Research Statement

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My research interests cover the fields of environmental economics, urban economics, and public economics. I am especially interested in developing and applying economic analysis to guide the design and evaluation of environmental policies. Economic analysis guides the design of environmental policies to achieve environmental improvements while pursuing equity in the distribution of benefits and costs. My current work focuses on the differential welfare impacts of environmental policies/changes across household groups driven by mobility and housing market re-equilibration. In the future, I will extend my attention to policy design and other related fields.

Welfare Distribution from Environmental Policy

In my job market paper, I develop an empirical framework to measure welfare impacts from localized environmental changes, taking account of residential sorting based on environmental changes and housing price/rent responses. This paper focuses on addressing one question: how are welfare impacts from environmental changes distributed across heterogeneous households? While some existing literature that measures benefits from environmental policies using general equilibrium models takes account of property market responses, little is known about the distribution of those benefits. My model measures the distribution of welfare impacts from environmental changes and focuses on four previously overlooked factors that explain the differential welfare impacts: tenure status (renting vs. owning), preference heterogeneity, forward-looking behavior and wealth evolution. First, rent increase in response to environmental improvements harms renters while housing price appreciation benefits owners. Renters can lose from environmental improvements if the increase in rent burden offsets the gains from environmental improvements while owners benefit from both environmental improvements and housing price appreciation. Second, lower-income households have a lower value on environmental improvements and may sort into neighborhoods with worse environmental conditions. Preference heterogeneity affects residents’ welfare through housing
re-optimization undertaken in conjunction with the realization of capital gains for low-income owners and the displacement of low-income renters. Third, forward-looking behavior and wealth-evolution are subject to the inherently dynamic nature of household location decisions and help explain housing appreciation and environmental gentrification in the most impacted neighborhoods. Residents choose to own houses in the most impacted neighborhoods expecting an increase in wealth corresponding to housing appreciation. The influx of medium- and high-income residents brings housing investment and increases both housing prices and rent burden in environmentally improved neighborhoods.

I incorporate all these factors into a dynamic sorting model with endogenous tenure choices and forward-looking agents. I allow preferences for public amenities to be heterogeneous by income, wealth, and race. Given the expectations about property market prices and public amenities, forward-looking residents maximize their lifetime utility by choosing housing locations and tenures while taking into account moving costs. Price adjustments and public amenity changes are the main channels through which environmental improvements affect residents’ housing decisions. In the presence of differences in price effects, moving costs, wealth accumulation, and liquidity, renters and owners get differential welfare impacts from environmental improvements. This paper takes advantage of an exogenous environmental shock and a unique dataset tracking residents’ locations and tenure decisions over time, mitigates the curse of dimensionality by applying a computationally light approach from Bayer et. al (2006), explores the causes of residents’ differential responses and measures the distribution of welfare impacts from localized environmental changes.

In my job market paper, I discover that the distribution of benefits from a positive environmental shock favors high-income households, especially owners, and harms low-income renters. Low-income renters who get a small welfare gain from environmental changes in partial equilibrium experience welfare losses once I incorporate housing market responses and residential sorting in a general equilibrium measure. In contrast, owners of all income levels benefit more in general equilibrium because of the capitalization of environmental improvements in the housing market. Evidence that the benefits of environmental improvement are distributed regressively and the fact that renters are on average both poorer than owners and are more likely to be people of color also raises environmental justice concerns, which will affect likely policy design and evaluation in the future.
Gentrification and Eviction

Another strand of my research focuses on gentrification-induced displacement and its impacts on incumbent residents. This work elucidates the factors that drive displacement and investigates influences of gentrification-induced displacement on the displaced groups, which is a vital part of understanding the impacts of gentrification. For instance, in my paper “The Link between Gentrification and Displacement and the Effects of Displacement on Residents in Los Angeles County” (joint with Christopher Timmins and Ashley Qiang), I study the link between gentrification and displacement, identifying the social groups most likely to be displaced and the impacts on those displaced groups. The results provide evidence of displacement, showing that lower-income renters are significantly more likely to exit from gentrifying neighborhoods and tend to move to neighborhoods with significantly lower school quality and higher crime rates. Owners, however, are more likely to stay in gentrifying neighborhoods, benefiting from the increased amenities and rising home values. When these owners do move, they convert those capital gains into improved living conditions in stark contrast to renters.

Gentrification-induced inequalities are an important part of my research as well. In another working paper with Grace Mok, “Do Evictions Cause Income Changes? An instrumental Variables Approach,” we leverage two datasets — eviction court records from DataWorks and InfoUSA data — to get a sample of evicted residents that we use to quantify the causal impacts of eviction on residents’ socioeconomic conditions. The challenge in identifying the causal impacts stems from the possibility that eviction is a consequence of financial distress for households. This paper offers a new instrumental variable — gentrification — to identify evictions caused by exogenous changes in the property market and neighborhood conditions. Exploiting gentrification-related evictions as an instrument, I find a 2.5% decrease in household income after eviction. By further exploring where residents moved to and examining tract-level “workplace+residence” pairs, commuting time, and travel cost after eviction, we find a positive correlation between eviction, worse neighborhood, and increase in commuting time. The results provide evidence of welfare loss as a result of changing jobs and moving to the worse neighborhood for evicted residents.

Beyond Demand in Housing Markets

Beyond this list of projects investigating responses from housing markets, the method I developed in my job market can be broadly applied in the analysis of other public policies and urban projects to understand their welfare impacts. Currently, I have one work in
progress that examines the welfare impacts from transportation infrastructure expansion, taking account of responses from both the labor market and the housing market. The massive investment in metro rail transit aims to reduce roadway traffic congestion and environmental pollution, increase local amenities, and spur urban development. However, since residents have heterogeneous preferences for time, commuting, and face different choices in the housing market and labor market, such projects are likely to have distributional impacts and offer differential benefits to residents within an area. Evidence shows that access to the new transit lines increases the percentage of public transportation users in both tracts with new metro rail stations and tracts with interacting metro rail stations, increases local housing prices and expands residents’ choices in the labor market. This paper will further develop a dual market choice model to assess the potential distributional impacts of transportation infrastructure improvement on residents’ welfare.

In my future work, I propose examining responses to policies from the housing supply market and guiding the design of potential complementary policies. Housing price appreciation corresponding to environmental improvement can lead to the conversion of rental units into owner-occupied dwellings and further increase rent burden, but little has been done to rigorously understand the responses from the supply side. Besides, as the regressively distributed benefit from environmental policies requires the use of complementary policies, it becomes vital to develop a model with both housing supply and demand to capture changes in housing stock and housing/rental prices after imposing complementary policies. My future research will sit at the crossroads of demand effects and supply effects, opening a broad array of subsequent policy-relevant research areas to explore.

Overall, my research plan builds on my current research and explores issues associated with welfare impacts from urban policies and changes in the housing market while leaving space for extensions into other markets and policy research. In sum, successfully executing my research will provide a valuable understanding of how urban changes can influence residents’ welfare and will help guide policymakers by improving policies and reducing social inequality.