Gasoline Price Changes And The Petroleum Industry An Update

In the retail gasoline market, gas stations as independent entities set gas prices according to a number of factors related to global and local economic conditions, especially those pertaining to oil and gasoline demand and supply. The behaviour which governs the daily gas price setting by the owner of gas stations is difficult to model by using conventional equation based and/or statistical models. Agent-based modelling, as a bottom-up approach, has been used to model the behaviour of many social phenomena, including the retail of gasoline. However, previous studies didn't explicitly consider the competition among nearby gas stations, and therefore their estimated gas price deviated significantly to the real price. This paper presents aims to simulate the behaviour of gas station owners by integrating agent-based modelling and spatial competition models. The Norwood neighbourhood in Cincinnati, Ohio, consisting of 12 gas stations with the brand name of BP, Speedway, Marathon, Mobile, Shell and Kroger, was chosen to be our study area. Traffic volumes passing by gas stations are used as surrogate of potential customers in this simulation. This hybrid model was calibrated and validated with real data. The results suggest that the simulated behaviour is capable of generating realistic estimates for daily gasoline price changes for individual gas stations.
When gasoline prices rise, people notice: the news is filled with reports of pinched household budgets and politicians feeling pressure to do something to ameliorate the burden. Yet, raising the gasoline tax to internalize externalities is widely considered by economists to be among the most economic efficiency-improving policies we could implement in the transportation sector. This dissertation brings new evidence to bear on quantifying the responsiveness to changing gasoline prices, both on the intensive margin (i.e., how much to drive) and the extensive margin (i.e., what vehicles to buy). I assemble a unique and extremely rich vehicle-level dataset that includes all new vehicle registrations in California 2001 to 2009, and all of the mandatory smog check program odometer readings for 2002 to 2009. The full dataset exceeds 49 million observations. Using this dataset, I quantify the responsiveness to gasoline price changes on both margins, as well as the heterogeneity in the responsiveness. I develop a novel structural model of vehicle choice and subsequent utilization, where consumer decisions are modeled in a dynamic setting that explicitly accounts for selection on unobserved driving preference at both the time of purchase and the time of driving. This utility-consistent model allows for the analysis of the welfare implications to consumers and government of a variety of different policies, including gasoline taxes and feebates. I find that consumers are responsive to changing gasoline prices in both vehicle choice and driving decisions, with more responsiveness than in many recent studies in the literature. I estimate a medium-run (i.e., roughly two-year) elasticity of fuel economy with respect to the price of gasoline for new vehicles around 0.1 for California, a response that varies by whether the vehicle manufacturer faces a tightly binding fuel economy standard. I estimate a medium-run elasticity of driving with respect to the price of gasoline around -0.15 for new personal vehicles in the first six years. Older vehicles are driven much less, but tend to be more responsive, with an elasticity of roughly -0.3. I find that the vehicle-level responsiveness in driving to gasoline price changes varies by vehicle class, income, geographic, and demographic groups. I also find that not including controls for economic conditions and not accounting for selection into different types of new vehicles based on unobserved driving preference tend to bias the elasticity of driving away from zero -- implying a greater responsiveness than the true responsiveness. This is an important methodological point, for much of the literature estimating similar elasticities ignores these two issues. These results have significant policy implications for policies to reduce gasoline consumption and greenhouse gas emissions from transportation. The relatively inelastic estimated responsiveness on both margins suggests that a gasoline tax policy may not lead to dramatic reductions in carbon dioxide emissions, but is a relatively non-distortionary policy instrument to raise revenue. When the externalities of driving are considered, an increased gasoline tax may not only be relatively non-distortionary, but even economic efficiency-improving. However, I find that the welfare changes from an increased gasoline tax vary significantly across counties in California, an important consideration for the political feasibility of the policy. Finally, I find suggestive evidence that the ``rebound effect'' of a policy that works only on the extensive margin, such as a feebate or CAFE standards, may be closer to zero than the elasticity of driving with respect to the price of gasoline. This suggestive finding is particularly important for the analysis of the welfare effects of any policy that focuses entirely on the extensive margin.
The German petrol station market is characterized by strong intraday price cycles, which probably correspond to the well-known Edgeworth cycles. The prices go up strongly in the late evening or in the middle of the night, fall relatively heavily in the early morning and then go up and down several times in the course of the day. Locally, the analysis is limited to the 26 petrol stations that plausibly form a common market in the Lueneburg region. This essay picks out the specific sequence in which, after generally rising prices during the day, a single supplier is the first to reverse the price trend and lower its price. For this purpose, current price reports are used to define the price reduction event down to the second, and to show only the valid prices of competitors prior to the event. All German petrol stations have to report price changes to the Bundeskartellamt's Market Transparency Department. Tankerkoenig then publishes the full reports. This results in one panel observation for each price reduction event. Out of nearly 300,000 price observations, just over 10,000 panel observations result. Fixed-effect logit estimates are used to test whether the theoretically and economically significant price differences of the Edgeworth cycles explain the behavior of the price cutters, or whether market structure factors, such as brand affiliation/independence of the petrol station, service offerings, or location characteristics predict price-cutting behavior. The novel recording of the price dynamics in the petrol station market by using the accurate petrol station price data to the second indicates promising research of extensive price data and avoids the enormous loss of information in the previously common calculation of average prices at certain times.
On April 25, 2006, Pres. Bush directed ¿the Dept. of Justice to work with the Fed. Trade Comm. (FTC) & the Energy Dept.(DoE) to conduct inquiries into illegal manipulation or cheating related to current gasoline prices.¿ The FTC was, at that time, investigating the increases in gasoline prices that occurred following Hurricane Katrina, including an intensive examination of whether refiners & other market participants had manipulated, or tried to manipulate, gasoline prices. The FTC found no evidence of manipulation & only limited instances of price gouging by gasoline wholesalers & retailers. The FTC & DoE conducted this economic analysis & investigation of the nat. avg. gasoline price increases that began during the spring of 2006 & continued through the summer. Illus.
It is often asserted that consumers undervalue future gasoline costs relative to purchase prices when they choose between automobiles, or equivalently that they have high "implied discount rates" for these future energy costs. We show how this can be tested by measuring whether relative prices of vehicles with different fuel economy ratings fully adjust to time series variation in gasoline price forecasts. We then test the model using a detailed dataset based on 86 million transactions at auto dealerships and wholesale auctions between 1999 and 2008. Over our base sample, vehicle prices move as if consumers are indifferent between one dollar in discounted future gas costs and only 76 cents in vehicle purchase price. We document how endogenous market shares and utilization, measurement error, and different gasoline price forecasts can affect the results, and we show how to address these issues empirically. We also provide unique empirical evidence of sticky information: vehicle markets respond to changes in gasoline prices with up to a six month delay.
Although there is much interest in the future retail price of gasoline among consumers, industry analysts, and policymakers, it is widely believed that changes in the price of gasoline are essentially unforecastable given publicly available information. We explore a range of new forecasting approaches for the retail price of gasoline and compare their accuracy with the no-change forecast. Our key finding is that substantial reductions in the mean-squared prediction error (MSPE) of gasoline price forecasts are feasible in real time at horizons up to two years, as are substantial increases in directional accuracy. The most accurate individual model is a VAR(1) model for real retail gasoline and Brent crude oil prices. Even greater reductions in MSPEs are possible by constructing a pooled forecast that assigns equal weight to five of

the most successful forecasting models. Pooled forecasts have lower MSPE than the EIA gasoline price forecasts and the gasoline price expectations in the Michigan Survey of Consumers. We also show that as much as 39% of the decline in gas prices between June and December 2014 was predictable.

Since 1999, regional retail and wholesale gasoline markets in the United States have experienced significant price volatility, both intertemporally and across geographic markets. In particular, gasoline prices in California, Illinois and Wisconsin have spiked occasionally well above gasoline prices in nearby states. The three chapters of my thesis study the relationship between gasoline price spikes, environmental regulation of gasoline content, unanticipated refinery outages and other recent structural changes in the domestic oil market. In the first chapter, I detail current regulations related to gasoline content. Implemented regionally to address local mobile-source emissions, gasoline content regulations increase costs to refiners, transporters and distributors of gasoline, as well as reduce the fungibility of gasoline across different regions. Chapter one provides a summary of the regulations and a qualitative description the costs the regulations impose on refiners, transporters and distributors of gasoline. In chapter two, I estimate two distinct effects of gasoline content regulations in California, Illinois and Wisconsin: (i) the effect of increased production costs due to supplementary regulation, and (ii) the effect of incompatibility between these blends and gasoline meeting federal reformulated gasoline standards. Using a structural model based on the production optimization problem of refiners, I simulate wholesale prices for jet fuel, diesel and four blends of gasoline in each geographic market. I then specify a counterfactual in which gasoline in the three states met federal requirements.

Imagine an everyday world in which the price of gasoline (and oil) continues to go up, and up, and up. Think about the immediate impact that would have on our lives. Of course, everybody already knows how about gasoline has affected our driving habits. People can't wait to junk their gas-guzzling SUVs for a new Prius. But there are more, not-so-obvious changes on the horizon that Chris Steiner tracks brilliantly in this provocative work. Consider the following societal changes: people who own homes in far-off suburbs will soon realize that there's no longer any market for their houses (reason: nobody wants to live too far away because it's too expensive to commute to work). Telecommuting will begin to expand rapidly. Trains will become the mode of national transportation (as it used to be) as the price of flying becomes prohibitive. Families will begin to migrate southward as the price of heating northern homes in the winter is too pricey. Cheap everyday items that are comprised of plastic will go away because of the rising price to produce them (plastic is derived from oil). And this is just the beginning of a huge and overwhelming domino effect that our way of life will undergo in the years to come. Steiner, an engineer by training before turning to journalism, sees how this simple but constant rise in oil and gas prices will totally re-structure our lifestyle. But what may be surprising to readers is that all of these changes may not be negative - but actually will usher in some new and very promising aspects of our society. Steiner will probe how the liberation of technology and innovation, triggered by climbing gas prices, will change our lives. The book may start as an alarmist's exercise.... but don't be misled. The future will be exhilarating.

It is often asserted that consumers purchasing automobiles or other goods and services underweight the costs of gasoline or other "add-ons." We test this hypothesis in the US automobile market by examining the effects of time series variation in gasoline price expectations on the prices and market shares of vehicles with different fuel economy ratings. When gas prices rise, demand for high fuel economy vehicles increases, pushing up their relative prices. Market share changes - increased production of high fuel economy vehicles and scrappage of low fuel economy vehicles - attenuate these price changes. Intuitively, the less that equilibrium vehicle prices and shares respond to changes in expected gasoline prices, the less that consumers appear to value gasoline costs. We estimate a nested logit discrete choice model using a remarkable dataset that includes market shares, characteristics, expected usage, and transaction price microdata for all new and used vehicles available between 1999 and 2008. To address simultaneity bias, we introduce a new instrument for used vehicle market shares, based on the fact that gasoline prices cause variation in new vehicle shares that then persists over time as the vehicles move through resale markets. Our results show that US auto consumers are willing to pay just $0.61 to reduce expected discounted gas expenditures by $1. We incorporate the estimated parameters into a new discrete choice approach to behavioral welfare analysis, which suggests with caution that a paternalistic energy efficiency policy could generate welfare gains of $3.6 billion per year. JEL Codes: D03, L62, Q41.

This book presents new evidence of asymmetric pass-through, the notion that upward cost shocks are passed through faster than downward cost shocks, in U.S. gasoline prices. Much of the extant literature comes to seemingly contradictory conclusions about the existence of an asymmetry, though the differences may be due to different aggregation (both over time and geographic markets) and the use of different price series including crude oil, wholesale, and retail gasoline prices. I utilize a large and detailed dataset to determine where evidence of a pass-through asymmetry exists, and how it depends on the aggregation and price series chosen by the researcher. Using the standard error correction model, I find evidence of pass-through asymmetry in the response of daily and weekly retail prices to wholesale rack price changes, though the magnitude varies by geographic market. On average, retail prices rise more than four times as fast as they fall. Branded gasoline features significantly more asymmetry with respect to rack prices compared with unbranded gasoline. Over time, nation-wide asymmetry varies significantly from year to year peaking in 2005. Midwest cities, like Louisville and Minneapolis, feature more asymmetry compared with other parts of the country. F-tests broadly confirm the results and illustrate that data selection and aggregation, as well as model specification, can have important implications on the findings of asymmetric pass-through.

Gasoline Price Changes and the Petroleum IndustryAn UpdateGasoline Price ChangesThe Dynamic of Supply, Demand, and CompetitionGasoline Price ChangesThe Dynamic of Supply, Demand, and CompetitionPrice Changes in the Gasoline MarketAre Midwestern Gasoline Prices Downward Sticky?DIANE PublishingThe Consumer Response to Gasoline Price ChangesEmpirical Evidence and Policy ImplicationsStanford University

Discusses how Connecticut's gasoline prices compared to those in the region and in the rest of the country during the spring and summer of 1998.

Prepared for the use of the Joint Economic Committee, Congress of the United States.

Discusses background on the recent price increases, compares gasoline price changes in Connecticut and its neighboring states, and, compares gasoline tax rates in these states.

Gasoline prices and driving behavior. Volume of traffic ; Speed of traffic ; Applicability of findings to other regions of the United States -- Gasoline prices and vehicle markets. Market shares for cars and light trucks ; Gasoline prices and vehicle market status ; Changes in new vehicle fuel economy and pricing ; Changes in the used vehicle market -- Study data -- Analytical approach and economic results.

The dissertation consists of three empirical studies and takes a closer look at price fluctuations using German gasoline prices as an example for a homogenous good. It analyzes consumers’ reaction to price fluctuations and respectively the pricing behavior of firms. The first paper, which was developed with co-authorship, explores consumers’ online price

search effects on the pricing behavior of firms (gasoline price level and price dispersion). As regulators have recently implemented a mechanism for reporting all price changes to a central data base, the core assumption of this price reporting scheme is that the increase in price transparency will lead to a decline in the price level and a reduction in price dispersion. The second study addresses the question whether German gas stations adjust their retail prices asymmetrically in response to crude oil price changes, i.e., whether gas stations react quicker to crude oil price increases than to crude oil price decreases. The third study aims to analyze whether consumers react more strongly to gasoline price increases or to price decreases when considering buying a new vehicle.

The dramatic increase in gasoline prices from close to $1 in 1999 to $4 at their peak in 2008 made it much more expensive for consumers to operate an automobile. In this paper we investigate whether consumers have adjusted to gasoline price changes by altering what automobiles they purchase and what prices they pay. We investigate these effects in both new and used car markets. We find that a $1 increase in gasoline price changes the market shares of the most and least fuel-efficient quartiles of new cars by +20% and -24%, respectively. In contrast, the same gasoline price increase changes the market shares of the most and least fuel-efficient quartiles of used cars by only +3% and -7%, respectively. We find that changes in gasoline prices also change the relative prices of cars in the most fuel-efficient quartile and cars in the least fuel-efficient quartile: for new cars the relative price increase for fuel-efficient cars is $363 for a $1 increase in gas prices; for used cars it is $2839. Hence the adjustment of equilibrium market shares and prices in response to changes in usage cost varies dramatically between new and used markets. In the new car market, the adjustment is primarily in market shares, while in the used car market, the adjustment is primarily in prices. We argue that the difference in how gasoline costs affect new and used automobile markets can be explained by differences in the supply characteristics of new and used cars.