Research Statement

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I was drawn to economics from the beginning of my undergraduate life, mostly because of its analyzing power and the statistical tools to model and frame people's actions individually and collectively. Examining public policies and exploring different economic aspects of these policies was always a core interest of economists, and I am no exception. I became more inclined to the applied microeconomics, industrial organization, and policy analysis during my graduate career.

In my academic research, I use up to date statistical methods to analyze public policies and market responses. Specifically, my dissertation research focuses on analyzing environmental policies and their implications on different economic and environmental factors.

In my dissertation, I try to analyze how the state-level incentive policies influence the market as well as the other unintended unexplored direction of these policies. In the first chapter of my dissertation, I analyze the effect of state-level tax credit policy on electric vehicle sales in Maryland by focusing on a synthetic control approach using Bayesian structural time series. Previous studies focused on different discrete choice models analyzing such policies that require another control state's data. Bayesian time series approach, however, is able to show the effectiveness of the policy by employing counterfactual analysis without another control state's information. In this study, I found this incentive indeed increased the electric vehicle (EV) adoption, but at the same time, the State's goal of EV adoption is too high to achieve with the current incentive program.

As I have observed a substantial increase in EV adoption by the State incentive program, I elaborate my analysis on my second paper titled "Impact of Electric Vehicle Adoption on Electricity Consumption and Generation." This study focuses on two different but interrelated aspects of EV adoption. First, using California's monthly county-level data for 2010 to 2019, this study reveals that electric vehicles and their supportive infrastructures like, charging stations, have a significant effect on increased residential and commercial electricity consumption. Second, analyzing the electricity generation information by county, this study concludes that there is a significant negative relation between EV adoption and the share of electricity that comes from renewable sources. Although electric vehicles emit lower greenhouse gas than conventional vehicles, it demands a significant amount of electricity for charging. We see that all of California's EV incentive programs' total spending incurs $2.46 billion for approximately ten years. So, this study concludes that unless California adopts cleaner sources of power plants, billions of dollars of public spending on EV adoption may not result in a clean atmosphere, which was the primary concern of the EV incentive policies in the first place.

In my third chapter, I want to dig deeper into such policies and explore other factors that influence EV adoption. In previous literature, I have found several states with relatively high EV registrations whose incentives are not offered nearly to the same extent as major incentive states. So, there might be some other factors of states' green measure that could affect the adoption. The hypothesis here that I want to test is that the policy would be more effective in places with better sustainability infrastructure. For example, I want to construct a variable for the "Green score" of each state based on environmental quality, eco-friendly behaviors, and climate change contributions from several policies and implications, and I want to see the effect of this variable on EV adoption with having the same incentive available across the States. This modeling would be a combination of statistical and experimental methods.

The research journey of my dissertation has paved the way for my future exploration. I especially want to investigate different aspects of policies; for example, in my second chapter, I realized another exciting aspect of that research could be analyzing the adoption of small-scale customer-sited solar photovoltaics (PV) in California. This generation is known as behind-the-meter generation and the predominant technology is residential solar PV. So, there might be some relationship between EV adoption with these solar photovoltaic installations.

I think my research interest would explore understanding the economic principles and both individual and collective behavior with various perspectives. I believe trying to understand different perspectives with unbiased viewpoints is the true beauty of academic research. By doing this, we can always walk one step towards a better society.