Research Statement

Mauricio Arango Isaza

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I am an urban and transportation economist with a secondary interest in real estate economics. My research focuses on analyzing how a city's shape affects the economic interactions of its inhabitants and vice versa. My usual methodological approach to research questions has two components: a theoretical model that structures the hypothesis and an empirical assessment that tests the hypothesis. The examples below provide a brief insight into my current research projects, the strategies used, the results, and the obstacles I had to overcome.

"Parking, Cruising, and Congestion." Job Market Paper

In my Job Market Paper "Parking, Cruising, and Congestion," I map and assess the congestion cost of on-street parking in New York City (NYC). The allocation process of curbside parking (cruising) has an embedded negative externality, congestion. The reduction in speed caused by congestion affects all vehicles on the road, while on-street parking only benefits a fraction of all drivers. The existing parking literature has analyzed this problem; however, data and empirical results were lacking. My paper sheds light on this question by using a unique data set to estimate the effect of on-street parking on traffic speed. The empirical approach, the demand simulations, and the welfare analysis follow the theoretical model I develop in the paper.

The first obstacle I faced in this project was the lack of data on parking supply. To address this issue, I built a panel of on-street parking prices and locations. The panel uses the text and coordinates of thousands of parking signs across NYC that mark the supply and schedule of curbside parking. I later crossed this panel with Uber traffic data to estimate the effects of on-street parking on traffic speed. I document a significant negative relation between on-street parking and traffic speed. This relation changes through the day as the link between vehicle density and traffic speed (congestion technology) is likely nonlinear—a car cruising has a higher impact on traffic during rush hour than in an empty street.

My findings show that a car commuter that works from 9 a.m. to 5 p.m. can lose 7 minutes every day due to on-street parking. These daily losses add up to 4 working days every year (32 hours). The paper also shows how differences in the price gap between curbside parking and garages create spatial variation in the demand for on-street parking. According to my simulations, high garage prices induce cruising in the most congested area of NYC, as the demand for on-street parking is higher close to the city center. My simulations also show that welfare gains from on-street parking drop during the day—the congestion cost increases from 8 a.m. to 5 p.m. while the consumer surplus remains stable.

The novel data set used in the paper provides some insight into the pricing and supply decisions made by city officials and garage operators. For example, free-of-charge on-street parking is the most abundant type of parking in NYC. I also document that prices and supply of garages and meters follow the shape of the monocentric city model, with high prices and concentration of supply at the city center and lower values further away.

"Assessing Walkability Through Parking Prices."

In my paper "Assessing Walkability Through Parking Prices," I use the garage market to answer a less conventional question: how should we measure the cost of walking? Existing walkability measures are used in the real estate and urban planning literature to assess the effect of walkable areas on the housing market, public health, and other quality of life indicators. These measures of walkability rely on educated opinions of what makes a place walkable. Most walkability indexes have reasonable assumptions. However, they can benefit from a more rigorous approach.

The measure of walkability introduced in my paper uses the cost of walking embedded in the price charged by garage operators. The theoretical model developed in the document explains the connection between the cost of walking and parking prices. The concept is as follows: drivers choose their parking spot based on the price and proximity to their destination. Drivers are willing to pay more for spots closer to their destination and less for those further away. Garage operators know this and modify their pricing behavior based on drivers' willingness to walk. As a result, garage operators in walkable areas engage in fierce price competition (high price correlation) due to the low cost of switching; meanwhile, garage operators in less walkable neighborhoods face more spatially segmented markets (low price correlation). This hypothesis is tested in the paper using data from Chicago.

I follow the price competition approach described in the theoretical model to isolate the cost of walking embedded in garage prices. To do this, I use competitors' prices and a measure of real estate value to control for price competition and the garage's opportunity cost. I then use the isolated cost of walking to weigh the location characteristics in the walkability index. The characteristics considered in this step are a summary of variables often used in the literature to describe walkability. This process yields a walkability index that shows a strong correlation with some of the existing measures. Maps with values for all census tracts in Chicago and NYC are displayed in the paper and my website.

One major obstacle in this paper was the garage price data. To bridge this difficulty, I coded a web-scraping tool that collected and organized hour-by-hour data of thousands of garages across the United States. The final panel contains the price, location, availability, and amenities of those garages. A simplified version of this web-scraping tool is available for downloads from my GitHub repositories.

"Crowning the Metropolis: Skylines, Land Values, and Urban Population," with David Albouy and Minchul Shin

In "Crowning the Metropolis: Skylines, Land Values, and Urban Population," my coauthors and I look at how land values mediate the relation between urban population and building heights. To do this, we develop a model that links population, central land values, income, construction costs, the arc of expansion, and building heights in metropolitan areas. We estimate a reduced form

model using cross-section data from metropolitan areas in the United States. A series of testable hypotheses shows that the data is consistent with the theoretical model.

One concern with the identification strategy used in the paper was the endogeneity of the metropolitan population. In an open city model, productivity and amenities can attract inhabitants to move in. At the same time, productivity and amenities can affect the height of buildings and other variables through mechanisms outside the dynamics in our model. To address this potential endogeneity, we used an instrumental variable derived from Zipf's law. Instead of using population in our regressions, we used the inverse of the population rank—so NYC is 1, Los Angeles is 1/2, and Chicago 1/3.

Additionally, the paper proposes an alternative definition of the city center. First, we use the locations of the tallest buildings in each city to draw a polygon; then, we use the geometric median of each polygon as the proposed city center. We show these locations and other landmarks in interactive maps that cover all the metropolitan areas in our sample. The theoretical model and results in this paper help provide a better understanding of the economics behind the verticality of cities.

"Eight Decades of Urban Expansion." with Lewis Lehe & Issi Romem (collecting data)

In this paper, my coauthors and I use the American Community Survey data to describe the last eighty years of urban expansion in the United States. Preliminary results show a lot of heterogeneity across cities, especially since the '80s. Cities like San Francisco and Los Angeles (expensive cities) show high growth in prices but little expansion in developed land. Meanwhile, places like Atlanta and Houston (expansive cities) have slower price growth and faster expansion in land use. This heterogeneity reflects a differentiated response to the increase in housing demand; expensive cities have adjusted their markets through higher prices while expansive cities have increased the housing supply. The preliminary results also show heterogeneity in the type of housing across decades. During the 40's single-family homes were the most common type of dwelling, while in the last ten years, multifamily structures have become more popular, especially in expensive cities, suggesting a densification process concentrated in expensive cities.