# Do warranties matter?

## An empirical analysis in the automotive industry

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As part of the salvation plan for the American automotive industry, in 2009 the government of that country announced the so-called Warranty Commitment Program. In short, that program ensures that the warranties of new cars sold by Chrysler and GM during the restructuration period are going to be honoured. In words of the president of USA, Barack Obama, "If you buy a car from Chrysler or General Motors, you will be able to get your car serviced and repaired, just like always. Your warranty will be safe. In fact, it will be safer than it's ever been, because starting today, the United States government will stand behind your warranty"[1].

Implicitly, the statement of President Obama implies the belief that warranties are an important attribute for new car buyers. But, is that really the case? In light of the strategies used by car manufacturers in the last ten years, there seem to be some indication in this direction. For example, in 2006 Ford Motor Co. announced the increase in the length of the powertrain warranty for all its 2007 Ford and Mercury models, from 3 years/36,000 miles to 5 years/60,000 miles. The change also included its Lincoln brand, which raised its powertrain warranty to 6 years/70,000 miles. As reported by Warranty Week in July 25th 2006[2], a spokesperson from Ford in relation to Ford's strategy stated that "We think that customers do look at warranties when they're making their purchase decisions. Therefore, we wanted to increase our competitiveness by offering an extended powertrain warranty. We think that customers do want it, and do care about it.... We think that some people weren't considering Ford products because we didn't have an extended powertrain warranty versus some of our competition. We hope that it will increase our competitiveness". This example illustrates that car manufacturers use warranties as part of their competitive strategy.

[1] http://www.whitehouse.gov/the_press_office/Remarks-by-the-President-on-the-American-Automotive-Industry-3/30/09/

[2] http://www.warrantyweek.com/archive/ww20060725.html

In this research, we empirically investigate whether warranties affect the purchase decision by a customer in the American automotive industry. More precisely, we quantify the impact of warranties on customers demand, and analyze the mechanisms under which that decision is affected by warranty coverage. Further, we also measure the implications of that decision on manufacturers' costs and competitive outcome. Analyzing this problem empirically is of great relevance to understand the extent to which warranties are effective tools of a firm competitive strategy, particularly considering the difficult moment of the industry today, an environment in which the investments are constrained and need to be allocated in the most efficient way.

The problem under analysis is a perfect example of decision making under risk and uncertainty. When buying a new car, consumers do not have perfect information about the reliability of the car, and even more, they ignore the magnitude of potential future failures. The manufacturer warranty provides the consumer with protection against failures of the car for a certain period, and therefore, it has an insurance role. This feature of warranties should then be of value to customers if they are risk averse. However, the importance of this role depends also on the intertemporal discounting of future losses by the consumer, a feature which we incorporate into our model. Alternative rationales for the provision of warranties are their signalling role of product quality and its screening role for customer heterogeneity. We investigate these mechanisms and their relative effects on demand. On the manufacturer side, the warranty decision involves resource allocation trough warranty reserves, which is based on beliefs about future failures by the manufacturer. Thus, the warranty coverage decision is also subject to risk and uncertainty, moreover considering the moral hazard problem originated by the unobserved use of the car by the consumer. When making the warranty decision, the manufacturer also faces intertemporal trade-offs involving discounting of future expenses associated to warranty coverage, a feature which we also incorporate into our model.

We propose a structural model that accounts for the dynamics of the demand and supply sides. In our model, we explicitly account for the endogeneity of not only the price but also the warranty decisions by firms, by adopting recent developments of the literature on discrete choice model in industrial organization. We believe this is a very promising framework to study how consumers and firms make decisions under risk and uncertainty, in a very relevant industry in today's economy.