



SAE *International*[™]

Measuring Crash Avoidance System Effectiveness with Insurance Data

www.iihs.org

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Matthew Moore, Vice President, HLDI

The Insurance Institute for Highway Safety,

founded in 1959, is an independent, nonprofit, scientific, and educational organization dedicated to reducing the losses — deaths, injuries, and property damage — from crashes on the nation's highways.

The Highway Loss Data Institute,

founded in 1972, shares and supports this mission through scientific studies of insurance data representing the human and economic losses resulting from the ownership and operation of different types of vehicles and by publishing insurance loss results by vehicle make and model.

Both organizations are wholly supported by auto insurers.



Highway Loss Data Institute

HLDI data providers have 80% share of U.S. auto insurance market

- AAA Northern California, Nevada and Utah
- Allstate
- American Family
- Amica
- ANPAC
- Auto Club Group
- Automobile Insurers Bureau of Mass.
- Chubb
- COUNTRY
- Erie
- Farm Bureau Financial Services (Iowa Farm Bureau)
- Farmers
- Foremost
- GEICO
- GMAC
- The Hartford
- High Point
- Kentucky Farm Bureau
- Liberty Mutual
- MetLife
- Nationwide
- PEMCO
- Progressive
- Rockingham
- Safeco
- Secura Insurance
- State Farm
- Tennessee Farm Bureau
- Travelers
- Unitrin
- USAA

Size of HLDI passenger vehicle database

Number of unique VINs in files, January 2013

model year	number of vehicles
2003	16,037,878
2004	15,837,777
2005	15,539,974
2006	14,555,883
2007	14,214,501
2008	12,444,140
2009	8,041,491
2010	8,984,595
2011	9,080,974
2012	8,550,880
total	123,288,093

Insurance coverages

- Collision
- Physical damage liability
- Bodily injury liability
- Medical payments
- Personal injury protection

Insurance measures

- Exposure
 - Expressed in insured vehicle years
 - One insured vehicle year represents 1 vehicle insured for 1 year or 2 vehicles insured for 6 months
- Claim frequency
 - Calculated by dividing claims by exposure
 - Expressed as the number of claims per selected number of insured vehicle years (exposure)
- Claim severity
 - Represents the average cost per claim
 - Calculated by dividing dollars paid for all claims by the claim count
- Overall losses
 - Represents the average cost per insured vehicle (year)
 - Calculated by dividing total dollars paid for claims by exposure



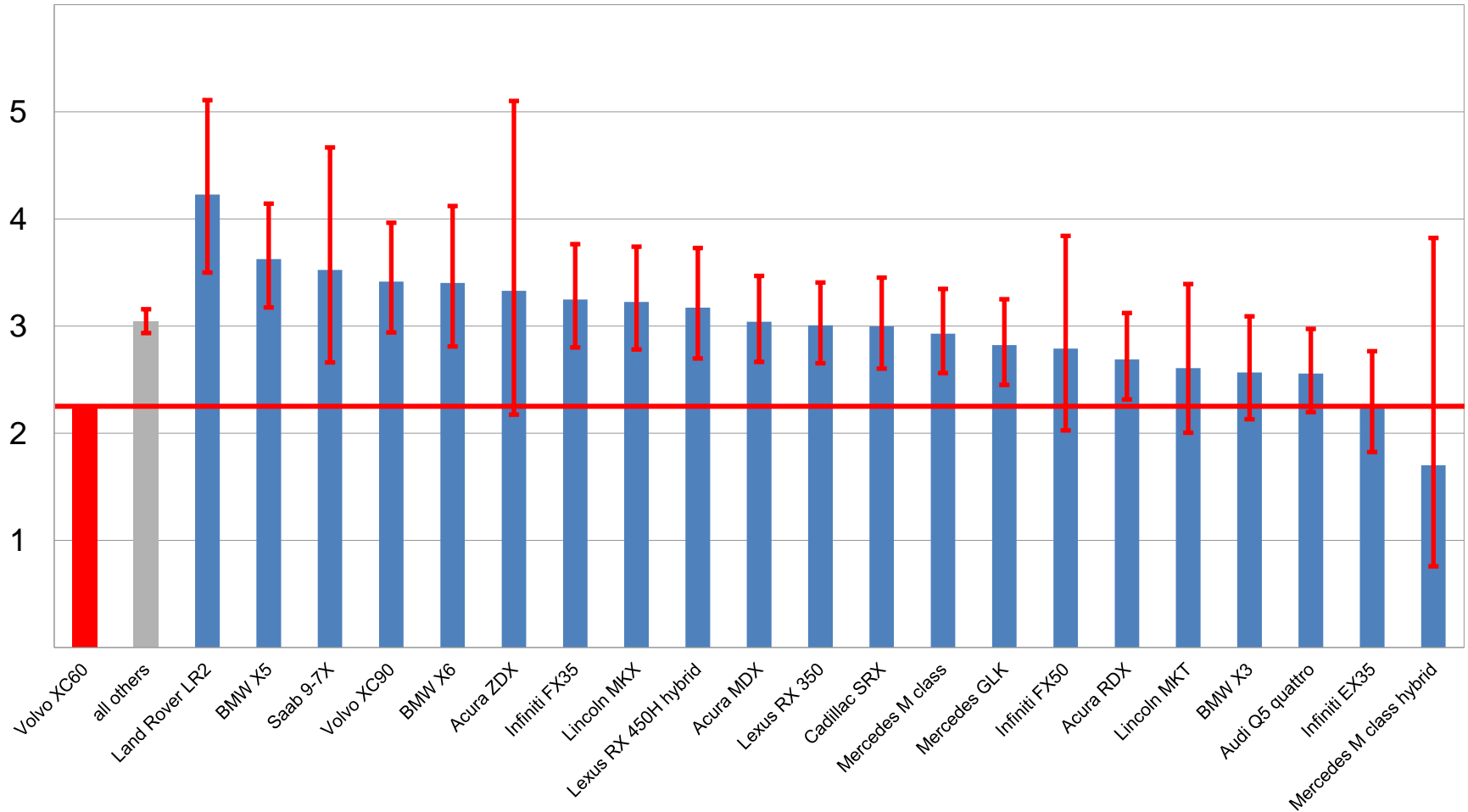
Evaluation of crash avoidance technologies



Volvo City Safety

Property damage liability claim frequencies for 2010 Volvo XC60

With City Safety vs. other 2009-10 midsize luxury SUVs



Early information about new technology

Example of Volvo City Safety loss reduction benefits (HLDI)

vs. other midsize luxury SUVs	claim frequency			claim severity			overall losses		
property damage liability	-29.3%	-26.6%	-23.9%	\$174	\$270	\$362	-\$21	-\$166	-\$125
bodily injury	-58.9%	-51.1%	-41.8%						
collision	-23.8%	-22.0%	-20.1%	-\$645	-\$517	-\$392	-\$109	-\$98	-\$86

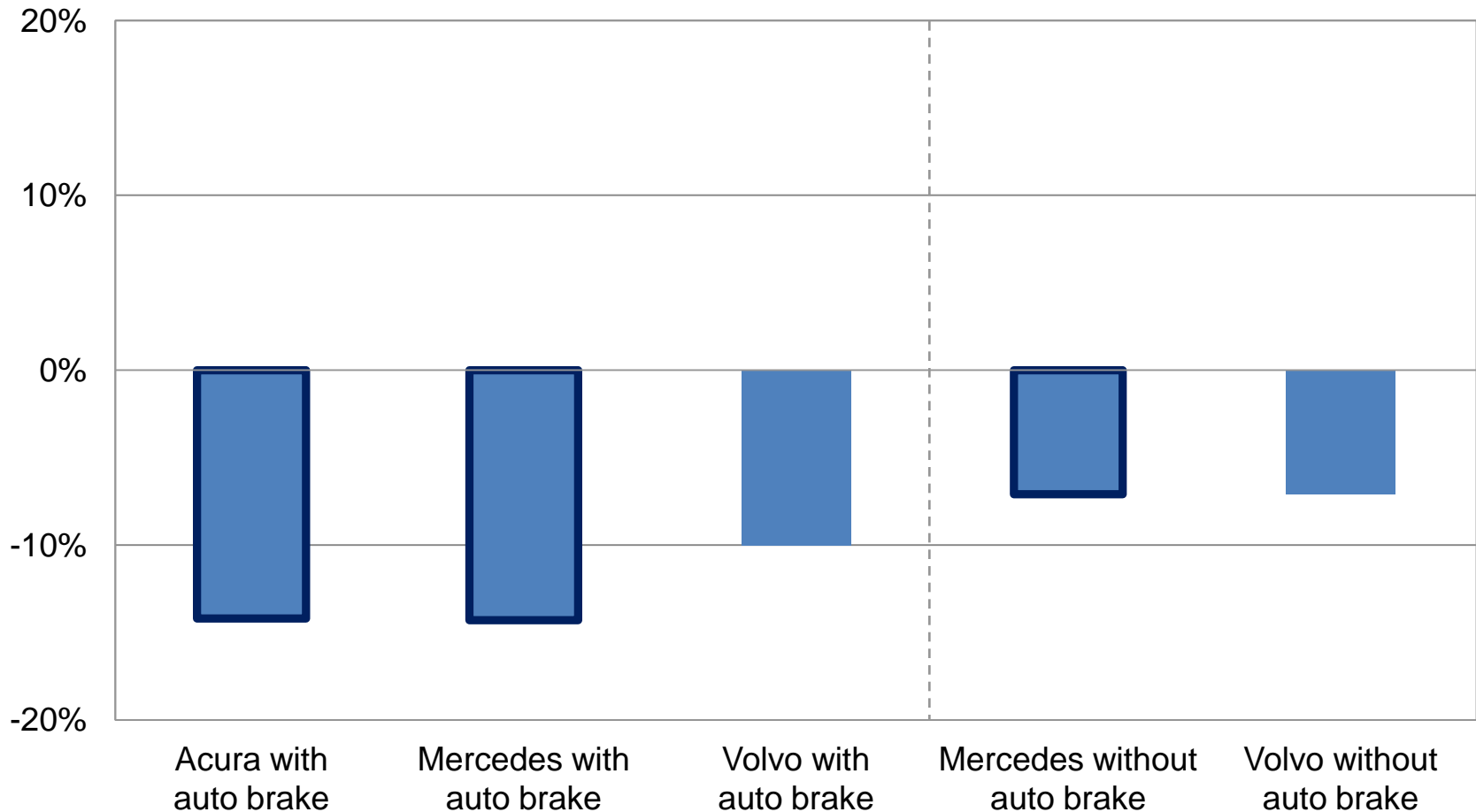
vs. other Volvos	claim frequency			claim severity			overall losses		
property damage liability	-24.5%	-19.2%	-13.7%	\$488	\$646	\$794	-\$5	\$2	\$7
bodily injury	-62.3%	-49.2%	-31.4%						
collision	-20.2%	-16.7%	-13.0%	-\$362	-\$147	\$58	-\$72	-\$53	-\$36



Forward collision warning and mitigation systems

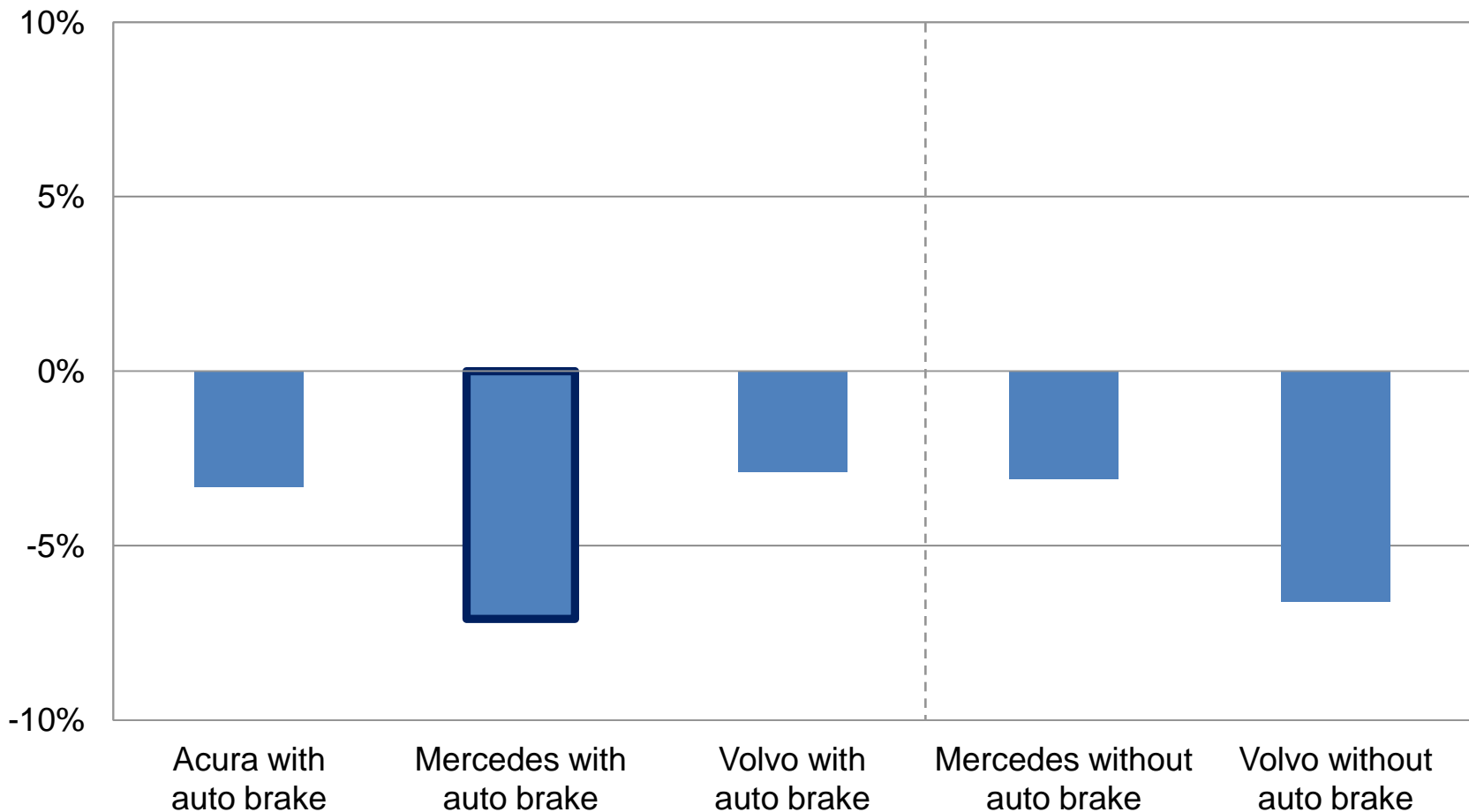
Forward collision warning with and without autonomous braking

Property damage liability claim frequency by manufacturer



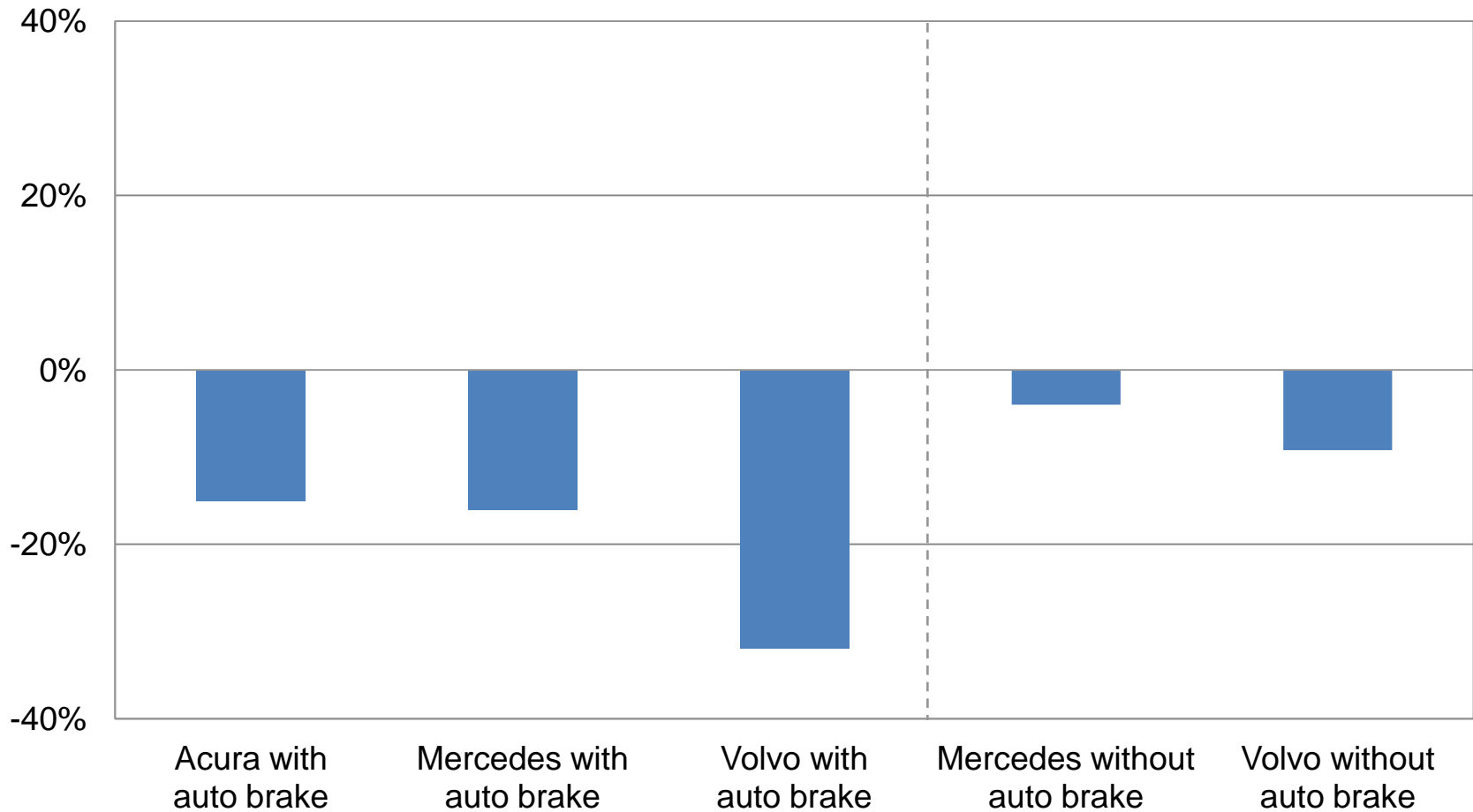
Forward collision warning with and without autonomous braking

Collision claim frequency by manufacturer



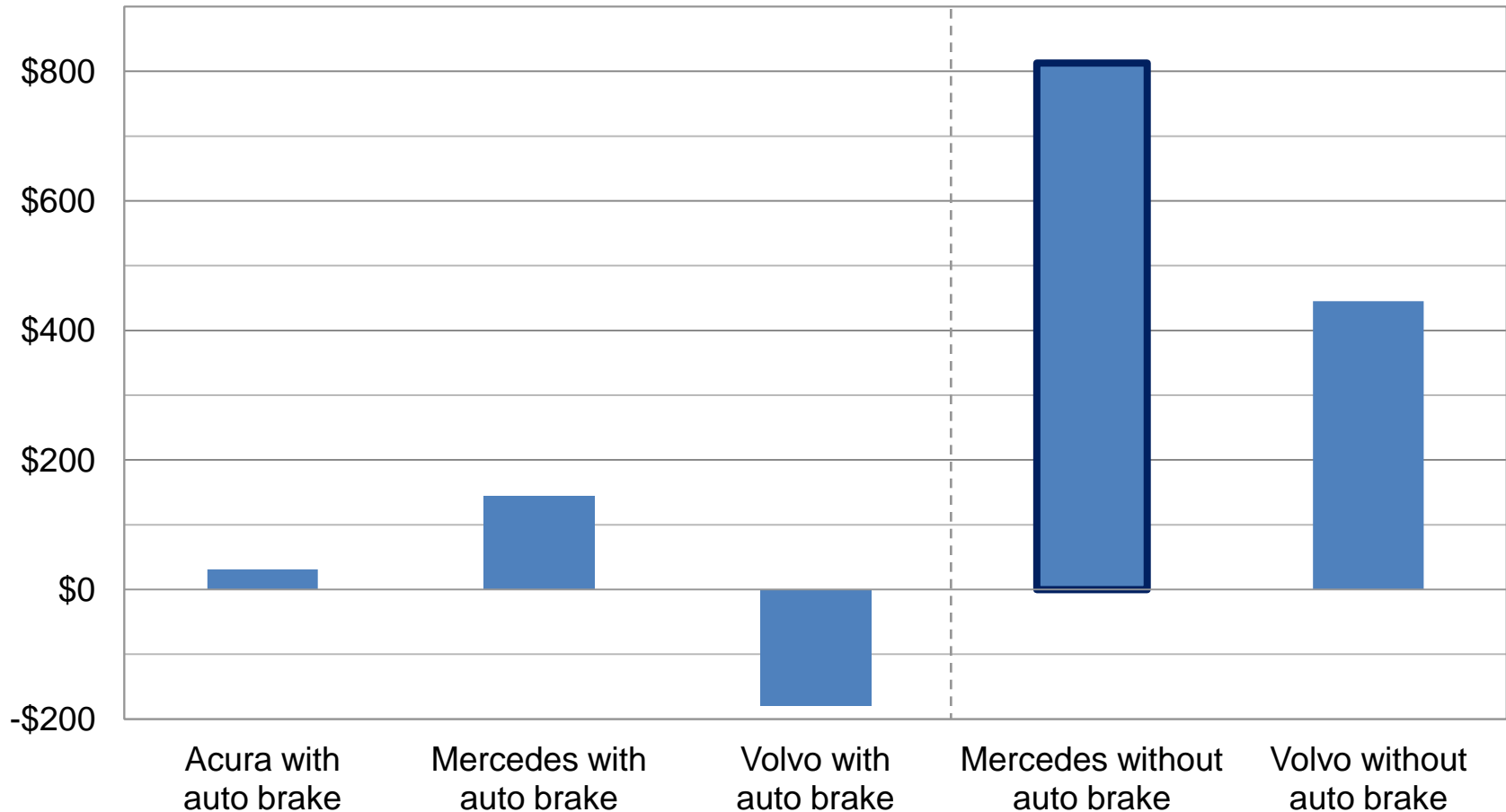
Forward collision warning with and without autonomous braking

Bodily injury claim frequency by manufacturer



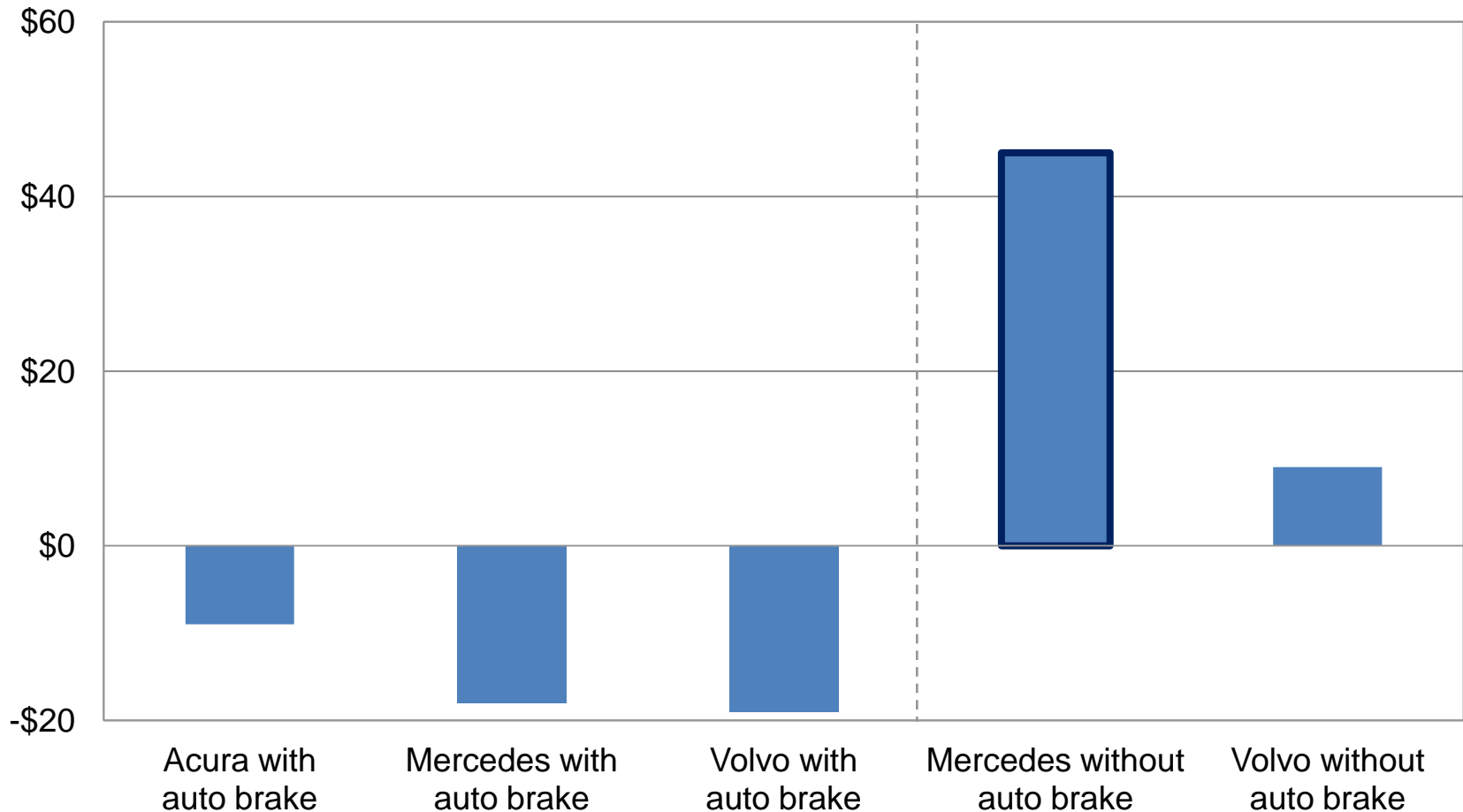
Forward collision warning with and without autonomous braking

Collision claim severity by manufacturer



Forward collision warning with and without autonomous braking

Collision overall losses per insured vehicle year by manufacturer

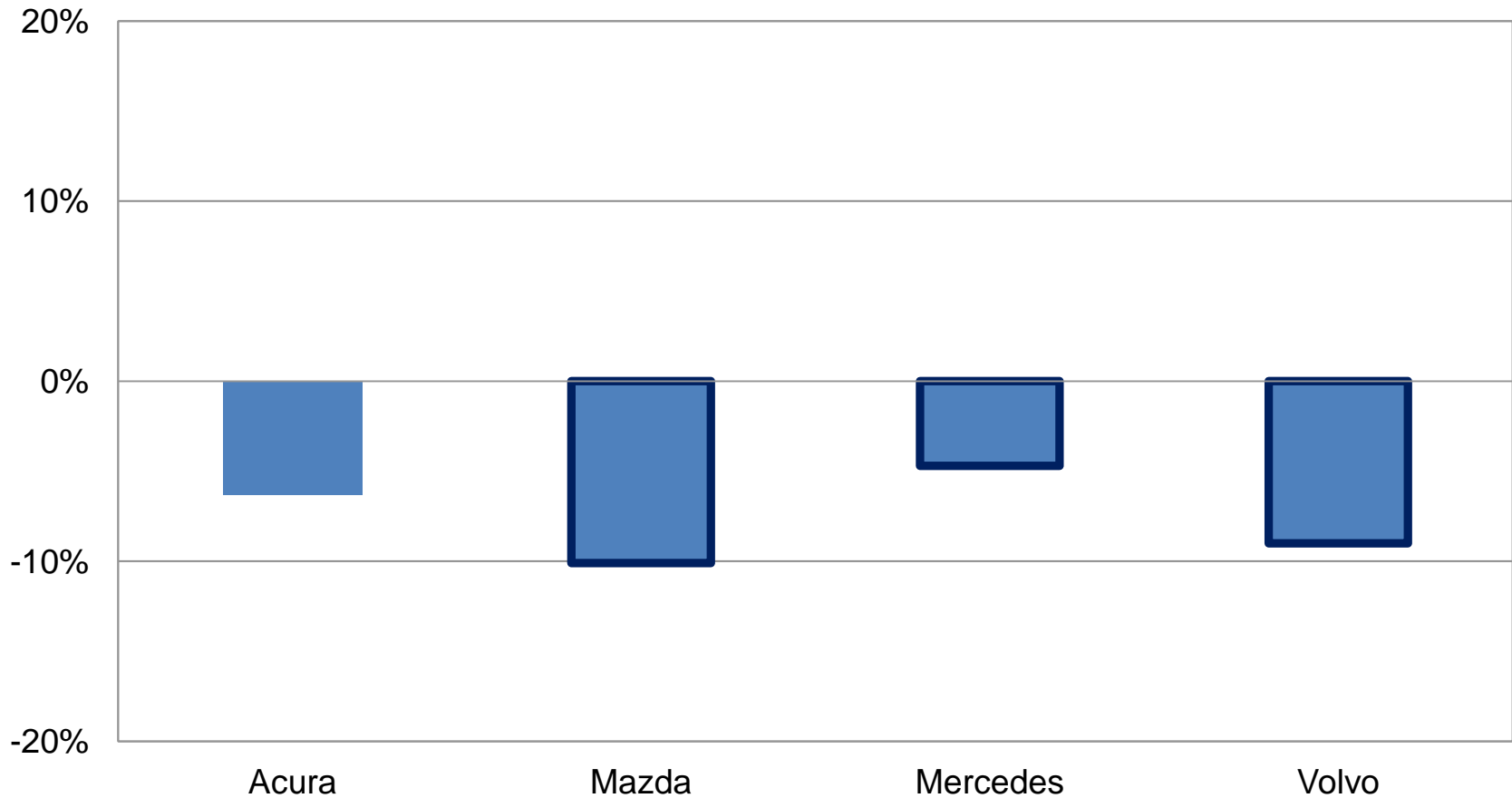




Adaptive headlights

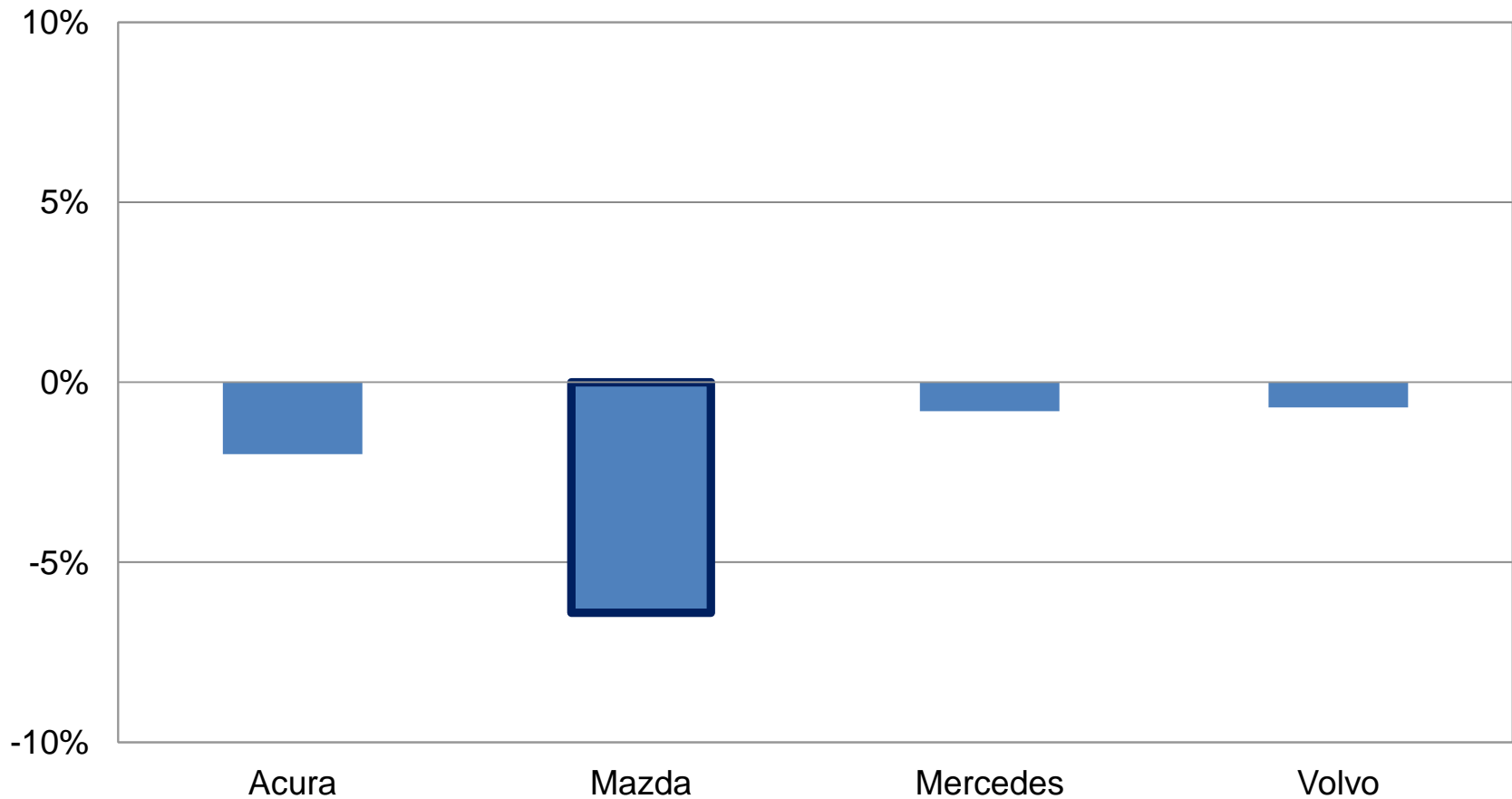
Adaptive headlights

Property damage liability claim frequency by manufacturer



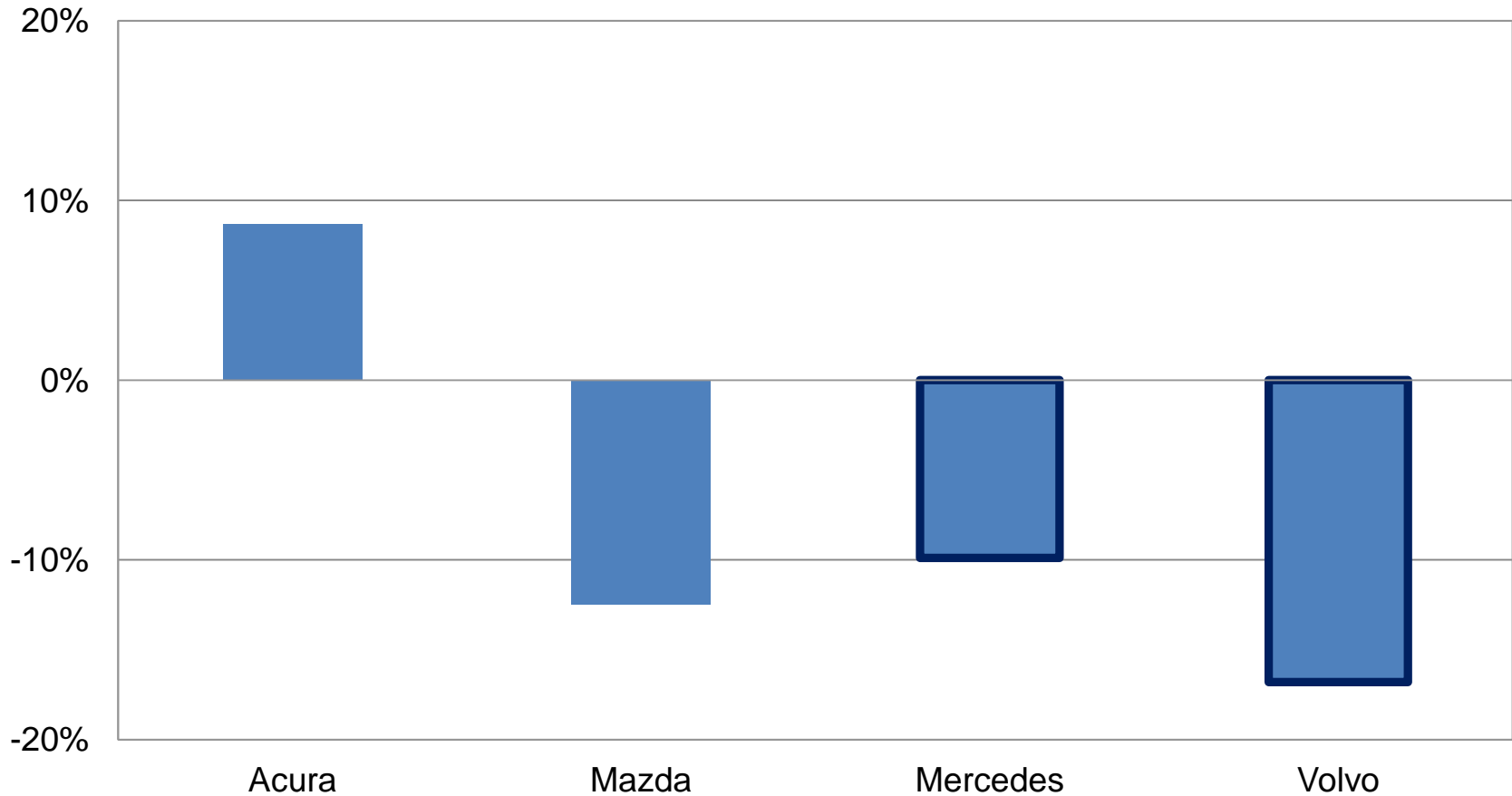
Adaptive headlights

Collision claim frequency by manufacturer



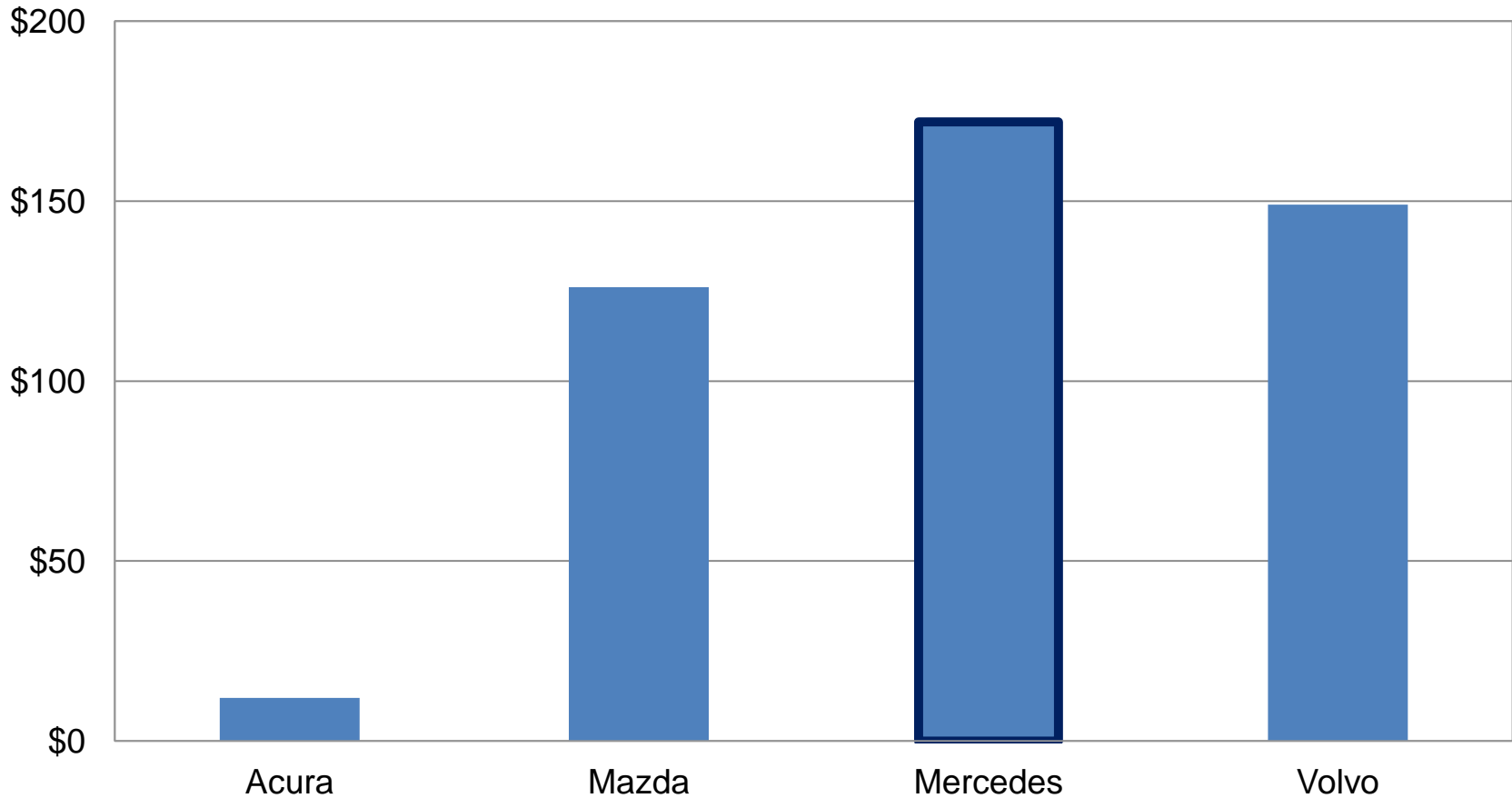
Adaptive headlights

Bodily injury claim frequency by manufacturer



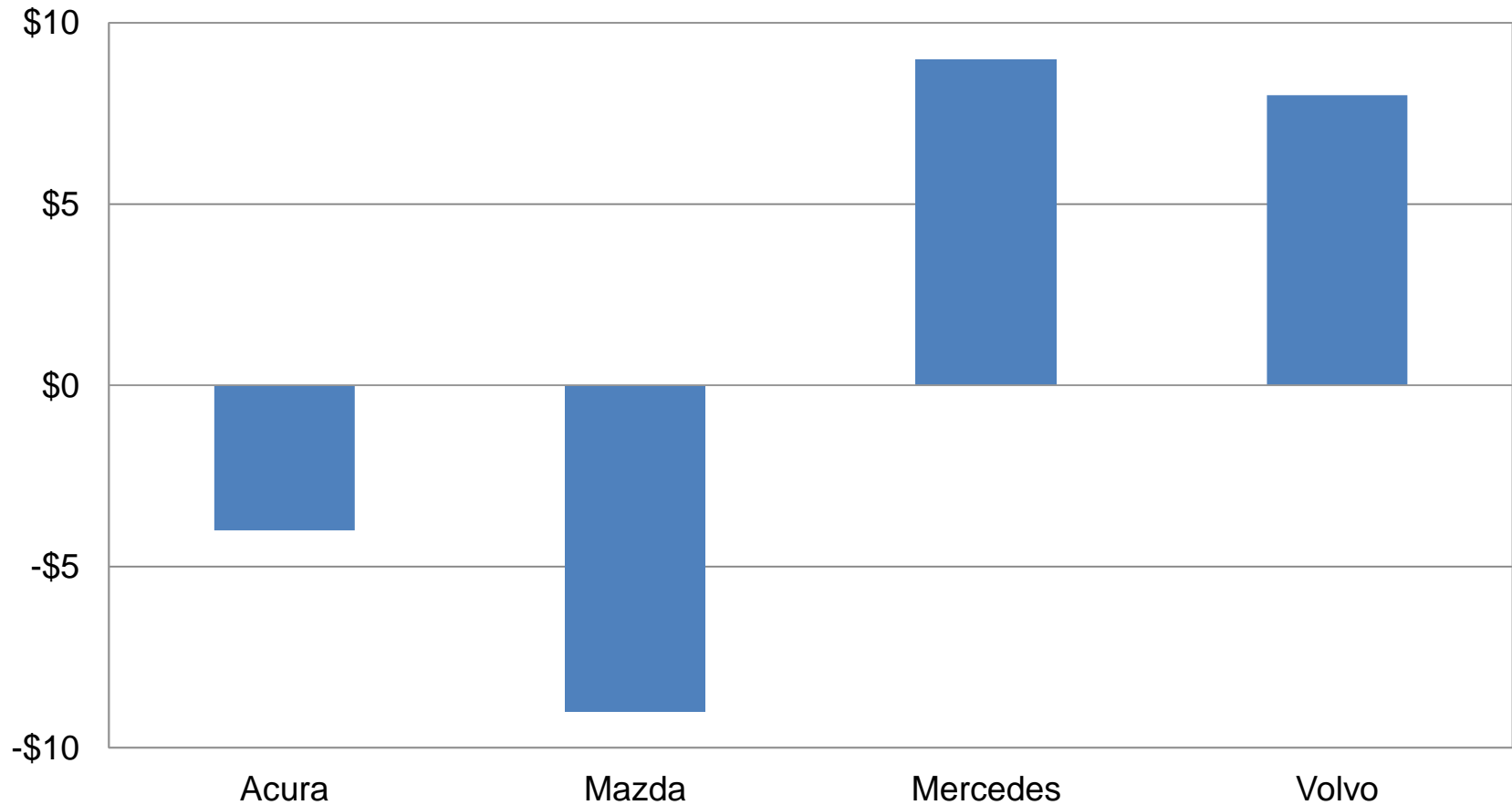
Adaptive headlights

Collision claim severity by manufacturer



Adaptive headlights

Collision overall losses by manufacturer

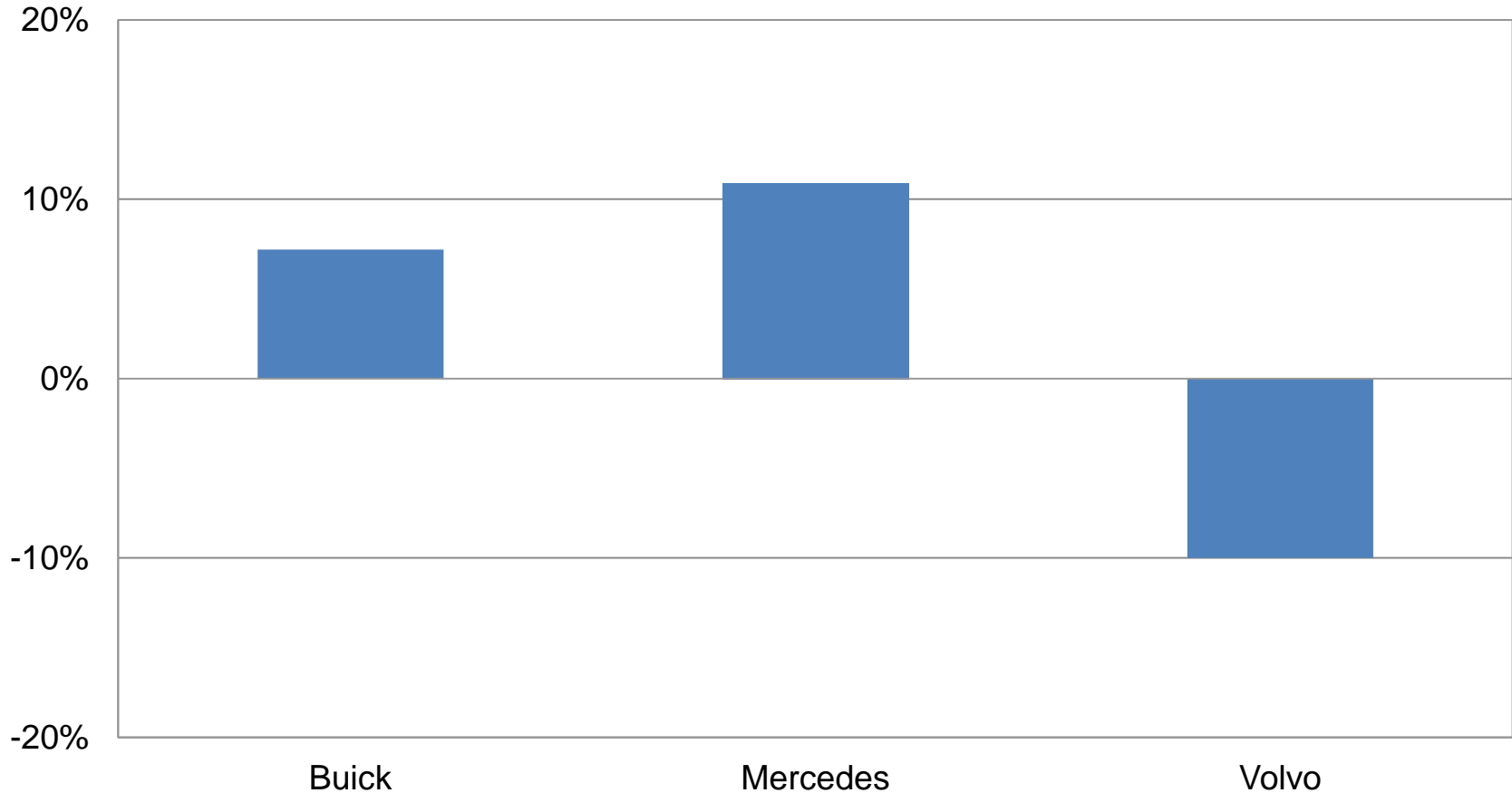




Lane departure warning

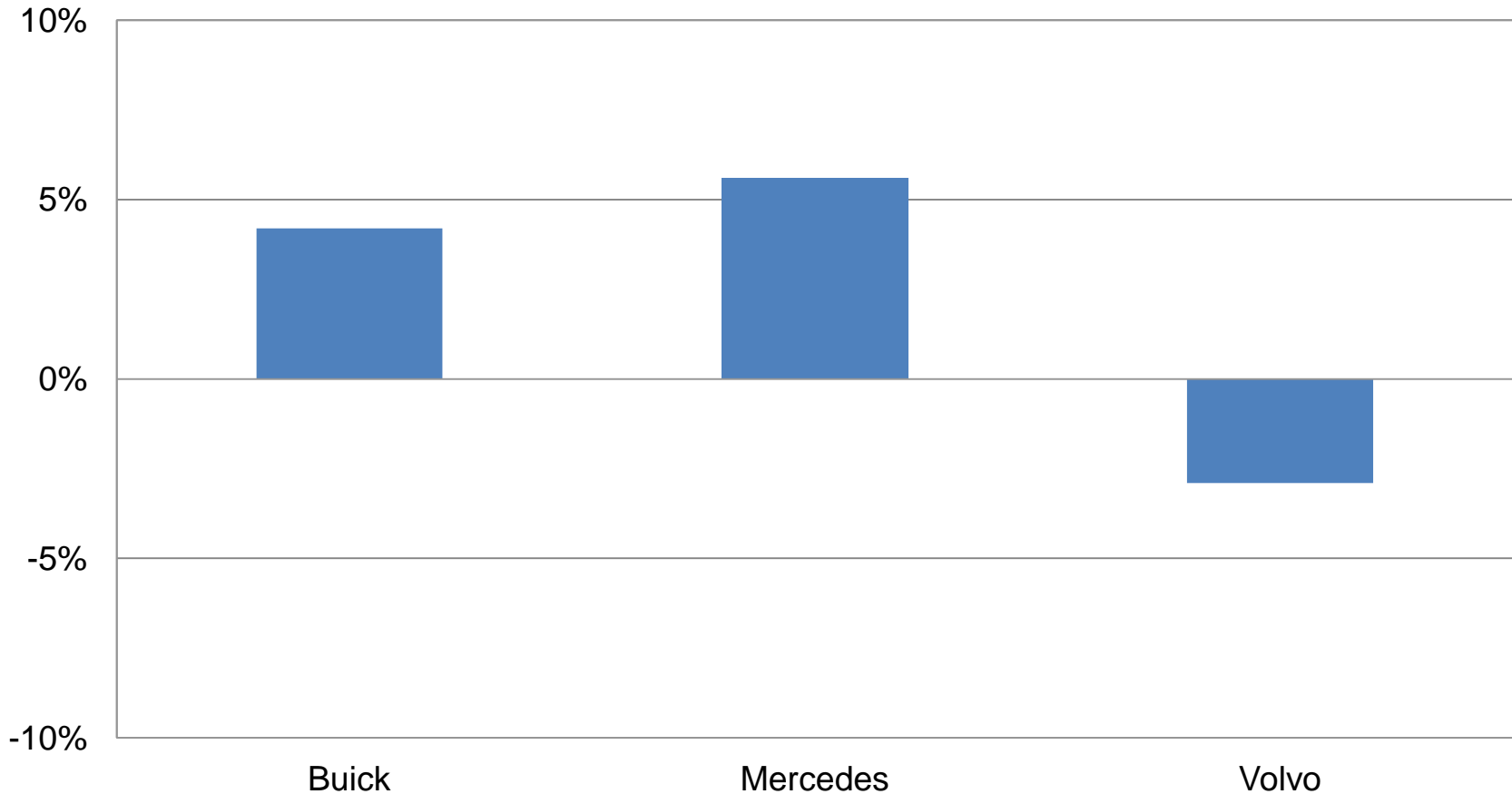
Lane departure warning without active assist

Property damage liability claim frequency by manufacturer



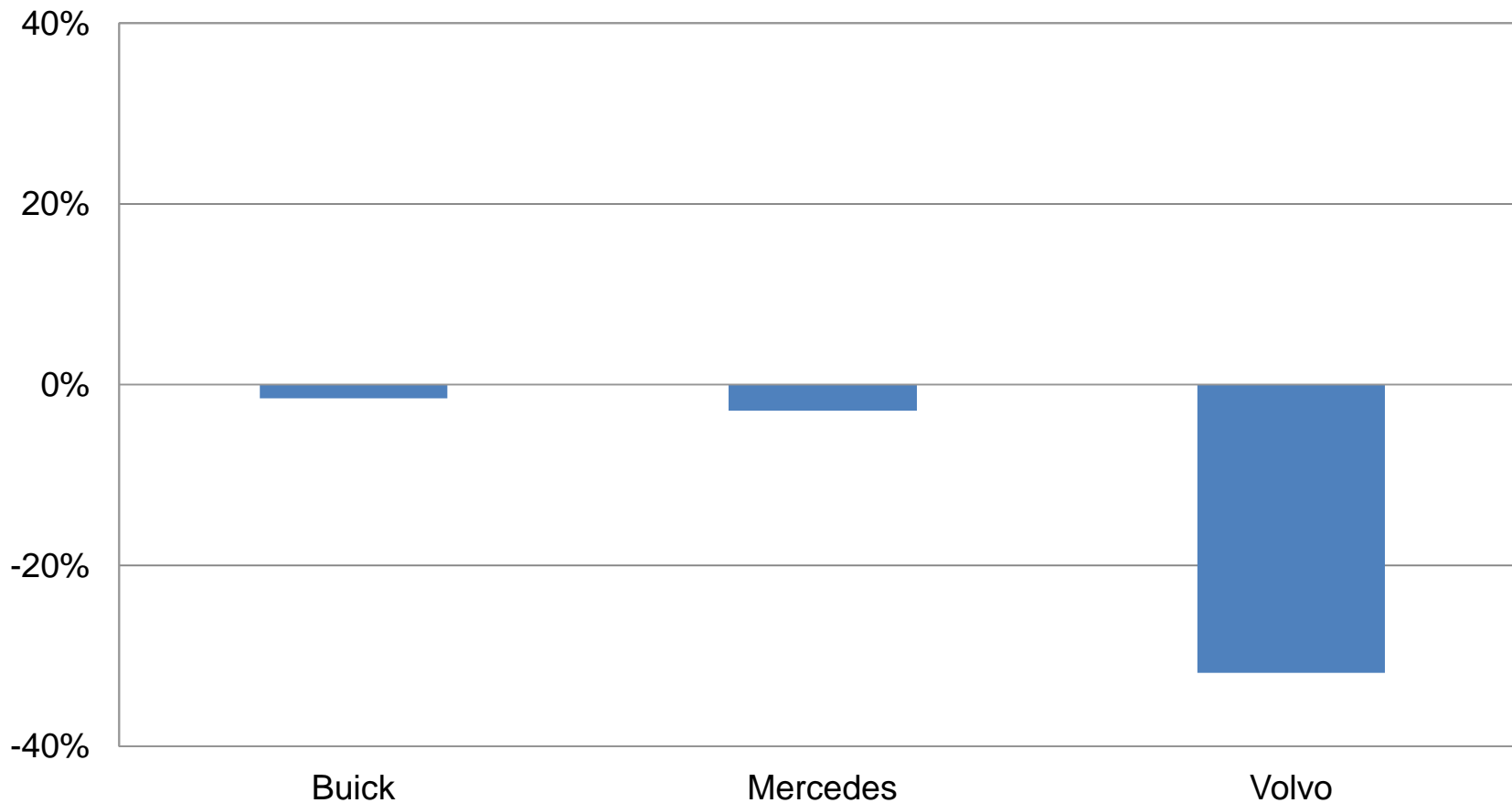
Lane departure warning without active assist

Collision claim frequency by manufacturer



Lane departure warning without active assist

Bodily injury liability claim frequency by manufacturer





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and property damage on the highway