

# RETAIL CHOICE IMPACT ON CONSUMER BEHAVIOR

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## Overview

This study examines the impact of the introduction of retail choice, which enabled consumers to choose their retail supplier rather than the local incumbent utility, on consumer behavior, namely on the elasticity of demand in Pennsylvania, USA electricity markets. Retail choice became available in Pennsylvania after passage of the Electricity Generation Customer Choice and Competition Act of 1996. However, it took more than a decade before the switching to a retail provider became a wide-spread activity.

In December of 2008, Pennsylvania Public Utilities Commission (PA PUC) approved a final rulemaking order which “adopted reporting requirements regarding electric generation market activity to prevent anticompetitive or discriminatory conduct and the unlawful exercise of market power.” Since then all retail choice suppliers were required to file an annual activity sales report with the PA PUC, and the first annual “Retail Electricity Choice Activity report” was issued by the Commission for 2010. This year, in 2010, marks a boom in switching activity from incumbent utilities to retail choice providers in all customer classes.

Implications of retail choice reforms have been studied by many economists for various customer segments including residential, commercial and industrial customers. Joskow (2006) is one of the first studies that looked at the impact of competition on retail prices for residential and industrial customers. Although his study provides an indication of price reduction in retail rates, the results are based on limited dataset. Swadley and Yucel (2011) study the impact of retail competition and transitional pricing on residential electric rates using Texas as baseline. Their study showed that retail choice programs had no impact on retail electricity prices in the long-run and conclude that customers did not have an incentive to switch to a retail supplier. Finally, Ros (2017) employed an econometric analysis of electricity demand in the United States and estimated the impact of competition on customer price responsiveness. Ros (2017) study, which updates the study done by Joskow (2006) with more comprehensive and recent data, concludes that retail competition overall benefited electric customers, particularly large industrial customers.

Our research extends the existing literature in several ways. First, this study presents a theoretical framework to explain consumer switching between the incumbent utilities and retail choice providers. Our modelling framework can be useful in explaining consumer adoption of any innovative energy product, which is the subject of our forthcoming research. Second, this is one of the first studies that estimates price elasticity of electric demand of utility customers and consumers switched to a retail choice program separately. As expected, we find different dynamics in consumption between the two groups.

## Methods

We specify a dynamic linear demand equation similar to Houthakker (1974), Bohi and Zimmerman (1984), Gately and Huntington (2002), Bernstein and Griffin (2006), Erdogdu (2010), and Alberini and Filippini (2011) for residential, commercial and industrial customer segments separately and estimate price elasticity of demand for customers who switched to retail suppliers versus customers who stayed with their local utility after the adoption of retail choice reforms (“Post Adoption Period”). Post adoption period is defined separately for each customer segment after the assessment of the pace of the customer saturation of the retail choice programs for each customer segment. Next, we estimate demand on a “pooled” data stacking energy consumption of all customers from 2008 to 2019. This data includes the energy consumption data prior retail choice reforms in Pennsylvania (“Pre Adoption Period”) and the energy consumption data from the Post Adoption Period. We estimate the average price elasticity of demand after the adoption of retail choice programs.

Finally, part of our study is an investigation of the aggregate customer switching patterns from utility to retail providers. We observe patterns that are consistent with the classic Bass (1969) diffusion model, once we allow for switching back from retail providers to utility. We evaluate each customer segment separately and observe differences in pace of the switching to retail providers for different customer classes.

## **Preliminary Results**

The introduction of retail choice option effectively allowed the consumers to self-select into two groups: the customers of the incumbent utilities and the customers that chose a retail provider. Prior research points to significant inertia in switching suppliers: many residential consumers are just not interested in “shopping” for a cheaper rate. Our preliminary empirical analysis results generally support the hypothesis that the customers that chose to switch to a retail choice provider are more price elastic. We observe higher price elasticity for residential and commercial customers of retail providers, which suggest that these customers are more aware of changes in electricity prices.

Not surprisingly, we observe different patterns in the energy demand of the industrial customers. Note, that industrial customers face different price scheme: industrial customers pay a provider fee to either utility or retail supplier and most of their energy bill is based on the real-time LMPs. Thus, industrial customers are directly affected by the changes in real-time electricity prices, however are likely unable to change their consumption on the short-run. Our findings suggest that the price elasticity estimates for industrial customers that stayed with the utility are greater than for the ones that chose a retail provider.

We find that price responsiveness overall have increased for residential and commercial customers after the retail choice option was introduced. For residential and industrial sectors, customers’ price responsiveness increases after the retail choice reforms. Although commercial customers’ price responsiveness is higher, it is statistically insignificant.

We analyse the pace and pattern of customer switching between utilities and retail choice providers by customer class, and observe significant differences between customer classes. We note the phenomenon of switching from the retail choice providers back to utilities, and incorporate this option in an extension of classic Bass (1969) diffusion model. Our model provides simple intuitive explanation to the observed switching behavior. Further research will include the calibration of the parameters of our proposed model to the data.

## **Conclusions**

Our empirical findings indicate that the introduction of Retail Choice in Pennsylvania led to an overall increase in the magnitude of the elasticity of demand across customer classes, which indicates a move towards more competitive markets. Previous literature focused on the effect of the retail choice on prices, which may be difficult or impossible to observe due to multiple factors directly impacting the electricity prices and data limitations. We believe that increase in demand elasticity is one possible desired outcome of the retail choice reform, and our findings may have important policy implications.

We propose an intuitive theoretical extension of the classic Bass diffusion model which explains switching patterns between utility and retail choice providers. Our further research includes calibration of the theoretical model to the data, which will allow us to make predictions of the impact of various economic factors on switching behavior.