

Vehicle Safety Features and Car Insurance Rates

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Issue

How does vehicle safety technology (advanced driver assistance features) impact car insurance rates and premiums?

Summary

Safety features have become more advanced as motor vehicle manufacturing capabilities have increased, and new cars are increasingly automated using technology called advanced driver assistance systems (ADAS). New vehicles often have, as standard or optional, technologies that monitor the vehicle's environment and warn the driver of potential collisions, or even automatically brake or steer the car. Drivers, however, are still fundamentally responsible for the vehicle's operation.

Independent research has shown that certain safety features reduce claim frequency. However, these same features can also increase claim severity (how much a claim costs). As such, the overall cost to the insurer may be largely unchanged, or only slightly reduced. Consequently, the impact of these features on premiums is mixed and depends on how individual insurers evaluate and weigh various risk factors.

Determining Car Insurance Premiums

To determine car insurance pricing, insurance companies generally estimate the cost and frequency of future claims and calculate how much they must charge policyholders to cover those claims. The amount someone pays for insurance (the premium) is based on many [factors](#), such as

their age, claims history, and driving record; their vehicle's make, model, and safety features; the location where the vehicle is regularly parked; how frequently the vehicle is driven; and the specific policy's deductible. The factors used vary by company, and the precise weight of each factor is generally considered a [trade secret](#).

[Insurance premiums](#) reflect both base insurance rates and underwriting. Base rates are set at the group level using common factors among groups of policyholders, such as age or gender. Rates are [actuarially determined](#), generally using data analyses of accident statistics, vehicle repair or replacement costs, and vehicle safety features, among other things. To determine a policyholder's premium, insurers adjust these rates through underwriting to reflect individual risk level (such as their driving history) and policy choices (such as coverage amount and deductible).

Safety Features' Impact on Premiums

Although safety features have been shown to lower claim frequency by preventing some crashes, some have been shown to increase claim severity (financial loss to the insurer). For example, these safety features often use sensors that are [expensive to replace](#) and often positioned on the outside of the vehicle where damage is often most severe. If claims involving safety features are more severe (more expensive for the insurer), the overall cost to the insurance company may remain unchanged despite a reduction in claims.

Additionally, it is not just the policyholder's vehicle that impacts their accident risk, but the possibility of encountering other drivers who may have older and less safe vehicles. While front crash prevention was standard or optional on [89% of 2021 model year vehicles](#), only 23% of registered vehicles had front crash prevention systems in the 2021 calendar year. From an insurer's perspective, a policyholder's vehicle safety features only partially offset potential losses if the majority of vehicles on the road lack the same features.

Ultimately, the impact of vehicle safety features on car insurance premiums is mixed and varies across insurance companies. Several car insurance companies offer specific premium discounts for safety features, including [State Farm](#) and [Geico](#).

Safety Features' Impact on Claims

For a given safety feature to affect insurance rates, there must be sufficient data to prove that the feature lowers accident risk. Below, we summarize findings on several different vehicle safety features.

Front Crash Prevention

Front crash prevention uses sensors to detect when a car is getting too close the car in front of it, and many also feature automatic emergency braking (applying the brakes if the driver does not respond). Starting in 2029, this system will be [required](#) on all new cars in the US. Vehicles equipped with front crash prevention technology show [lower claim frequency](#) but higher claim severity.

When tested on its own, front automatic emergency braking also [reduced](#) claim frequency but did not have a significant effect on claim severity.

Lane Departure Warning

Lane departure warning technologies generally use cameras to determine if a vehicle is moving out of its lane. Warnings can include visual signals or haptic feedback (for instance, making the steering wheel vibrate), and prevention technology can steer the car back into the lane by braking or moving the steering wheel. Lane departure warnings have not been shown to significantly [affect claim frequency](#).

Curve Adaptive Headlights

Curve adaptive headlights change the headlights' angle to shine in the direction the car is turning. Curve adaptive headlights have been shown to [reduce claim frequency](#). However, they have also been shown to [increase claim severity](#).

Blind Spot Warning

[Blind spot warnings](#) use sensors to alert the driver to a vehicle in the blind spot, or, in some cases, prevent the driver from changing lanes when a vehicle is detected. Blind spot warnings have been shown to [lower claim frequency](#).

Rear Crash Prevention

Rear automatic emergency braking (often accompanied with a back-up camera) has significantly [reduced claim frequency](#).

Automation

Combinations of the advanced safety features listed here are generally considered a type of automation. For example, General Motors' [Super Cruise](#) uses a variety of sensors to sense traffic around the vehicle, keep the vehicle within the lane, and check blind spots before changing lanes. This differs from an advanced safety feature, such as lane keeping assistance, by simultaneously combining elements of other safety features into a dynamic system. Although increasing

automation may help prevent crashes, drivers may also be paying less attention to the road [while using automated features](#). Additionally, a [company's marketing](#) about the capabilities of its automated driving features may lead to consumer over-confidence.

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