Consumer Benefits from a Competitive Aftermarket for Crash Parts
Executive Summary

Major automobile manufacturers[1], often referred to as car companies or "Original Equipment Manufacturers" ("OEMs"), have been acquiring design patents on crash parts for the cars they sell. Recently, Ford successfully enforced a number of design patents against competing distributors of aftermarket crash parts for the Ford F-150, eliminating future competition in the supply of those parts. Our analysis concludes that if, as currently expected, the car companies continue to enforce their design patents and exclude current competing suppliers of aftermarket crash parts from the market, car companies will gain a monopoly in a separate "second market," *i.e.*, in the supply of crash parts for their vehicles, leading to substantial price increases for those parts.

Several characteristics of the market for crash parts give the car companies an unusual ability and incentive to use design patents to raise prices and harm consumers. First, a vast majority of the initial costs will be borne by current car owners, as opposed to buyers of new cars. Second, in contrast to, for example, a large company that buys an expensive copy machine for office use based on its "total cost of ownership," including repairs and maintenance, buyers of new cars are generally uninformed about the costs of replacement parts. And finally, even if new car buyers did expect significantly higher prices for crash parts in the future, they would have little incentive to take those costs into account when deciding which car to buy because a large share of crash parts is paid for through insurance rather than directly by consumers. Therefore, car companies that use design patents to gain monopolies over the sale of crash parts can raise prices above a competitive level without concern that consumers would switch their purchases of new cars to car companies that have not raised their crash part prices.

Our empirical analysis confirms common sense expectations: competition in the market for crash parts lowers crash part prices. Based on the results of multiple regression analysis, we conclude that the prices of crash parts sold by car companies fall by more than 8% when a competitive alternative exists, with the alternative part then priced an additional 26% below this reduced car company price. We estimate that the total benefit to consumers from the availability of competitive alternative parts is approximately $1.5 billion a year. Consumers would be harmed by this amount if car companies were to use design patents to eliminate competition in the supply of crash parts.

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[1] Chrysler, Ford, GM, Honda, Nissan and Toyota

Consumers Benefit from a Competitive Aftermarket for Crash Parts

The major car companies[1], also known as Original Equipment Manufacturers (OEMs), have been acquiring design patents on crash parts for the cars they sell. Recently, Ford successfully enforced a number of design patents against distributors of aftermarket crash parts for the Ford F-150, eliminating future competition in the supply of those parts. Our analysis concludes that if, as currently expected, car companies continue to enforce their design patents, and exclude current competing suppliers of aftermarket crash parts from the market, car companies will gain a "second monopoly" over the supply of crash parts for their vehicles which will lead to substantial increases in the prices for those parts and in the total cost of vehicle ownership for consumers.

Why Design Patents Would Grant Car Companies a "Second Monopoly" over Crash Parts.

Many economists would argue that if there is vigorous competition in the market for a new, durable product that is sold to sophisticated customers who are fully informed as to all future additional costs of ownership, including prices of replacement parts, then consumers are unlikely to be harmed significantly if the car company is the sole supplier of those parts since the car company would be constrained from raising its parts prices excessively due to a concern that this would reduce the demand for their new cars .[2] Most

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[1] Chrysler, Ford, GM, Honda, Nissan and Toyota.

[2] The reasoning is that fully-informed consumers should be expected to take into account the "total cost of ownership" of a product over its life-span when originally considering purchasing that car company's product. Economists define "total cost of ownership" as the present discounted (expected) value of all costs associated with owning and using a durable product, including future maintenance and insurance costs, including both the cost of the original product (the new car) and the costs anticipated in the future (*e.g.*, the cost of replacement parts). If consumers do not differentiate between an increase in the total cost of

economists would also agree, however, that there are at least three sufficient conditions under which a car company's elimination of competitors from an aftermarket for its original equipment (*e.g.*, Ford's eliminating alternative suppliers for crash parts for Ford vehicles) would cause significant harm to consumers. First, consumers may not be sufficiently sophisticated to fully take into account all elements of the total cost of ownership beyond the original purchase price, even if those costs could have been foreseen by a fully-informed consumer. Second, at the time of original purchase, consumers may not have been able to foresee the subsequent exclusion of competitors and the resulting price increases for replacement parts. And, third, some of the higher cost of ownership may be born by individuals other than those who purchased or currently own that car company's product. **All three of these conditions are present in the market for replacement crash parts for automobiles.** Thus, before turning to the empirical estimates of the effects of exclusion on crash part prices, we need to discuss each of these conditions, at least briefly.

First, some purchasers of new cars may have a rough idea that some cars are more costly to maintain than others, or carry higher insurance premiums. But there is no reason to expect that any significant number of car buyers are sophisticated enough to take into account the effect of higher prices for a particular car company's replacement parts on the

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ownership caused by a price increase for a car and an equivalent increase due to an increase in the cost of replacement parts, new customers that can foresee the higher replacement part prices will demand lower prices on the new car to compensate, or will purchase elsewhere. If the linkage between the original equipment market and its aftermarket is strong enough, even a car company that was the only supplier of replacement parts for its cars should be constrained from raising its parts prices excessively due to a concern that this would reduce the demand for their new cars.

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total lifetime cost of ownership of that car company's cars, even if such price increases would eventually result in higher collision insurance premiums for owners of those cars.[3]

Second, few if any current car owners could possibly have anticipated that car companies, such as Ford, would succeed in excluding their competitors in the market for crash parts by enforcing design patents through the ITC. At the time they purchased their cars, consumers would have expected, if anything, to be able to continue to purchase parts at relatively competitive prices and pay the relatively lower insurance premiums that resulted from those lower part prices. If the car companies now gain monopoly power over crash parts for their vehicles and raise the prices of those parts, all consumers who purchased their cars before the car companies obtained those monopolies will be harmed. **Existing car owners will thus unambiguously be forced to "pay twice" for their parts.[4]**

In principle, purchasers of new cars in the future may be harmed to a lesser extent if car companies were to pass on some of their higher profits from the sale of crash parts in the form of lower prices for new cars.[5] New cars each year, however, account for only around 7% of the total stock of cars.[6] In addition, the pass-through rate for cost

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[3] Most replacement parts paid for by insurance are covered under either collision or property liability coverage; collision covers the damage to cars of drivers at fault, while property liability covers damages drivers cause to other people's property, including cars.

[4] In the terminology of economics, unanticipated increases in the prices of aftermarket parts prices sold to a car company's installed base of customers who are effectively locked in to their purchases is referred to as "Installed Base Opportunism". Further, such behavior provides a cause for antitrust action. See, *e.g.*, *Kodak v. Image Technical Services.*

[5] The affect of higher expected profits from aftermarket sales on prices of new cars can be analyzed as equivalent to reductions in marginal costs of production of new cars.

[6] This estimate is based on data provided in the following: Tracie R. Jackson, US Environmental Protection Agency, "Fleet Characterization Data for MOBILE6: Development and Use of Age Distributions, Average Annual Mileage Accumulation Rates, and Projected Vehicle Counts for Use in MOBILE6," EPA Publication No. M6.FLT.007, September 2001.

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reductions for US car companies appears to be quite low – between 12% and 45%.[7] As a result, only 1% to 3% of the windfall gain to the car companies would be passed on to new car buyers in the first year. Thus, the vast majority of the increase in repair costs will translate into harm to current car owners on a one-to-one basis and, even for new car buyers, any offset is likely to be minor.

Third, price increases by any one car company due to monopolization of its replacement parts can be expected to harm all car owners through higher insurance premiums for all drivers. Most of the costs of crash parts are paid for by insurance, and higher prices for crash parts will increase insurance premiums for all drivers of new and used cars, not just purchasers of new cars sold by those car companies that raised the prices for replacement parts on their cars. With respect to collision insurance premiums, some of the larger insurance firms may try to increase collision premiums only on those models for which prices of crash parts have risen, rather than spreading it over all customers. With respect to property liability premiums, however, premiums will rise for all drivers. [8] Thus, nearly half the amount of any increase in crash part prices by a car company will increase the total cost of ownership of other automakers' cars, not their own, making it even more profitable for each car company to raise its prices once competitors are excluded from the market.

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[7] See Anne Gron and Deborah L. Swenson, "Cost Pass-Through in the U.S. Automotive Market", *The Review of Economics and Statistics*, 82, No. 2 (May 2000), pp.316-324. Gron and Swenson estimate a pass-through rate of about 0.451 for industry-wide cost increases, and 0.117 for model-specific cost increases. Given that not all car companies imposed design patents, and not on all models, the pass-through rate from higher crash part revenues into lower new-car prices is thus likely to be closer to 0.117 than to 0.451.

[8] As noted earlier, most replacement parts paid for by insurance are covered under either collision or property liability coverage; collision covers the damage to cars of drivers at fault, while property liability covers damages drivers cause to other people's property, including cars.

The presence of any one of these factors alone would cause a less-than-competitive aftermarket to lead to significant harm to consumers. Thus while many economists would argue that there are conditions under which consumers would be unlikely to be harmed significantly if a car company became the sole supplier of some or all of the parts for its vehicles, we conclude that those conditions do not apply in this case. **Allowing car companies to exclude competitors from aftermarkets for their cars would indeed grant them a "second monopoly" in the market for repair parts, without any significant offsetting benefit to their customers, even purchasers of new cars.**

We thus turn in the next section to estimating the increase in the cost of repair parts that can be expected if the car companies succeed in excluding competitors from supplying those products, secure in the conclusion that all or nearly all of the increase in those costs represents a net harm to consumers.

Estimating the Benefits to Consumers from Competition in the Market for Automotive Parts

Our ultimate goal is to measure the aggregate amount of economic benefit to consumers from competition in the market for automotive collision parts. We first econometrically estimate the average benefit that consumers receive on individual sales of these parts, and then apply them to estimates of the size of the market to calculate the total dollar savings to consumers.

Consumers benefit in two ways when a distributor of alternative parts enters the market with a competitive alternative to a car company part.[9] First, the price from a distributor

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[9] For the purposes of this study, we assume that Keystone was the first entrant, and thus use the date of Keystone entry as the date of first entry. To the extent that Keystone was not the first entrant, we thus underestimate the gain to consumers from competition in this market.

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of aftermarket parts will usually be lower than the car company's price. We refer to this as the "direct" benefit.[10] Second, a distributor's entry and competition usually results in the car company reducing its price. We refer to this as the "indirect" benefit.

To allow us to quantify each of these benefits, we used publicly available data on car company crash part prices, as well as data provided by Keystone on its prices from 2002 to 2007. Using the price data for car company and the alternative distributor's parts, we estimated the following multiple regression model:

$$\ln(car\ company\ real\ price) = a_i + b * \ln(years\ since\ car\ model)$$
$$+ c * distributor\ indicator\ variable + d * years\ since\ distributor\ entry,$$

where:

  Car company real price is the car company price deflated by the producer price index for intermediate materials, supplies and components;

  a_i is a vector of fixed effects for each part type (this controls for fixed characteristics common to all parts in a generic group);

  Years since car model is defined as the difference between the current year and the first car model year for which the part is used;

  Distributor indicator variable is a variable that equals one if that car company part is subject to competition from a distributor part in that year, otherwise it equals zero;

  Years since distributor entry is a variable that equals the number of years a competitive distributor part has been available if that car company price is subject to competition from a distributor part, otherwise it equals zero.

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[10] This assumes that the car company crash parts and the competitive alternatives are of equal quality.

The "c" coefficient thus is the best estimate of the initial effect of a distributor's entry on car company prices, while the "d" parameter estimates the incremental effect on car company prices for each additional year of competition from a distributor.[11] Our best estimate is that the average effect of a distributor's introduction of competitive alternatives to car company crash parts is to reduce those car company part prices by 1.4% for each year that the distributor's products are in the market.[12]

We used these estimated parameters to calculate the average "indirect" benefit per part that faced competition from a distributor. To do this, we first used the regression estimates to project what prices would have been[13] for car company parts subject to competition if competition had not existed for those parts.[14] The indirect benefit to consumers per part is then calculated for each year as the difference between the projected car company price without competition and the actual car company price. We estimated that, on average, prices of car company parts have been reduced by about 8% due to competition, or by about $18 per part.

For each part that the distributor offers, we then calculated the direct benefit as the difference between the actual car company price and the distributor price. On average, we estimate that the distributor's automotive part prices are about 26%, or $53, lower than the prices of the car company parts they compete against. See Graph 1 and Graph 2

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[11] It is easy to see how this might arise: imagine that, absent competition, car company prices would have risen at 3% per year, but that with competition, they only rise at 2% a year – then, each year the gap between what prices are and what *they would have been absent competition* will increase.

[12] Our estimate of the initial, instantaneous effect (the value of the "c" parameter) is statistically indistinguishable from zero.

[13] The car company price without competition is calculated as $e^{\ln(\text{car company price}) - c \cdot \text{distributor } indicator\ variable - d \cdot \text{years since distributor entry}}$.

[14] As noted above, our model assumes that Keystone was the first competitor to car companies for each part. To the extent that other distributors entered before Keystone, we will have underestimated the benefits from competition.


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below for estimates[15] of the effect of a distributor's entry on car company part prices
based on the above calculations.

**Graph 1. Effect of Competitive Entry
on a *RT Headlamp Door***
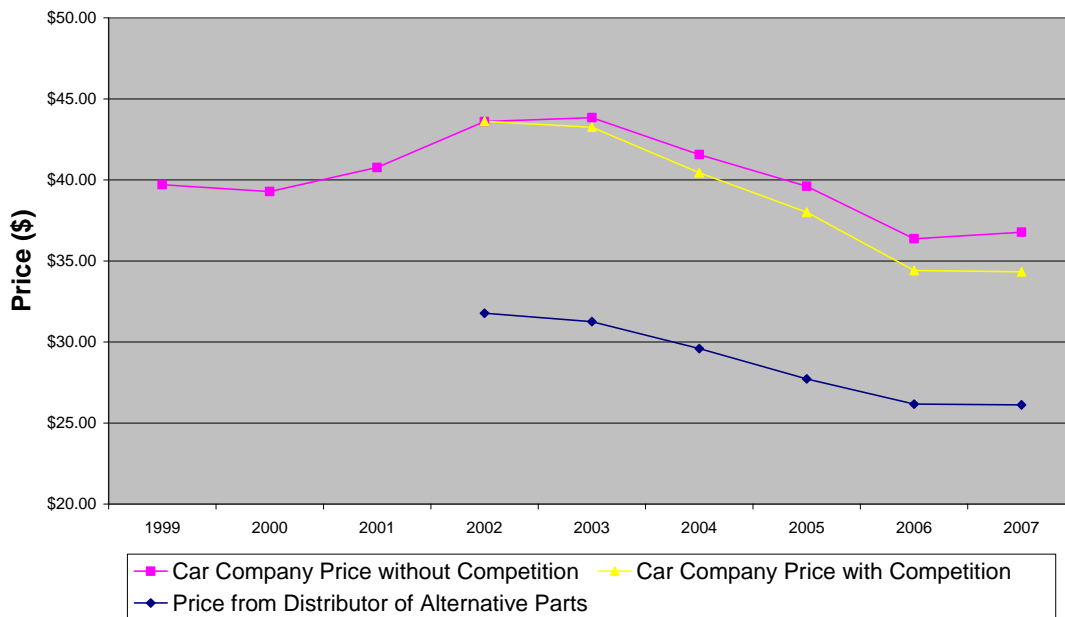
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**Graph 2. Effect of Competitive Entry
on a *LT Headlamp Assy Sealed Beam***
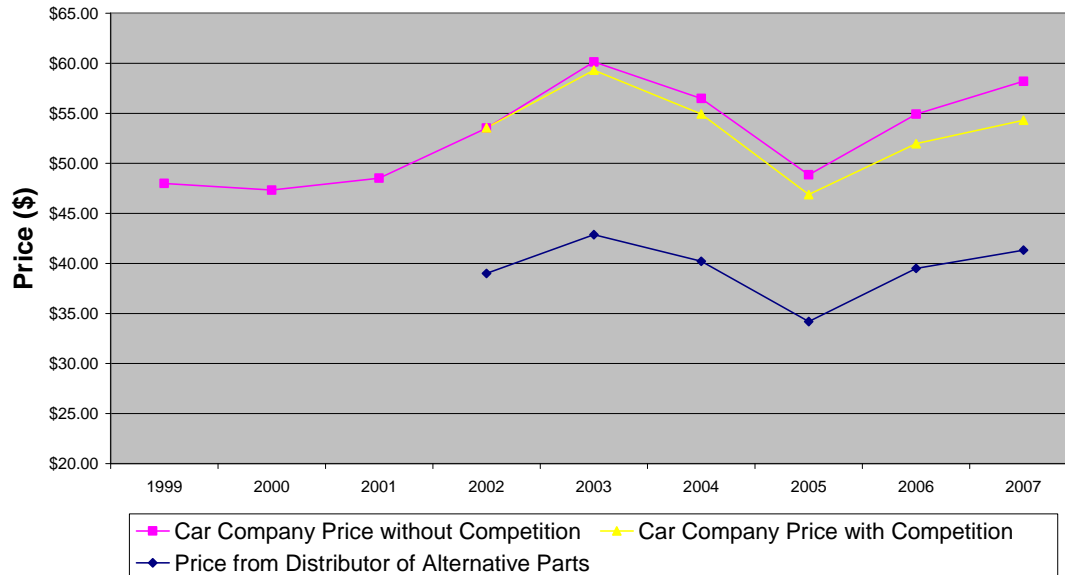
Note that the total benefit to a consumer of a distributor's part will equal the amount by which the distributor's price is lower than the car company price, plus the difference between the actual car company price and what that price would have been absent a distributor's entry; *i.e.*, a customer of a distributor receives both "direct" and "indirect" benefits as we have defined them whereas a customer of a car company receives only the "indirect" benefit. See Table 1 below for summary of benefits per part.

Table 1. Average Per Part Benefits due to Competition
(per part that faces competition)

Year	Direct Benefits		Indirect Benefits	
	% Price Difference	$ per Part	% Price Difference	$ per Part
2005	28.7%	$55.77	7.9%	$16.51
2006	26.0%	$51.98	8.5%	$18.24
2007	24.7%	$50.71	8.7%	$18.97
Total	26.4%	$52.76	8.4%	$17.93

To illustrate the aggregate size of these benefits, we utilize the following estimates of the total size of the market for crash parts and of its composition:[16] 1) the total size of the market for automotive parts is $16 billion a year; 2) 74% of the total is from sales of car company parts and 11% is from sales of newly manufactured alternative parts; and 3) two- thirds of car company parts sold face competition. All sales of alternative, newly manufactured parts will then have both "direct" and "indirect" benefits associated with them, and all sales of car company parts for which there is a competitive alternative will have "indirect" benefits associated with them. See Table 2 below for a summary of these benefits.

Table 2. Aggregate Annual Benefits from Competition*

Market Segment	Assumed Sales	Direct Benefits**	Indirect Benefits	Total Benefits
Car Company Facing Competition	$7,893,333,333	$0	$723,492,226	$723,492,226
Car Company Facing No Competition	$3,946,666,667	$0	$0	$0
New Parts from Alternative Suppliers	$1,760,000,000	$631,728,555	$161,319,213	$793,047,767
Total, New Parts	**$13,600,000,000**	**$631,728,555**	**$884,811,439**	**$1,516,539,993**

* Based on hypothetical sales figures

** Assumes that the percentage direct benefit would be the same for all sellers of alternative parts as measured for Keystone

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[16] Estimates of market size were provided by Keystone.

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Ultimately, given these assumptions about the size and make-up of the market for automotive crash parts, we estimate that consumers receive aggregate benefits of just over one and a half billion dollars a year due to competition in the market for automotive parts.

Expected Effects of Monopolization of Crash Parts

If car companies are able to exclude competing suppliers from the market for replacement parts, all of the benefits from competition described above would disappear, with an estimated immediate harm to consumers of just over $1.5 billion per year.