Personal Transportation Demand and Consumer Finance:  
Panel analysis of U.S. and German Surveys and Advertisements

This dissertation is composed of three essays covering two areas of interest. The first topic is personal transportation demand with a focus on fuel price and fuel efficiency elasticities of mileage demand. In these two chapters I challenge assumptions commonly made in the literature on the “rebound effect,” such as assuming that i) households of different income levels respond equally to changes in fuel economy, ii) households respond in the same way to increasing and decreasing fuel prices, and iii) households respond in the same way to changes in fuel economy as to changes in fuel prices. The second topic is consumer finance with a focus on small dollar loans for nondurable goods. I discuss my three chapters in more detail below.

Chapters 1 and 2. In the US, government intervention to improve the fuel economy of road vehicles has traditionally relied on fuel economy standards. However, an improvement in fuel economy or a decline in fuel prices reduce the fuel cost per mile, potentially inducing an increase in miles driven. Increased mileage may reduce the intended decrease in fuel consumption and increase pollution and congestion.

The first paper intends to examine the equivalence of the response to fuel economy and fuel prices as well as to test for an asymmetric response to prices. A panel dataset from Germany from 1997 to 2009 provides me with a unique opportunity to estimate household-level mileage elasticity outside of the U.S. I use observed fuel economy (rather than manufacturer specs), and create separate variables for fuel prices during periods of increasing and decreasing prices to empirically test these assumptions. I find an overall fuel economy elasticity of mileage of 47%, which is significantly different than the gas price elasticity of mileage during periods of decreasing gas prices (2.5% in my preferred specification). Since the elasticity of mileage during period of increasing gas prices ranges from 24.0% and 24.7%, I reject the null hypothesis of price symmetry.

The second paper deals more explicitly with the rebound effect, the magnitude of the increase in miles driven following an improvement in fuel efficiency. Unlike previous work, this study explores the potential for the rebound effect to vary with income. Panel data from U.S. households from 1997 to 2003 are used to estimate the rebound effect in a median (50th quantile) regression. The estimated rebound effect independent of income ranges from 15.6% to 28.4%. The coefficient on the interaction of income and fuel economy is negative and significant, indicating that the rebound effect may be much higher for low-income individuals and decreases with income. In the baseline median regressions, the rebound effect for low-income households ranged from 55.8% to 169.6%, indicating that such households may increase gasoline consumption given an improvement in fuel economy.

Chapter 3. The final paper addresses two main questions. My coauthor, Dr. Mary Zaki, and I analyze a time series of the cost of credit between different mail order stores for different loan amounts and for loans for items of varying durability, such as clothing versus furniture and appliances. We look at how these rates change depending on business cycles and historical events, such as rationing during World War II. We expect to find that interest rates are sticky,
much like modern day payday loan pricing and credit card rates. We also look at the Truth in Lending Act (TILA), which required all creditors who advertised a credit instrument to provide the annual percentage rate (APR). This allowed customers to better compare rates when considering financing. We explore the effects of providing the APR on the cost of credit to consumers. We also test for changes in the pricing of goods in the post-TILA period, when the cost of credit is more easily comparable. Finally, we examine governmental data on the quantity of sales of consumer credit.