

Essays on Consumers, Risk and Rationality

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Foreword

This volume is the result of a research project carried out at the Department of Finance at the Stockholm School of Economics (SSE).

This volume is submitted as a doctors thesis at SSE. In keeping with the policies of SSE, the author has been entirely free to conduct and present his research in the manner of his choosing as an expression of his own ideas.

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To My Family and Friends

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Introduction

One way economists overcome the difficulty in analyzing the behavior of economic agents is to assume they behave rationally, making the optimal choice in any situation. Despite being an arguably reasonable assumption, an agent may not always behave optimally, failing to pay proper attention to given information or lacking the knowledge to make complex assessments of future situations. Understanding in which situations consumers are rational, and in which they are not, is of importance to economists trying to understand the underlying mechanisms that drive behavior. If the rationality assumption doesn't hold then behavioral predictions based on this assumption may prove to be incorrect, resulting in the loss of welfare or tax-payer money. This dissertation has centered on examining whether consumer purchasing behavior is consistent with economic rationality by studying purchases of cars on the Swedish new and used car markets.

In certain situations, for instance in auctions, naive consumers may not only be competing for products with other naive consumers, they may be competing against professional dealers or resellers. Knowing this, the naive consumer should rationally adjust his or her behavior so as not to fall victim to the more experienced buyers. In a similar manner, the more experienced buyers should rationally try to capitalize on their experience, sometimes at the expense of the less-experienced buyers.

In the first chapter, "*Asymmetric Information in Auctions: Are Resellers Better Appraisers?*", I study whether there are differences in the behavior of consumers participating in used car auctions as compared to that of resellers, and whether such differences can be attributed to consumers rationally adjusting their behavior to account for the potential that resellers have better information about the used cars which they are both trying to purchase.

Motivated by a currently limited understanding of the differences in behavior between professional and amateur types of bidders, I find that consumers and resellers do differ in their bidding behavior and that consumer and reseller be-

havior is consistent with resellers having better information about the cars they are trying to purchase. I quantify the degree to which resellers value estimates, or signals, are more precise finding that the dispersion in resellers' signals is roughly half that of consumers. Furthermore, I argue that because the auction house, from which the data is collected, provides a highly detailed mechanical assessment of every car auctioned, the asymmetries are unlikely to stem from knowledge about the quality of the car. Instead, I argue that resellers have better knowledge about the resale value of a given car than do consumers.

If consumers are in some way worse at valuing used cars than professional resellers, they face the risk of unknowingly purchasing a car of poor quality, a "lemon" as it is known, having to pay additional repair costs or suffering the discomfort of living with any flaws the car may have come with. In the second chapter, "*Avoiding the Bitter Taste of Lemons: Relating Quality Ratings to Lifetime Breakdown Costs*", I study how much the credible quality ratings provided by an auction house, aimed at helping consumers purchasing used cars avoid purchasing lemons, are worth. Of specific interest has been understanding the usefulness of different quality ratings, to which degree these affect prices and whether there are differences in their usefulness across different types of cars - for instance whether consumers care less about quality ratings for cars which still have valid warranties. The overall aim of this study has been to analyze the value of ratings by relating them to consumer beliefs about future car breakdown probabilities and the costs incurred once a car breaks down and has to be repaired.

I find that the expected breakdown costs can differ substantially between low and high quality cars and that there is an asymmetry between quality ratings that signal below-average quality and those signaling above-average quality, with below-average quality ratings having a larger impact on prices. This suggests that although quality ratings help consumers value future breakdown costs, consumers are more concerned about avoiding large unexpected future losses than having a car of above average quality.

One may think that by avoiding used cars altogether, instead buying a brand new car, consumers can avoid the risks associated with buying a used car of poor quality. In the event that something does go wrong, differing somewhat from

manufacturer to manufacturer, cars come with warranties that allow the buyer of the car to have it repaired free of charge or with significant discounts within a certain number of years or before the car has traveled a certain number of miles. However, should the manufacturer go bankrupt, warranties may become worthless, cars may be harder to resell and spare parts may be much harder to find. Rational consumers should take these risks into account, valuing cars less if the manufacturer is experiencing financial difficulties.

Motivated by a renewed political and public debate about the future of Swedish car manufacturer Saab due to its filing for bankruptcy only a short time after having exited a lengthy restructuring process, in the third chapter *“Bailing On The Car That Wasn’t Bailed Out: Bounding Consumer Reactions to Financial Distress”* (with Cristian Huse) we study how new car buyers responded to the firm’s failing financial situation. Having been part of U.S. car manufacturer General Motors, Saab’s financial situation deteriorated rapidly with that of its parent company, itself suffering the U.S. automobile crisis of 2008-2009. The fact that we believe Saab’s situation to have deteriorated in a largely rapid and unexpected manner allowed us to analyze the impact of financial difficulties on new car sales, avoiding an issue commonly associated with such studies - the issue of not knowing whether financial difficulties resulted in poor firm performance or whether poor performance was instead the trigger of a failing financial situation.

We find that as a result of a failing financial situation, sales of new Saab cars fell sharply compared to those of a carefully chosen group of Saab’s close competitors - more so than the effects suggested by previous studies analyzing the used, as opposed to new, car market. We realized that comparing the sales of two competing products may give misleading results as consumers switching from one product were likely to substitute to the other, overemphasizing the difference between the two. We propose a way of accounting for the issue of switching by making assumptions about the degree of substitution and showing that even if we cannot directly observe switching, the true drop in sales can be bounded within an interval.

The focus of the three previous chapters has been on the potential losses in value stemming from different risks that the consumer might face at the time of purchasing a durable good and whether the consumers are “rational enough” to

take these risks into account. These studies however overlooked another considerable source of risk that consumers face when purchasing durable goods - risks associated with unknown future costs of usage.

The cost of using cars comes primarily from the fuel needed to operate them over a given distance and although consumers can decide how much they drive, they cannot choose the price of fuel. The introduction of multifuel technology, giving the owner the option to operate their vehicle on gasoline or an alternative fuel such as ethanol or compressed natural gas, has given consumers a new way of protecting themselves against volatile fuel prices.

In the fourth chapter “*Cars as Options: Quantifying the Option Value of Multifuel Vehicles*” (with Cristian Huse) we study whether consumers that purchase multifuel vehicles understand, and value, the ability to switch between two fuels and save money by choosing the cheaper alternative. Motivated both by the limiting fact that only risks associated with purchases were considered in the second and third essays and by the active effort of Swedish policy makers debating and implementing policies aimed at curbing dependence on fossil fuels and lowering carbon emissions to reach EU-wide emission targets, we find that the value of multifuel vehicles is increasing as the alternative fuel becomes relatively cheaper than gasoline. That is, the more consumers stand to save by switching fuels, the higher the value of being able to switch becomes. Similarly, the more volatile the relative price of the alternative fuel to gasoline becomes, the higher the value of multifuel vehicle, as it is more likely that prices will be such that consumers would want to switch to take advantage of differences in prices.

A complicating factor is that the value of an option to switch between two fuels is only useful if in practice, both fuels are available when the consumer chooses to refuel. As the ethanol distribution network in Sweden didn't necessarily provide coverage over the entire country, we find that multifuel vehicles are worth more in parts of the country where the distribution network is well-developed. This suggests that if policy makers wish people to switch to greener fuels, there is still a significant need to improve distribution in certain parts of the country. Furthermore, in line with previous studies, we find that consumers undervalue fuel costs but we do not find enough evidence to suggest that consumers additionally misprice the savings from being able to switch to alternative fuels.