) “Why has safety improved at rail-highway crossings” *Risk Analysis* 25(4):467-481

Pooled data, 49 states, 1975-2001

After adjusting for increased AADT, and increased train frequency, improvement in fatalities due to:

- 6.5% crossing closures
- 12.5% installation of active warning devices
- 33.0% generally improved highway safety
- 18.0% *Operation Lifesaver*
- 29.0% installation of ditch lights

Trespassing . . .

Ian Savage (2007) “Trespassing on the railroad”
Research in Transportation Economics 20:199-224

Time series analysis 1947-2003

For 1974-1988, exact balance between

- Increased population
- “Baby boom” in prime trespassing age (15-44)
- Increased train frequency
- Line closures
- Increased wealth (decreased risk taking)