

Q3 2014

The Impact of Vehicle Recalls on the Automotive Market

AT A GLANCE

The history of vehicle recalls

Factors that determine recall impact
on market performance

Historical review: Ford and Toyota
recalls comparison

Recent GM recalls and impact



NADA Used Car Guide

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INTRODUCTION

Manufacturers of any product—from toys to medicine to automobiles—must create items that are, above all else, safe to use. Not only is this essential to long-term brand value and corporate success, but it's also required by law. But while perfection is the goal, defects are bound to occur, especially in advanced products such as automobiles.

When a safety defect does occur, auto manufacturers must initiate some form of recall to address the problem. Most recalls are simple, routine matters. Manufacturers work with their dealer partners to take care of the issue in a transparent and timely fashion, usually during scheduled maintenance visits. Consumers are inconvenienced little and drive away happy because proactive action was taken. As a result, it's unusual for a recall to negatively impact new vehicle sales and market share or used vehicle prices.

On some occasions, however, a recall is serious enough to have a lasting effect. These cases commonly involve a large number of vehicles, numerous reports of severe injury or death, and extensive media coverage. These factors, along with reputation for quality, dictate how much damage a brand suffers from a recall.

This report explores the issue in detail, beginning with a brief history of motor vehicle recalls. We examine the market impact of the high-profile 2000–2001 Ford/Firestone tire and 2009–2010 Toyota acceleration recalls, as well as the General Motors ignition switch recalls that have dominated industry headlines in 2014.

A HISTORY OF RECALLS

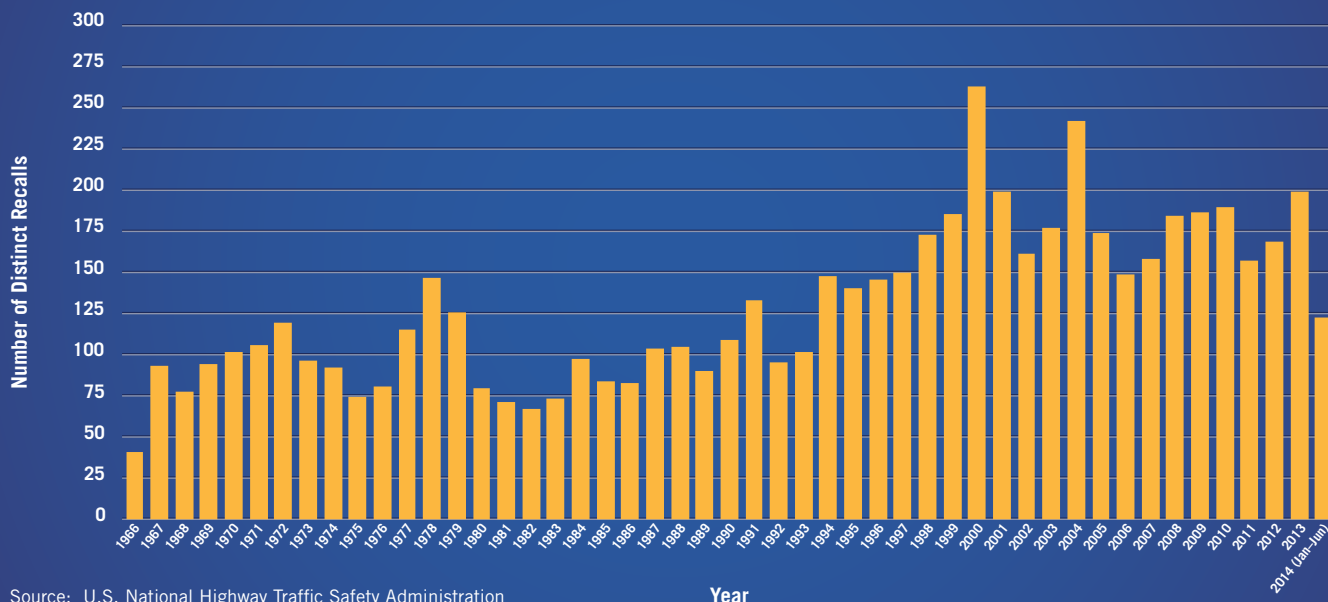
Established by the Highway Safety Act of 1970, the National Highway Traffic Safety Administration (NHTSA) is responsible for setting and enforcing motor vehicle safety standards in the United States. Manufacturers of motor vehicles and motor vehicle equipment are required by law to comply with the safety standards enacted by the NHTSA and to conduct a recall campaign when a safety-related defect is discovered.

Recalls over the first 20 years of the agency’s history were relatively consistent, averaging 95 distinct events per year from 1966 through the early 1990s.¹ Beginning in the mid-1990s, however, recall activity jumped radically. From 1994 to 2013, the number of recalls climbed to an average of 177 per year, up 86% from the prior period average. Although there are multiple reasons for the increase, the flow of information made possible by the Internet is arguably the most significant. Consumers and dealers are able to provide information to vehicle manufacturers and the NHTSA more easily. This in turn increases the efficiency in which legitimate safety defects or noncompliance issues are addressed.

The Internet has also likely helped create the perception that recalls have ballooned in recent years. In a recent survey conducted on NADAguides.com to gauge consumer perceptions of automaker recalls, 71% of 1,440 respondents believed recalls have grown significantly over the past few years. But in fact, the overall trend has changed little since the mid-1990s.

NUMBER OF DISTINCT MOTOR VEHICLE SAFETY RECALLS BY YEAR

Recalls include vehicles, tires or equipment.



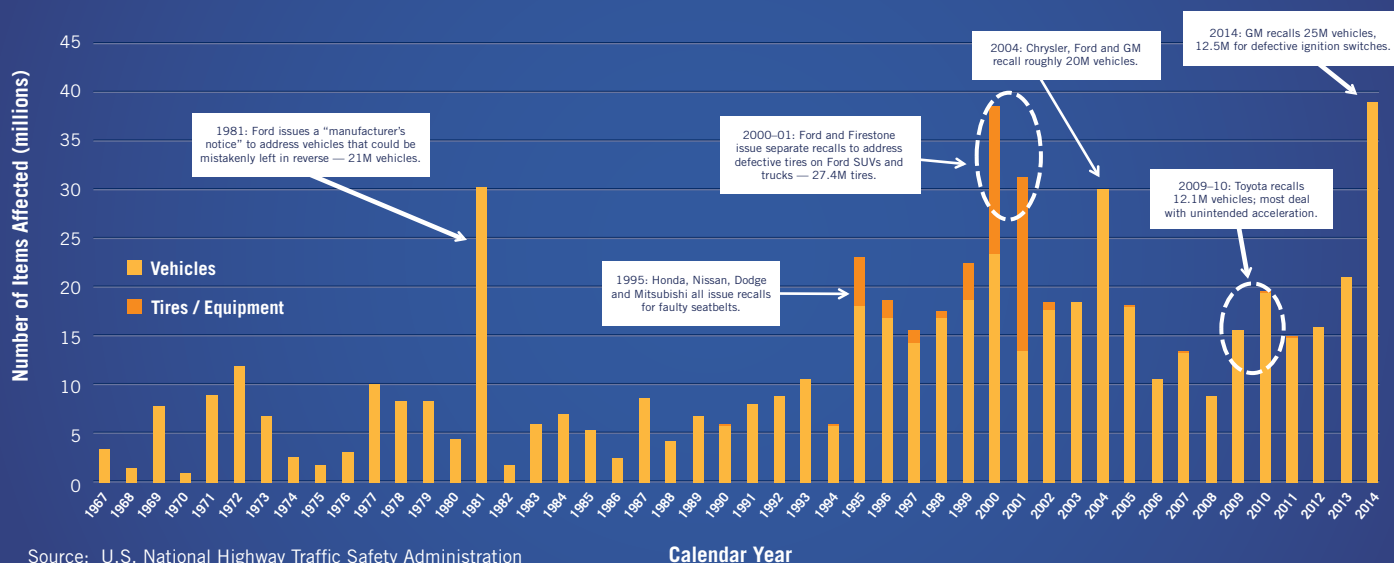
Source: U.S. National Highway Traffic Safety Administration

¹ Although the NHTSA didn't officially open its doors until 1970, the federal government began collecting information on safety-related defects in 1966 as part of the National Traffic and Motor Vehicle Safety Act.

The total number of vehicles involved in recalls per year hasn't grown all that much either. Excluding pronounced spikes in activity, the number of vehicles recalled has generally ranged from 15 million to 20 million over the past 20 years—up from 5 million to 10 million prior to 1995 (recalls for tires and equipment are much less frequent).

NUMBER OF VEHICLES, TIRES OR EQUIPMENT AFFECTED BY SAFETY RECALLS

Note that items can be included in multiple distinct recalls in a given year. In these cases, the same item will be counted multiple times.



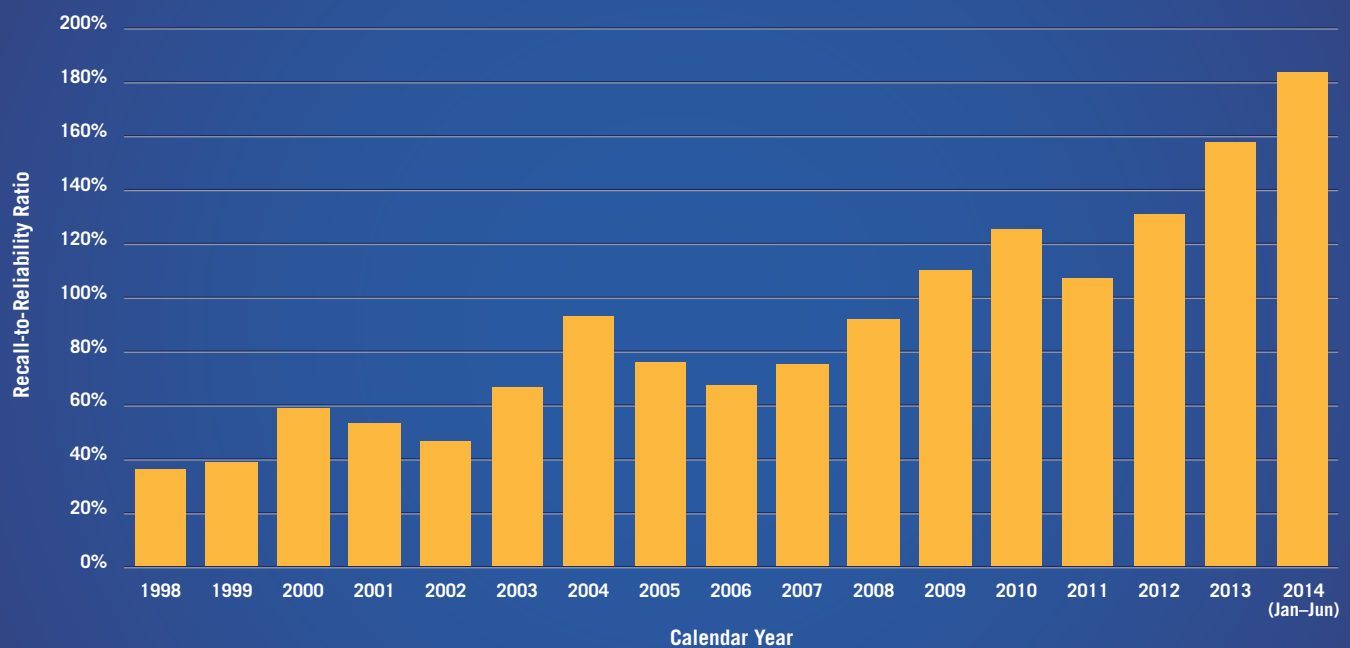
Source: U.S. National Highway Traffic Safety Administration

But while both the number of unique recalls and total number of vehicles involved have been relatively flat over the past decade-plus, manufacturers have been much more inclined to initiate a recall in an era of rapidly improving quality. In 2000, for example, the typical vehicle had approximately 270 quality problems in its third year of ownership per 100 vehicles (PP100); by 2013, the figure had dropped to 126 PP100—a 53% improvement.²

² J.D. Power and Associates Vehicle Dependability Study for the years 2000 and 2013. Studies reflect the number of problems reported per 100 vehicles after three years of ownership.

Of course, reliability issues aren't always related to recall issues (e.g., navigation system malfunctions wouldn't be addressed through a safety recall), but one would expect the need for recalls to decline with the number of reliability problems—unless the general bias toward initiating a recall has increased. By dividing the number of recalls by the swiftly declining number of problems observed in vehicles, we see that it's now far more likely (nearly four times more since 2000, by our measure) that a recall will be initiated for a given vehicle issue.

VEHICLE RECALLS VERSUS RELIABILITY PROBLEMS*



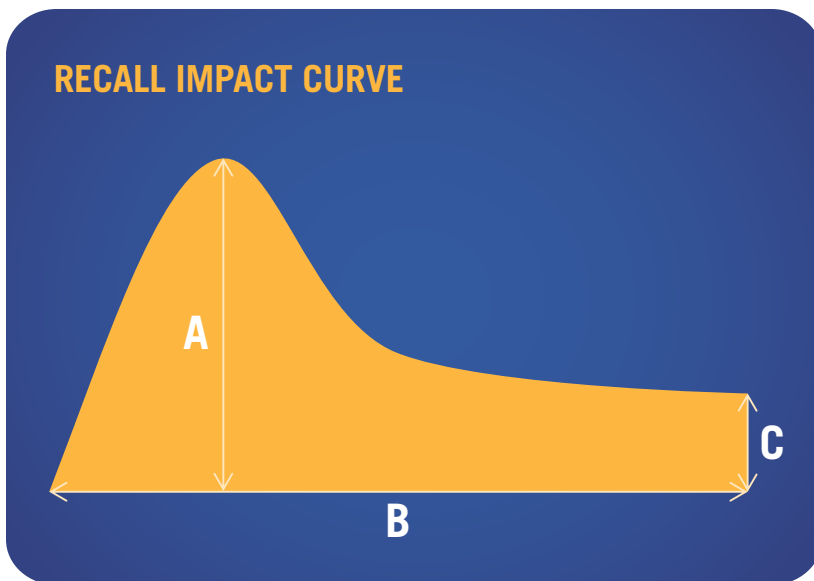
*Based on J.D. Power and Associates Vehicle Dependability Study, which records the number of problems per 100 vehicles for 3-year-old models. Number of recalls/number of reliability problems per 100 vehicles. 1998 and 1999 estimated by NADA Used Car Guide; 2014 count of recalls annualized by NADA Used Car Guide.

The dramatic increase in the quality of vehicles corresponds to the age of vehicles involved in recalls. Over time, the age of recalled vehicles has risen—from an average age of 24 months in 1980 to 50–60 months today.

The widespread nature of recalls—nearly all brands, domestic and import, have issued recalls over the past 20 years—underscores the fact that cars and trucks are highly complex machines. Understanding this, consumers accept a reasonable degree of imperfection, so new vehicle sales, market share and used vehicle prices usually aren't penalized. But sometimes the safety concern and number of vehicles affected are significant enough to harm market performance. In these cases, the extent of damage is largely determined by two factors: media coverage and brand reputation prior to the recall.

RECALL IMPACT: A GENERAL FRAMEWORK

Recalls tend to impact the new and used vehicle market along a particular curve, an example of which is shown in figure 1.



A— Maximum recall impact

B— Length of recall impact

C— Size of lasting portion of recall impact

All recalls have a key pre- and post-event contrast consisting of consumer opinion of a brand's quality (encompassing both reliability and safety) before and after the recall. The size of the contrast determines the impact of the recall on brand or model performance in the new and used vehicle markets.

Figure 1

The degree of media coverage surrounding a recall plays a critical role in determining both the extent and duration of its impact. For example, in the paper “An Analytic Framework for Assessing Automobile Sales Loss from Recalls: A Toyota Case Study,” researchers estimated that Toyota's market share was reduced by 0.007% *each time* the media covered the automaker's recalls in 2009 and 2010.³

³ Heechang Shin, Robert Richardson, and Oredola Soluade. “An Analytic Framework for Assessing Automobile Sales Loss from Recalls: A Toyota Case Study.” Hagan School of Business, Iona College, 2012.

The media picks up quickly on recalls that affect a large number of vehicles, have high repair costs and entail serious attention-grabbing consequences.⁴ Daily media coverage of defect-related crashes, injuries and deaths exacerbate the negative reaction consumers have toward the defect, despite how calmly they may reason through its severity a few months later. The extent of this initial media-driven overreaction can be represented as the difference between (A) and (C) in figure 1.

While media attention wields significant influence in determining recall impact, brand perception prior to a recall event is the primary driver behind post-recall outcomes. The chart below shows an example of consumer responses to a recall with a more severe impact.

Probable Consumer Responses

| Consumer Survey Questions | Before Recall | During Recall <i>(with dramatic media coverage)</i> | After Recall |
|--|---------------|--|--------------|
| <i>“What is the probability that a vehicle from brand X will have a defect that causes a serious accident?”</i> | 2% | 20% | 5% |
| <i>“What is the probability that a vehicle from brand X will have a serious reliability issue before reaching 100k miles?”</i> | 20% | 50% | 25% |

The large jumps in percentages during the height of recall media coverage represent consumer overreaction (as demonstrated by measurement A in figure 1).

⁴ Media attention to recalls was empirically observed by Nicholas Rupp in his paper, “Newspaper Coverage of Automotive Safety Recalls.” East Carolina University, 2005.

There is a huge range on the consumer scale of belief regarding brand quality. In the last example, consumer responses would vary based on actual (and perceived) levels of safety and reliability associated with a particular brand prior to the recall. Post-recall, consumers generally have one of the following thoughts:

- “That’s what I expected from brand X.”
- “I never thought this would happen to brand X.”
- “I thought brand X was different now, but I guess I was wrong.”

As a result, the impact of every recall falls into one of three categories:

- Recall aligns with low expectations.
- Recall contrasts with high expectations.
- Recall contrasts with improving expectations.

In the paper “The Liability of a Good Reputation: A Study of Product Recalls in the U.S. Automobile Industry,” researchers analyzed whether or not major recalls damage firms with good reputations more so than those with poor reputations.⁵ The authors found that a severe recall decreases the market share of a low reputation automaker by 1.6%, while a high-reputation automaker’s market share declines by 2.9%—a loss nearly twice as high. They attribute this to an “expectancy violation effect,” in which unfulfilled quality expectations are seen as a broken promise to produce high-quality goods. People react more strongly when companies behave in a manner inconsistent with previous expectations.

It’s important to note that the author’s analysis only covered *major* recalls centered on problems that could lead to serious injury or death. Research dating back to 1976 suggests minor recalls have a negligible impact in both the short and long term.⁶ Collectively, studies have found that minor, well-handled recalls have an insignificant or even slightly positive effect, helping automakers promote themselves as safety-conscious companies that care about their customers.

⁵ Mooweon Rhee and Pamela Haunschild. “The Liability of Good Reputation: A Study of Product Recalls in the U.S. Automobile Industry.” *Organization Science*. No. 1 (2006): 101–117.v

⁶ James A. Wynne and George Hoffer. “Auto Recalls: Do They Affect Market Share?” *Applied Economics*. (1976): 157–163.

FORD AND TOYOTA: A TALE OF TWO RECALLS

Brand reputation's effect on consumer reaction to a recall is reflected in used vehicle prices. Let's look at two recent, well-publicized recall events as examples: the 2000–2001 Ford/Firestone tire recalls and Toyota's 2009–2010 acceleration recalls.

In 2000, hundreds of rollover accidents and dozens of fatalities prompted the NHTSA to investigate the high rate of tire failure on Ford's popular Explorer sport utility vehicle and its corporate siblings the Mercury Mountaineer and Mazda Navajo. Initially, it was determined that Firestone's Decatur, Illinois, plant was responsible for producing tires whose tread would separate under certain conditions, thereby causing Ford's SUVs to roll over. To remedy the problem, Firestone issued a recall of 14.4 million tires in August 2000.

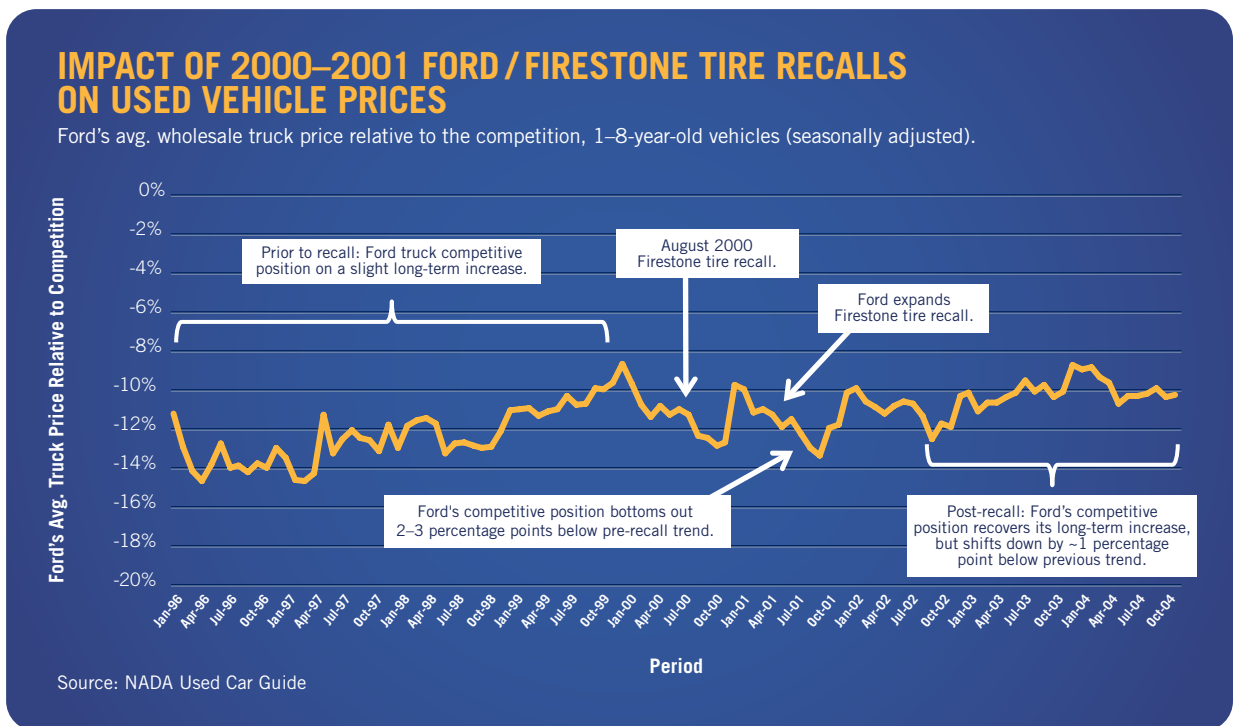
However, that wasn't the end of the matter.

Firestone acknowledged producing faulty tires—but with its corporate reputation on the line (as well as millions of settlement dollars), it openly questioned the role of the Explorer's design in triggering rollovers. In May 2001, Firestone officially ended its 95-year relationship with Ford, stating that “the basic foundation of our relationship has been seriously eroded.” The following day, Ford issued its own recall of all Firestone tires—regardless of size, the Ford truck they were installed on, or the Firestone factory in which they were produced. The whole affair was messy; involved multiple crashes, injuries and deaths; and captured media headlines for an extended period of time.

So, what was the impact on used Ford truck prices? The answer is, in fact, very little.

Although Ford's competitive position was slowly getting better, consumer expectations were relatively low at the time and the brand's value position was subpar. In 1999, the year prior to the onset of the tire issue, Ford's used car and truck prices were third and seventh worst, respectively, among competitive brands.

By NADA Used Car Guide’s measurement, the Ford/Firestone tire recalls of 2000–2001 produced a temporary impact that lasted approximately nine months and reduced the competitiveness of Ford’s used truck prices by just 2 to 3 percentage points at its peak. By 2002, Ford truck prices had essentially reassumed their slowly improving pre-recall trend.



Simply put, consumers’ rather low expectations of the brand meant that Ford didn’t have much to lose at the time. The fact that Firestone’s tires were fingered as the primary culprit could also have helped minimize the impact on Ford prices.

By contrast, Toyota suffered much more from multiple recalls the company issued related to unintended acceleration in late 2009 and early 2010.

In August 2009, an off-duty California highway patrol officer and his family were killed in an accident when the accelerator on the 2009 Lexus ES350 he was driving jammed due to an improperly installed floor mat. In the months that followed, additional complaints surfaced regarding the unintended acceleration

of Toyota models, which were again traced either to floor mat interference with the accelerator pedal or to a faulty friction lever inside the accelerator pedal assembly (the NHTSA eventually concluded that most accidents were the result of “pedal misapplication,” or drivers accidentally hitting the gas pedal rather than the brake).

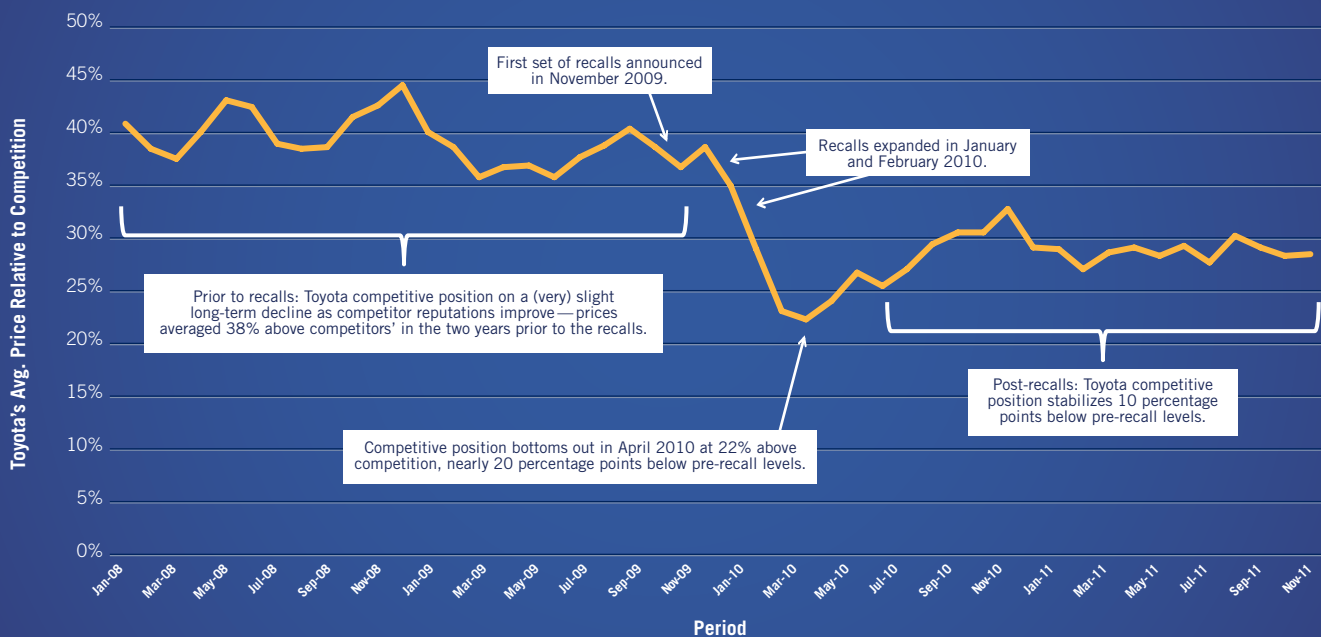
By early 2010, Toyota had initiated a series of recalls involving nearly 8 million 2005–2010 model year Toyota and Lexus vehicles to address these issues. Virtually all of the automaker’s nameplates—cars and trucks—were included, and numerous other deaths were associated with the problems. Similar to the Ford/Firestone recalls, Toyota’s series of recalls was highly publicized for an extended period of time.

Prior to these events, Toyota was the world’s largest and most profitable automaker, and the company was universally perceived as a builder of high-quality, reliable vehicles. J.D. Power and Associates® vehicle dependability data routinely placed Toyota and Lexus above other brands, if not at the top of the list. The circumstances surrounding Toyota’s recalls were counter to consumers’ high expectations for the manufacturer—resulting in a dramatic contrast between pre- and post-recall perceptions of the brand.

Before the recalls, used Toyota cars and trucks carried prices nearly 40% higher than those of direct competitors. This meant that for the average \$10,000 vehicle, a comparable Toyota carried a premium of \$4,000. But as the recalls unfolded and media scrutiny intensified, Toyota’s advantage over the competition quickly deteriorated. By April 2010, five months after initiating the first recall, Toyota’s competitive advantage had shrunk to 20%.

IMPACT OF 2009–2010 TOYOTA RECALLS ON USED VEHICLE PRICES

Toyota's avg. wholesale price relative to the competition, 1–8-year-old-vehicles (seasonally adjusted).



Source: NADA Used Car Guide

By late 2010, Toyota recovered some of the ground it had lost, but the automaker's used vehicle prices still have not regained their former position of dominance. When the dust settled, Toyota's price advantage over its competition stabilized at around 30%, an outcome that reduced the spread between its used prices and those of a \$10,000 rival by a considerable \$1,000.

2014 GENERAL MOTORS RECALLS

General Motors' ignition switch issue is the first recall event since 2010 with conditions grave enough to threaten brand value.

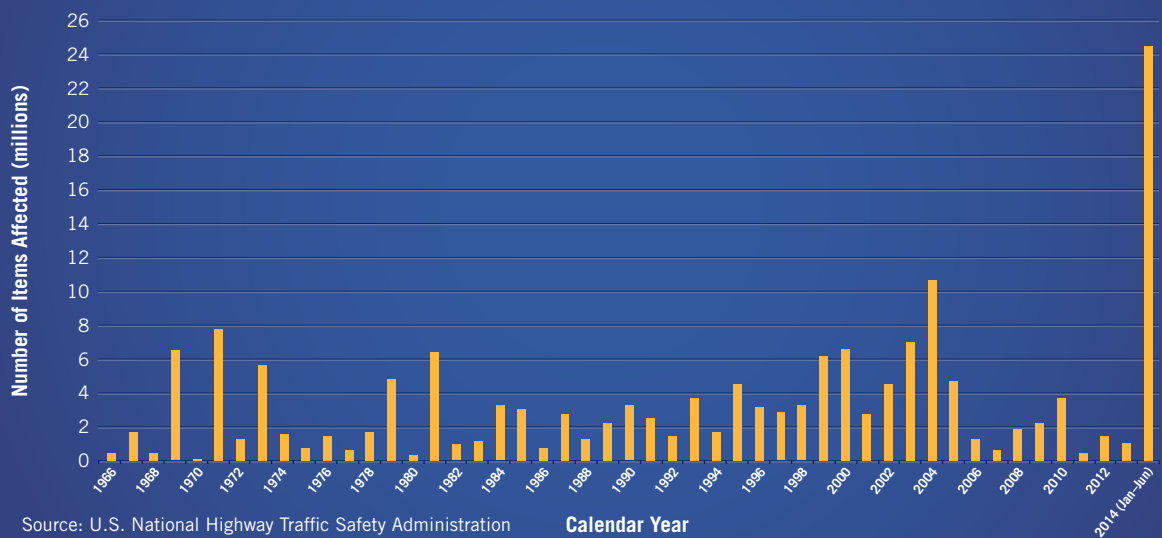
On Feb. 10, 2014, GM recalled nearly 780,000 2005–2007 model year Chevrolet Cobalt and 2007 Pontiac G5 compact cars because of faulty ignition switches. The switches could be inadvertently switched off, due to weight on the key ring or jarring road conditions, causing the engine to shut off and preventing airbag deployment in the event of a crash. In the weeks that followed, the automaker expanded the recall to include other Chevrolet, Pontiac and Saturn models, bringing the total number of vehicles involved to 2.6 million globally.

GM quickly came under heavy fire over the issue because internal documents revealed that company engineers knew about the problem for years, but failed to do anything about it. Arguably, quicker action would have prevented some of the 54 accidents and 13 deaths linked to the defect. GM's newly appointed CEO, Mary Barra, has been called to testify at multiple congressional hearings, where lawmakers have accused the company of “criminal” behavior and exhibiting a “disturbing pattern” of neglecting safety. The magnitude of GM's recalls has kept the company in media headlines for months, and a number of sites have even created standalone pages dedicated to the issue.

With sensitivity at an all-time high, GM has moved quickly to address other potential safety defects. As of mid-July, GM had issued five separate recalls covering 13.1 million vehicles for unsafe ignition switches, along with numerous other recalls for issues ranging from faulty brake lights to defective steering components. In total, GM recalled nearly 25 million vehicles in just over six months—almost as many as the company recalled in the previous 10 years combined.

GENERAL MOTORS RECALLS: 1966–2014

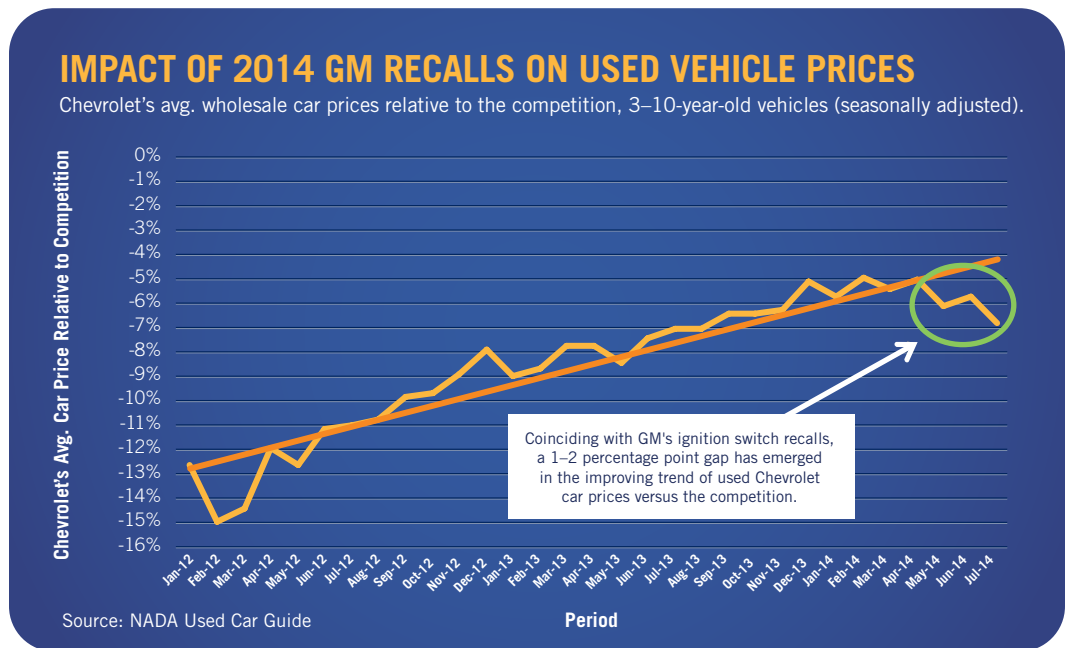
Recalls include vehicles, equipment and tires.



The costs associated with GM’s record-shattering recalls are expected to be enormous. In May, the automaker was slapped with a maximum \$35 million fine for its tardy handling of the compact car ignition switch recall, and GM has stated that recall-related repair charges could reach a whopping \$2 billion.

But while expenses are mounting, the recalls have done little to impact GM’s new vehicle sales, which improved by 3% on a prior-year basis through June. For comparison, sales for Ford, Honda and Hyundai either grew less or fell. Similarly, there is only mild evidence to suggest that used GM prices are being affected by the recalls. Let’s look at Chevrolet as an example.

Over the past few years, better, more competitive product has steadily narrowed the gap in prices between Chevrolet and its peers, such that prices for the brand’s cars moved from a deficit of 12% in 2012 to 5% at the start of 2014. This improving trend continued in the two months following the initial switch recall, but a 1 to 2 percentage point decline has emerged since April—discernible, but far short of the compelling evidence collected after Toyota’s recalls.



A combination of factors are likely responsible.

For starters, even though consumer perception of GM quality has dramatically improved over the years, the automaker has yet to achieve the near-universal reputation for rock-solid quality held by Toyota (both prior to late 2009 and today). Consequently, GM's recalls contrast with consumers' improving expectations of quality (see page 8), not expectations that are already high. Therefore, the automaker's prices are less at risk than Toyota's were five years ago.

The ages of the recalled models are probably also affecting matters. Results from NADA Used Car Guide's recall perception survey indicate that consumers are somewhat indifferent to recalls of older models, as 61% of respondents either agreed with or were neutral toward this statement: "Recalls of older vehicles are generally less meaningful to me than recalls of newer ones." While GM's highly publicized ignition switch recalls include vehicles as new as the 2014 model year, the majority of affected models were produced between 2000 and 2010 (Toyota models recalled in 2009–2010 were between one and six years old at the time).

Regardless of the weight associated with any one factor, the buying public has so far only given GM a light slap on the wrist for its safety transgressions.

CONCLUSION

The effect of recalls on automaker market performance is determined by a variety of factors.

History has shown that, by and large, brand reputation only tarnishes when recalls are tied to numerous injuries or deaths and media attention is widespread. As we saw with Toyota, significant and lasting damage can occur when these conditions are combined with events perceived as decidedly out of character for a manufacturer. Automakers strive for a reputation synonymous with quality, but ironically they suffer more from a recall event if consumers already perceive them in this light. Evidence suggests that model age also influences recall impact, which could be because older models are less associated with a brand's current product image.

We can say with confidence that future recalls will have a measurable impact on market performance, but it's a bit more difficult to pinpoint the exact degree. GM's recalls are a perfect example. The manufacturer's new vehicle sales and used vehicle prices have gone relatively unscathed, even though circumstances surrounding its recalls are somewhat similar to what Toyota experienced a few years ago.

Above all, this report shows that the same factors cause recall-related brand damage, but individual circumstances determine the severity of the damage.

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NADA's market intelligence team leverages a database of nearly 200 million automotive transactions and more than 100 economic and automotive market-related series to describe the factors driving current trends to help industry stakeholders make more informed decisions. Analyzing data at both wholesale and retail levels, the team continuously provides content that is both useful and usable to the automotive industry, financial institutions, businesses and consumers.

Complemented by NADA's analytics team, which maintains and advances NADA's internal forecasting models and develops customized forecasting solutions for automotive clients, the market intelligence team is responsible for publishing original content in the form of blogs, white papers and market reports. Throughout every piece of content, the team goes beyond what is happening in the automotive industry to confidently answer why it is happening and how it will impact the market in the future.

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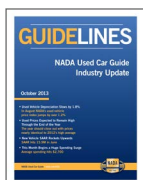
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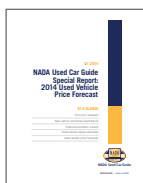
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