Research Statement

My research focuses on the consequences of environmental and food policies aimed at altering consumer behavior. What we eat and how we eat impact the environment, and our environment impacts how and what we eat. With public concern over reducing pollution and health care costs, policymakers often turn to economic interventions to change how consumers consume (e.g., taxes, bans, and advisory campaigns). I am interested in the effectiveness of such policies, especially when there is debate over optimal policy design. I am also interested in how these policies displace consumption in unintended ways—where the reduction of one externality causes the growth of another externality. Finally, I am interested in how these policies interact with issues of equity. Environmental and health issues often disproportionately affect poorer and more vulnerable populations, and yet the policies designed to address such issues sometimes themselves have unattractive distributional properties.

Microeconomics is the discipline I use to study policy; my training is in the fields of agricultural and resource policy, behavioral economics, and applied econometrics. My methods are quasi-experimental, relying on a range of econometric techniques, such as difference-in-differences, event study, instrumental variable, and discrete choice methods. My projects have covered diverse topics, including quantifying how consumers respond to a local soda tax campaign,\(^1\) and understanding the adoption of water-saving technologies by farmers.\(^2\) In particular, my dissertation research examines an increasingly popular policy intervention which aims to address an environmental externality by incentivizing consumers to change how they obtain food—the regulation of disposable carryout bags (DCB). The contentious debate over these policies and their design, as well as the spatial and temporal variation in their adoption across the U.S., make them a particularly rich setting to study. The three papers of my dissertation examine DCB regulations in three ways: (1) are they effective tools for changing behavior, (2) do they impose non-monetary costs on consumers, and (3) do they cause unintended consequences that undermine the benefits of the policies.

My job market paper, Giving Plastic Bags the Sack: The Hidden Costs of Changing Behavior, addresses the second question. Understanding the non-monetary costs consumers face has implications for social welfare evaluation and policy design; however, quantifying these costs is not always feasible. In this paper, I am able to precisely identify and measure a hidden time cost of DCB policies. Using high-frequency scanner data from a national supermarket chain and an event study design, I precisely quantify the effect of DCB policies on the wait and processing time of checkout services provided by supermarkets. This paper contributes to the literature as the first (1) to quantify the time cost of a policy change separately from other non-monetary costs, (2) to examine how this recurring cost evolves as behaviors and habits adjust to the policy, and (3) to focus on a policy and setting where capacity constraints determine whether retailers or customers bear the incidence of the time cost. My results show that DCB policies cause a 3% increase in transaction duration, which translates to 1.09 additional minutes of wait and processing time per transaction. The policy implications of the results are threefold. First, policies which incentivize customers to change their habits may have large non-monetary costs, and ignoring these costs overstates the welfare gains of such policies. Second, not fully considering the institutional conditions and constraints of a policy setting can result in competing externalities. I show that when consumer behavior is connected through queuing systems, individually slower actions propagate into an even larger congestion externality. Third, the policy tool (i.e., bans vs. fees) matters with respect to the time costs. I find that policies which tax both plastic and paper bags have less persistent time costs than policies which ban plastic

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and tax paper, due to paper bags being the slower technology.

The second paper in my dissertation, *Bans vs. Fees: Disposable Carryout Bag Policies and Bag Usage*, examines the importance of policy design.³ Having lived in both Washington, DC—which implemented a disposable bag fee in 2010—and in Berkeley, CA—which implemented a plastic bag ban and paper bag fee in 2013—I wanted to know whether bag bans or bag fees were more effective in changing behavior. While there is growing adoption of both types of policies in the U.S., little had been done to compare outcomes under each regulation tool. Based on my previous research on DCB policies, I designed a field experiment, taking advantage a local DCB policy change. With the help of my advisor Sofia B. Villas-Boas and a team of undergraduate researchers, we made bi-weekly visits to a set of treated and control stores during the months before and after the policy shock. We observed customers during checkout and recorded the number and types of bags used, whether a bagger was present, and basic customer demographic information. With these data, we use a difference-in-differences model to measure how bag bans affect customers’ demand for various types of disposable and reusable bags. We then investigate how bans and fees compare by juxtaposing our analysis on a bag ban with a concurrent study on a bag fee. We find that both DCB policies lead to similar increases in reusable bag usage; however, under a plastic bag ban, the eradication of plastic bag use is offset by a 47 percentage point increase in paper bag use. Therefore, if the environmental costs of both plastic and paper bags are a concern to policymakers and the public, our result indicate that DCB policies should also address the types and prices of the reusable bags that stores choose to sell in lieu of—or alongside—disposable bags. This project gave me the opportunity to build relationships with retailers that will continue into future projects, as well as to organize, lead, and mentor undergraduate students in experimental design, data collection, and econometric methods.

The third paper in my dissertation, which is a work in progress, asks whether DCB policies have unintended consequences that undermine the benefits of the policies. In particular, do DCB policies lead to increased consumption of other types of plastic bags? In a preliminary analysis, I find statistically significant increases in purchases of garbage bags when DCB policies go into effect. This “plastic bag leakage” is an unintended consequence of DCB policies that could offset the benefit of reduced plastic grocery bag use. Combining the results of all three of my dissertation papers, I will be able to complete a comprehensive welfare analysis of DCB policies.

In a related stream of research, I am interested in how local retail food environments play a role in explaining household store choice decisions and food acquisition patterns. Policymakers are pursing initiatives to increase food access for low-income households; yet, due to previous data deficiencies, there is still little evidence supporting the assumption that improved food store access will alter dietary habits, especially for the poorest of U.S. households. In a recently published paper, *Food Store Choices of Poor Households: A Discrete Choice Analysis of the National Household Food Acquisition and Purchase Survey (FoodAPS)*,⁴ we use the USDA’s new FoodAPS data to address this hole in the literature. We find that households are willing to pay more per week in distance traveled to shop at Superstores, Supermarkets, and Fast Food outlets than at Farmers Markets and smaller Grocery Stores, and that willingness to pay is heterogeneous across income group, SNAP participation, and other household and food environment characteristics. Our results imply that policymakers should consider incentivizing the building of certain outlet types over others, and that policies should be designed to fit the sociodemographic composition of each identified low-income,


low-access area in question.

While my dissertation focuses on one set of policies, the results have implications for other public interventions where consumers are incentivized away from convenient behaviors towards more socially-beneficial behaviors. My future research will continue to look at the tensions between consumer behavior, the environment, and health outcomes. Two open questions I plan to address in the next five years are: (1) do policy-induced non-monetary costs alter where consumers acquire food, on average and heterogeneously by socioeconomic status, and (2) as the food sector continues to evolve—with advances in supply chains and the rise of online ordering of groceries—what are the tradeoffs between increased convenience and the environment. With the use of economic theory and causal techniques, I will continue to analyze the consequences of environmental and food policies aimed at altering consumer behavior.

TEACHING STATEMENT

Making sure his 9:00am Econometrics class was awake and up to speed, Professor Anderson prompted, “Are you all on the bus?” I was a junior at Washington & Lee University still taking full advantage of my liberal arts education and sampling a smörgåsbord of potential majors. During this course, I thoroughly enjoyed learning the mechanics of OLS regressions and statistical significance, but I fell in love with economic research when Professor Anderson assigned us to create an independent research project. In searching for a topic, I marveled in how econometric tools could be used to connect and analyze questions I had formed in other courses—such as environmental studies, policy, and psychology. Getting my hands dirty in the entire research process—from delving into the literature, searching for usable data, and developing a model to test my hypothesis—captivated me. Thus, when Professor Anderson repeated his catch phrase question, I knew my answer. I was on the bus and ready to travel further into economic research.

Due to my success in econometrics, I earned a position as Peer Mentor in the Economics Department at Washington & Lee University. This was my first taste of teaching an academic subject, and consequently, the first time I understood (a) how much fun teaching could be when the light-bulb clicked on for a student and (b) how frustrating it could be when I could not help a student get even close to the light switch. After that tutoring experience, I began paying attention to the diverse ways in which my professors succeeded in bringing us out of the dark. What I’ve learned is that effective methods—whether in or out of the classroom—almost always involve active learning and experiencing the material in multiple ways (hearing, seeing, discussing, writing, relating).

During my time as a PhD student at UC Berkeley, I’ve had to opportunity to hone my teaching skills as a graduate student instructor (GSI) in two undergraduate courses: Microeconomic Theory with Applications to Natural Resources (Fall 2013) and Introductory Applied Econometrics (Fall 2014). As a GSI, I taught new material during weekly discussion sections, complementing what was covered in lecture. I held weekly office hours to help students grasp basic concepts and tackle problems in homework assignments. I also developed problem sets and exams, often drawing on the data and code from my own research to create practice datasets. My students appreciated these real world examples in their assignments, as well as my enthusiasm for the material. For both courses, I received strong GSI evaluations, in particularly for the usefulness of section notes and assignments.

With respect to active learning techniques, I found think-pair-share activities to be particularly effective in engaging students with the material during class time. For example, after a lecture on the five necessary steps for completing a hypothesis test, numerous students missed a step or two on their subsequent homework. To help students practice all five steps, the following section I posed a hypothesis test on the board and had students work through the problem on their own. I then divide
the students into groups, gave each group one of the 5 steps, and asked them to compare and contract their answers. Finally, I re-grouped the class and had each group write the name of their step and their solution on the board in order. After this activity, I found that missing a step was more of a rarity than the norm.

Given the invaluable mentoring I received during my undergraduate and graduate careers, I view mentoring younger generations in forming and following their own economic questions as one of the top reasons for pursuing a career in academia. For this reason, I have sought out mentoring opportunities during my time at UC Berkeley. As part of Undergraduate Research Apprentice Program, I mentored students in research projects, programming in STATA and R, and in navigating the graduate school application process. Through the support of Sponsored Projects for Undergraduate Research, I organized and led a team of 11 undergraduates in field research and data collection. Students obtained first-hand experience in field research and learned how to design data collection in order to implement econometric analysis. Finally, for formal training in mentoring, I completed UC Berkeley’s Mentoring in Higher Education course, to develop skills for effective mentoring in research.

As I transition from graduate school to my career as a professional economist, I look forward to developing and teaching my own courses. As a faculty member, I am prepared to teach microeconomics, applied econometrics, behavioral economics, and environment and resource economics at any level, as well as a course I have developed based on my own research: Environment, Agriculture, and Food: Economic & Policy Analysis. This course would be designed to provide students with guidance on the models and tools needed to conduct economic policy analysis on the intersecting topics of environment, agriculture, and food. We would cover topics such as taxation vs. command-and-control policies to address pollution externalities, environmental labeling and green nudges to alter consumer behavior, safety net policies to insure food security, and regulations to maintain food safety standards. For each topic, I would combine theory and empirical work, and guide students to read related papers. For a graduate course, I would also emphasize quasi-experimental methods for identifying causal effects, including instrumental variables, difference-in-differences methods, discrete choice analysis, and regression discontinuity designs.

In summary, the tools, inspiration, and support I received, starting with Professor Anderson’s econometrics course, has shaped the foundation of my teaching philosophy, which boils down to: Teachers foster connections for students—connections between students and the material, students and each other, and students and the outside world. In my teaching, I hope to emulate Professor Anderson—helping students find, hop on, and drive their own bus.