



# Glass claims in Honda and Subaru vehicles with and without front crash prevention

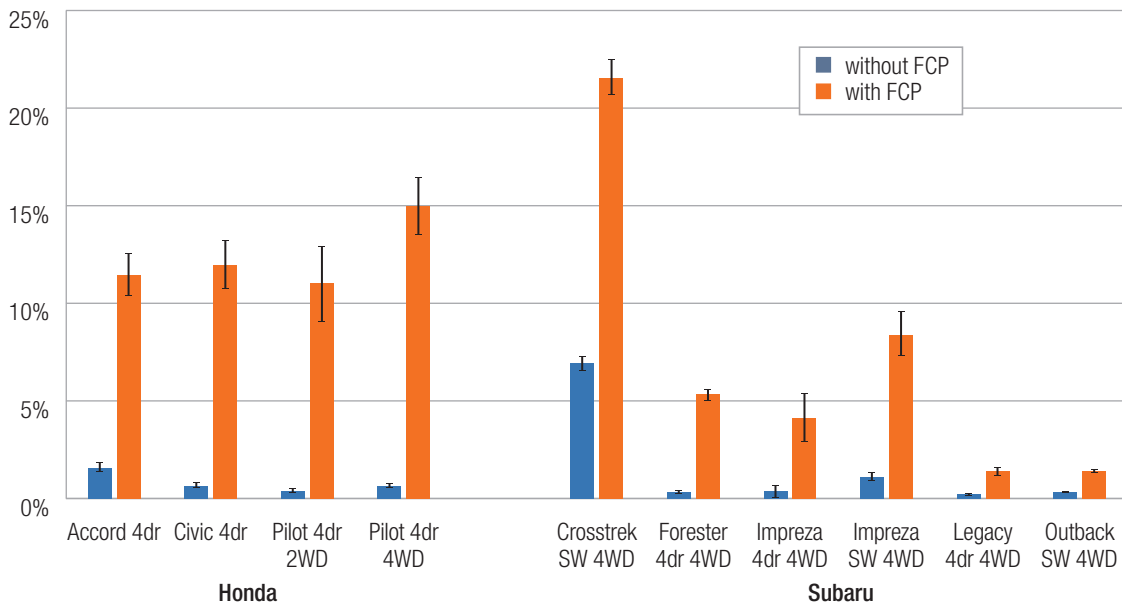
## ► Summary

Earlier Highway Loss Data Institute (HLDI) studies have found higher glass claim severities for vehicles with front crash prevention (FCP) systems compared with those without FCP. The FCP systems, both in the earlier studies and the present study, used windshield-mounted camera-based sensors. This study explored whether the higher severities for FCP-equipped vehicles were due to more high-dollar claims (those of \$1,000 or more) or fewer windshield repairs (claims less than \$125). When the windshield of a vehicle with FCP needs to be replaced, a recalibration of the FCP system is generally required. This extra cost may contribute to the higher glass claim severities for FCP-equipped vehicles. The need for FCP recalibration may also affect the rate at which vehicle owners elect to have a small chip or crack repaired as opposed to replacing the windshield. Typical windshield replacement costs range from about \$250 to \$600. Claim amounts of \$1,000 or more likely included an FCP recalibration.

The figure below shows the unadjusted percentage of glass claims of \$1,000 or more for Honda and Subaru vehicles with optional FCP. For each vehicle series, a weighted total was computed from the trim level/model year results by FCP availability. For most vehicle series, FCP-equipped vehicles had a much higher percentage of glass claims of \$1,000 or more than their corresponding models without FCP. The percentage for Honda vehicles without FCP was less than 2 percent, compared with over 10 percent for Honda vehicles with FCP.

Subaru vehicles had a wider range of results. The Crosstrek had the highest proportion of high-dollar claims for models without FCP (7 percent) and with FCP (22 percent). An optional moonroof and optional heated wiper park area on the windshield may have contributed to the higher claim amounts for the Crosstrek. The large number of high-dollar claims for Crosstreks without FCP only occurred with the 2018–19 models, not the 2015–17 models. Other Subaru vehicles without FCP had around 1 percent or fewer claims of \$1,000 or more. Results for Subaru vehicles with FCP ranged from 1 percent (Legacy and Outback) to 8 percent (Impreza station wagon). Although some increases in glass losses are associated with FCP, the system has been shown to significantly reduce crash and injury claim frequencies.

**Percentage of glass claims of \$1,000 or more for selected Honda and Subaru vehicles with optional front crash prevention**



## ► Introduction

Earlier HLDI studies have found higher average glass claim severities for vehicles equipped with front crash prevention (FCP) compared with those without FCP (HLDI, 2018b, 2018c). Glass claim severity was estimated to be 11 percent higher in Honda Accord four-door models and 16 percent higher in Subaru Legacy and Outback vehicles when compared with the same vehicle series without FCP. Slightly higher glass claim frequencies for FCP-equipped vehicles were also found. The FCP systems in these studies and the present study used windshield-mounted camera-based sensors.

When the windshield of a vehicle with FCP needs to be replaced, a recalibration of the FCP system is generally required. This extra cost may contribute to the higher glass claim severity for FCP-equipped vehicles. The need for FCP recalibration may also affect the rate at which vehicle owners elect to have a small chip or crack repaired as opposed to replacing the windshield. The present study examines low-dollar claims (less than \$125) and high-dollar claims (\$1,000 or more) for vehicles with and without FCP. Claims less than \$125 were assumed to be for windshield repairs. To encourage this lower-cost option, many insurers waive the comprehensive deductible for repairs of small cracks and chips. Typical windshield replacement costs range from about \$250 to \$600. Claim amounts of \$1,000 or more likely included an FCP recalibration.

## ► Methods

The results in this study were based on glass losses under comprehensive coverage of selected Honda and Subaru vehicles from their introduction through July 2019. Information on the type of glass damage is not available in the HLDI database, only the loss amount is available. **Table 1** lists the study vehicles. Only trim levels and model years where FCP was optional were included in the study. In both the Honda and Subaru vehicles studied, FCP is discernable by the Vehicle Identification Number (VIN). The results were based on over 270,000 glass claims.

**Table 1: Study vehicles**

Make	Series	Trim*	Model years
Honda	Civic 4dr	EX	2016-18
Honda	Civic 4dr	EX-T	2016-18
Honda	Civic 4dr	EX-TL	2016-18
Honda	Civic 4dr	LX	2016-18
Honda	Accord 4dr	EX	2016-17
Honda	Accord 4dr	EX-L	2016-17
Honda	Accord 4dr	EX-L V6	2016-17
Honda	Accord 4dr	LX	2016-17
Honda	Accord 4dr	SPORT	2016-17
Honda	Pilot 4dr 2WD	EX	2016-18
Honda	Pilot 4dr 2WD	EX-L	2016-18
Honda	Pilot 4dr 4WD	EX	2016-18
Honda	Pilot 4dr 4WD	EX-L	2016-18
Subaru	Crosstrek station wagon 4WD	2.0i Limited VDC	2018
Subaru	Crosstrek station wagon 4WD	2.0i Limited VDC NAVI	2015-17
Subaru	Crosstrek station wagon 4WD	2.0i Premium VDC	2015-19
Subaru	Crosstrek station wagon 4WD	2.0i VDC	2019
Subaru	Forester 4dr 4WD	2.0XT Touring VDC	2014
Subaru	Forester 4dr 4WD	2.5i Limited VDC NAVI	2015-18
Subaru	Forester 4dr 4WD	2.5i Premium VDC	2015-18

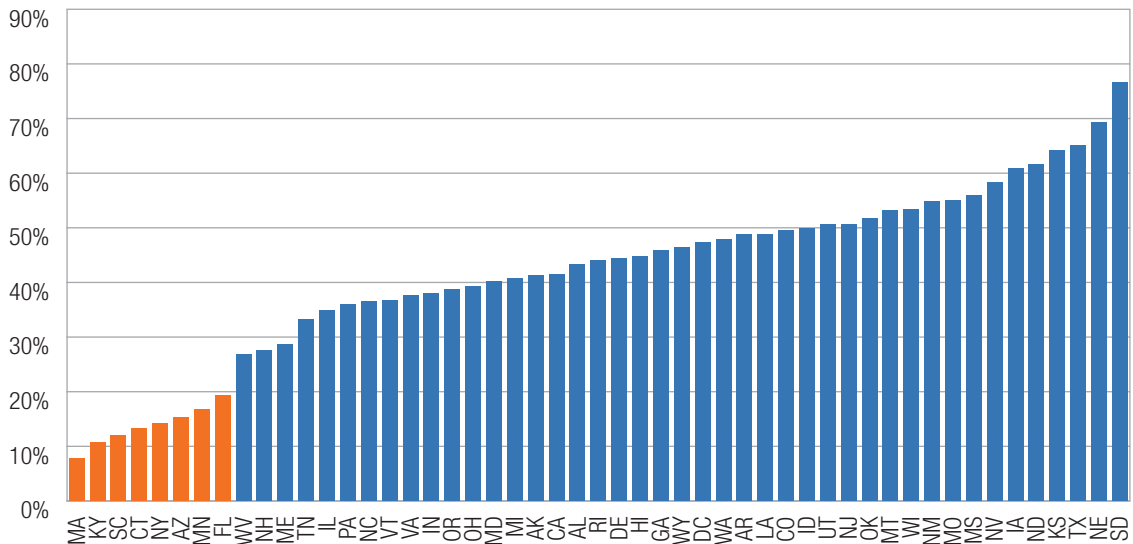
**Table 1: Study vehicles**

Make	Series	Trim*	Model years
Subaru	Forester 4dr 4WD	2.5I Touring VDC	2016
Subaru	Impreza 4dr 4WD	2.0I Limited VDC	2017-18
Subaru	Impreza 4dr 4WD	2.0I Premium VDC	2017-19
Subaru	Impreza 4dr 4WD	2.0I Sport VDC	2017-19
Subaru	Impreza 4dr 4WD	2.0I VDC	2019
Subaru	Impreza station wagon 4WD	2.0I Limited VDC	2017-18
Subaru	Impreza station wagon 4WD	2.0I Premium VDC	2017-19
Subaru	Impreza station wagon 4WD	2.0I Sport Premium VDC	2015-16
Subaru	Impreza station wagon 4WD	2.0I Sport VDC	2017-19
Subaru	Impreza station wagon 4WD	2.0I VDC	2019
Subaru	Legacy 4dr 4WD	2.5I Limited VDC NAVI	2013-16
Subaru	Legacy 4dr 4WD	2.5I Premium VDC	2014-18
Subaru	Legacy 4dr 4WD	2.5I Premium VDC NAVI	2015-16
Subaru	Legacy 4dr 4WD	3.6R Limited VDC NAVI	2013-15
Subaru	Outback station wagon 4WD	2.5I Limited VDC NAVI	2013-16
Subaru	Outback station wagon 4WD	2.5I Premium VDC	2014-18
Subaru	Outback station wagon 4WD	2.5I Premium VDC NAVI	2015-16
Subaru	Outback station wagon 4WD	3.6R Limited VDC NAVI	2013-15

\* In the Trim column, VDC = vehicle dynamics control and NAV = navigation system.

Some states have regulations that promote replacement as opposed to the repair of damaged glass. For example, Florida, Kentucky, and South Carolina mandate a \$0 deductible for glass damage. In Connecticut, the comprehensive deductible is not applied to glass damage. In Arizona and Minnesota, insurance companies are required to offer zero-deductible glass endorsements for comprehensive coverage. These laws disincentivize opting for a repair over replacement. To control for this, states with low percentages of repairs were excluded from the analyses. **Figure 1** shows the percentage of claims less than \$125 by state for calendar year 2018. The eight states with the lowest percentages were excluded from the study.

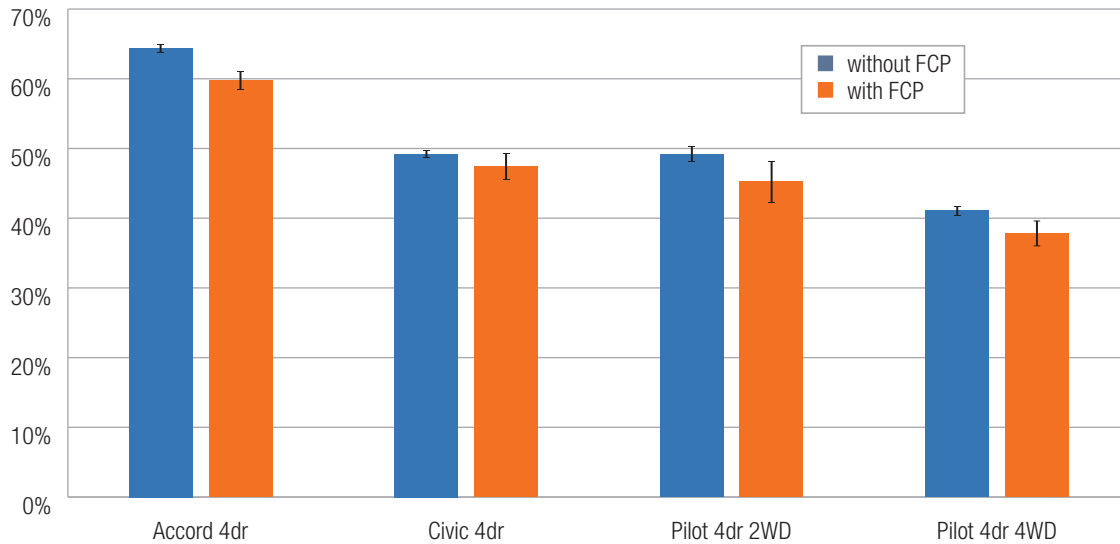
**Figure 1: Percentage of claims less than \$125 by state for calendar year 2018**



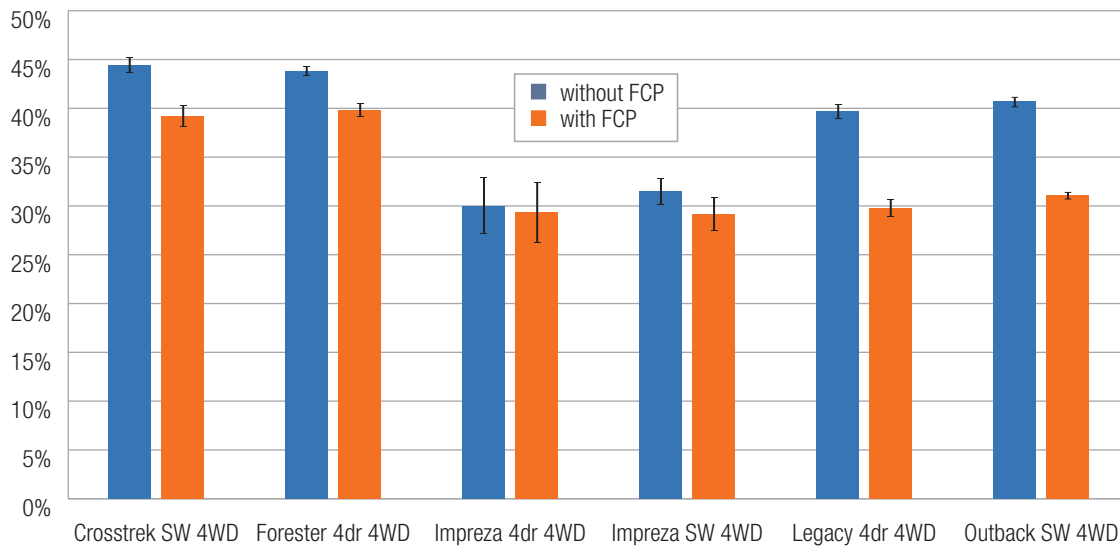
## ► Results

Figures 2–5 show the unadjusted percentage of glass claims less than \$125 (Figures 2–3) and the unadjusted percentage of claims greater than or equal to \$1,000 (Figures 4–5). For each vehicle series, a weighted total was computed from the trim level/model year results by FCP availability.

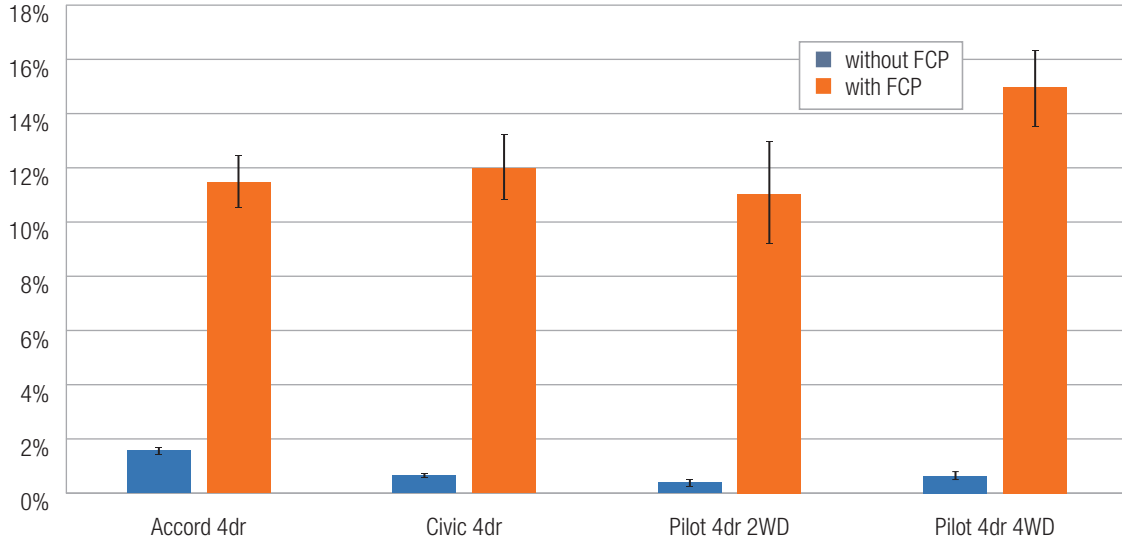
**Figure 2: Percentage of glass claims less than \$125 for selected Honda vehicles with optional front crash prevention**



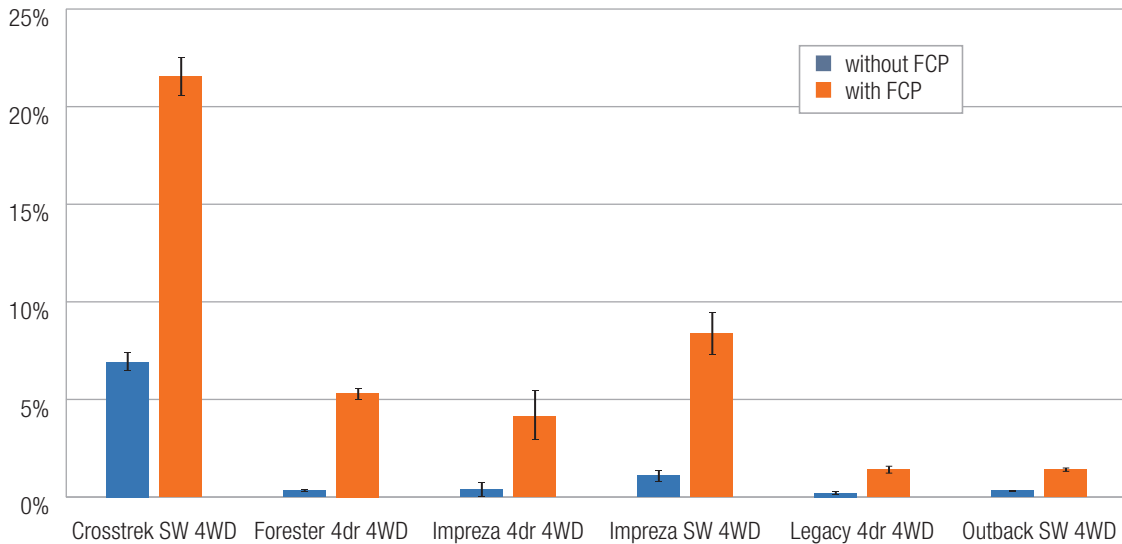
**Figure 3: Percentage of glass claims less than \$125 for selected Subaru vehicles with optional front crash prevention**



**Figure 4: Percentage of glass claims of \$1,000 or more for selected Honda vehicles with optional front crash prevention**



**Figure 5: Percentage of glass claims of \$1,000 or more for selected Subaru vehicles with optional front crash prevention**



Differences in the percentage of claims less than \$125 for vehicles with and without FCP varied significantly by vehicle series (**Figures 2–3**). There was very little difference in the results for the Honda Civic four-door (49 percent without FCP versus 47 percent with FCP), Subaru Impreza four-door (30 percent versus 29 percent), and Subaru Impreza station wagon (31 percent versus 29 percent). At the opposite extreme, large differences were found for the Subaru Legacy four-door 4WD (40 percent without FCP versus 30 percent with FCP) and the Subaru Outback station wagon 4WD (41 percent versus 31 percent). All vehicle series saw at least slightly lower results for FCP-equipped vehicles, although some of the differences were not statistically significant.

For most vehicle series, FCP-equipped vehicles had a much higher percentage of glass claims of \$1,000 or more than their corresponding model without FCP. Honda vehicles without FCP had results less than 2 percent, compared with over 10 percent for Honda vehicles with FCP (**Figure 4**). Subaru vehicles had a wider range of results. The Crosstrek had the highest result for models without FCP (7 percent) and the highest result for models with FCP (22 percent). An optional moonroof and optional heated wiper park area on the windshield may have contributed to the higher claim amounts for the Crosstrek. The high rate for Crosstreks without FCP only occurred with the 2018–19 models, not the 2015–17 models. Other Subaru vehicles without FCP had around 1 percent or fewer claims of \$1,000 or more. Results for Subaru vehicles with FCP ranged from 1 percent (Legacy and Outback) to 8 percent (Impreza station wagon).

Logistic regressions were run for the Honda and Subaru vehicles on the percentage of claims less than \$125 and the percentage of claims of \$1,000 or more. The models controlled for vehicle series and trim, vehicle age, deductible, and state. For brevity, the full model results are only provided for Honda claims less than \$125 in the **Appendix. Table 2** lists the risk ratios for FCP from the four models. Honda vehicles with FCP were 9 percent less likely to have a glass claim less than \$125 compared with Hondas without FCP. Subaru vehicles with FCP were 21 percent less likely to have a glass claim less than \$125 compared with Subaru vehicles without FCP. A much larger effect of FCP was seen in the percentage of claims of \$1,000 or more. Compared with vehicles without FCP, Hondas with FCP were over 12 times more likely to have a glass claim of \$1,000 or more. Subaru vehicles with FCP were over 6 times more likely to have a glass claim of \$1,000 or more.

Table 2: Risk ratio of front crash prevention availability Vehicles with FCP compared with those without FCP				
Make	Claim size group	Risk ratio	95% confidence interval	
			Lower limit	Upper limit
Honda	claims < \$125	0.908	0.886	0.930
Subaru	claims < \$125	0.788	0.775	0.801
Honda	claims >= \$1,000	12.261	11.365	13.200
Subaru	claims >= \$1,000	6.619	6.193	7.069

## ► Discussion

Earlier HLDI studies had found higher glass claim severities for vehicles with FCP compared with those without FCP. This study explored whether the larger severities were due to more high-dollar claims or a reduction in repairs. For both Honda and Subaru vehicles, some reduction in repair percentages was found. A more significant effect was the increase in claims of \$1,000 or more. Having a claim of \$1,000 or more was 12 times more likely in a Honda equipped with FCP and 6 times more likely in a Subaru equipped with FCP, when compared with the same vehicle series without FCP. Much of the higher claim amounts are due to the need for FCP recalibration after the windshield is replaced. Although some increases in glass losses are associated with FCP, the system has been shown to significantly reduce crash and injury claim frequencies (HLDI, 2018a). HLDI will continue to monitor how FCP affects glass and other losses.

## References

- Highway Loss Data Institute. (2018a). Compendium of HLDI collision avoidance research. *Loss Bulletin*, 35(34). Arlington, VA.
- Highway Loss Data Institute. (2018b). Glass losses for 2013–15 Honda Accords. *Loss Bulletin*, 35(37). Arlington, VA.
- Highway Loss Data Institute. (2018c). Glass losses for Subaru Legacy and Outback vehicles. *Loss Bulletin*, 35(26). Arlington, VA.

► **Appendix**

<b>Appendix: Logistic regression results on percentage of claims less than \$125 for Honda vehicles</b>				
<b>Variable</b>		<b>Approximate Relative Rate</b>	<b>95% CI</b>	<b>95% CI</b>
<b>Front crash prevention</b>	with FCP vs. without FCP	0.908	0.886	0.930
<b>Vehicle series and trim</b>	Honda Accord 4d EX	1.441	1.409	1.471
<b>(vs. Honda Pilot 4WD EX-L)</b>	Honda Accord 4d EX-L	1.387	1.359	1.413
	Honda Accord 4d EX-L V6	1.384	1.347	1.420
	Honda Accord 4d LX	1.405	1.379	1.431
	Honda Accord 4d Sport	1.393	1.368	1.416
	Honda Civic 4d EX	1.142	1.117	1.166
	Honda Civic 4d EX-T	1.156	1.127	1.184
	Honda Civic 4d EX-TL	1.118	1.084	1.152
	Honda Civic 4d LX	1.132	1.108	1.157
	Honda Pilot 2WD EX	1.125	1.075	1.174
	Honda Pilot 2WD EX-L	1.026	0.993	1.059
	Honda Pilot 4WD EX	1.048	1.003	1.091
<b>Vehicle age</b>	2–4 years vs. 0–1 years	0.943	0.929	0.958
<b>Deductible</b>	\$0–\$250 vs. \$251–\$999	0.517	0.505	0.528
	\$1,000–\$3,000 vs. \$251–\$999	1.120	1.093	1.146
<b>State</b>	Alaska vs. Texas	0.823	0.652	1.004
	Alabama vs. Texas	0.632	0.587	0.679
	Arkansas vs. Texas	0.672	0.599	0.748
	California vs. Texas	0.527	0.505	0.548
	Colorado vs. Texas	0.843	0.798	0.888
	District of Columbia vs. Texas	0.547	0.413	0.706
	Delaware vs. Texas	0.631	0.544	0.726
	Georgia vs. Texas	0.612	0.574	0.651
	Hawaii vs. Texas	0.486	0.396	0.589
	Iowa vs. Texas	0.962	0.857	1.067
	Idaho vs. Texas	0.912	0.838	0.988
	Illinois vs. Texas	0.504	0.469	0.541
	Indiana vs. Texas	0.513	0.464	0.565
	Kansas vs. Texas	0.937	0.862	1.014
	Louisiana vs. Texas	0.837	0.795	0.878
	Maryland vs. Texas	0.561	0.525	0.598
	Maine vs. Texas	0.509	0.415	0.614
	Michigan vs. Texas	0.697	0.642	0.755
	Missouri vs. Texas	0.808	0.749	0.869
	Mississippi vs. Texas	1.078	1.016	1.140
	Montana vs. Texas	0.961	0.831	1.091
	North Carolina vs. Texas	0.691	0.656	0.727
	North Dakota vs. Texas	1.031	0.888	1.171
	Nebraska vs. Texas	1.010	0.892	1.127
	New Hampshire vs. Texas	0.388	0.337	0.443

Appendix: Logistic regression results on percentage of claims less than \$125 for Honda vehicles

Variable	Approximate Relative Rate	95% CI	95% CI
New Jersey vs. Texas	0.685	0.650	0.721
New Mexico vs. Texas	0.841	0.769	0.915
Nevada vs. Texas	0.976	0.908	1.044
Ohio vs. Texas	0.539	0.507	0.572
Oklahoma vs. Texas	0.613	0.536	0.695
Oregon vs. Texas	0.544	0.492	0.599
Pennsylvania vs. Texas	0.563	0.531	0.595
Rhode Island vs. Texas	0.495	0.422	0.577
South Dakota vs. Texas	1.246	1.093	1.385
Tennessee vs. Texas	0.505	0.466	0.547
Utah vs. Texas	0.857	0.803	0.912
Virginia vs. Texas	0.581	0.551	0.614
Vermont vs. Texas	0.562	0.457	0.679
Washington vs. Texas	0.726	0.688	0.766
Wisconsin vs. Texas	0.807	0.746	0.870
West Virginia vs. Texas	0.369	0.301	0.447
Wyoming vs. Texas	0.798	0.640	0.966



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