

## Research Statement

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I am an applied microeconomist with a focus on urban economics, development economics and transportation. My research explores topics related to urban residential segregation by income and race, the cost of travel within cities and the relationship between the two. What explains slow travel in rich versus poor cities? How do the gains from faster transportation infrastructure compare for rich versus poor commuters? What are its implications for income and racial segregation within cities? These are some of the questions I explore in my most recent works. To address them, my research exploits newly digitized historical maps and surveys as well as large-scale web-scraping of newly emerging big data sources. More broadly, my works exhibit wide methodological variation that includes theoretical modeling (as in [2]), random utility model estimations (as in [1]) and controlled lab experiments (as in [6]). Below, I briefly outline some of my current working papers and my rich pipeline of works in progress.

Public transit expansions are widely believed to disproportionately benefit low-income and minority residents of cities. My dissertation research shows that is often not true. My job market paper [1] models heterogeneous preferences by income for access to faster public transit, driving and walking commutes by combining survey data on travel mode, residence and work location choices with web-scraped data on roads, establishments and counterfactual travel times for millions of trips across the largest US cities. I find that richer commuters sort more aggressively into the fastest public transit routes and are willing to pay more for faster transit travel where transit is fast (relative to driving) and in cities with a greater share of rail transit. In contrast, poorer commuters benefit more from faster public transit where transit is slow to begin with and in cities with more bus transit.

A companion paper [2] uses a theoretical framework to demonstrate how such heterogeneous preferences for transit can explain changes in income segregation and transit ridership within US cities since the 1990s. I also show that urban planners trying to maximize transit ridership (such as to reduce congestion or carbon emissions) have an incentive to expand high speed transit networks in ways that inadvertently exacerbate income segregation.

The third chapter of my dissertation [8] provides the first empirical evidence of the role of mass transit in the history of racial segregation in US cities. The analysis exploits a newly digitized panel of historical streetcar and neighborhood maps along with a matched panel of individuals from historical censuses (1870-1930) to show how the expansion of streetcars facilitated the flight of white households from black families in the urban core to the newly accessible suburbs.

In another project exploiting digitized historical neighborhoods and a matched panel of houses [4], we study how racially segregated housing markets perpetuated racial inequality during the Great Depression by forcing black households to pay disproportionately more for housing in racially transitioning neighborhoods that also lost disproportionately more in value over the following decade.

While my dissertation focuses primarily on public transit's socio-economic implications, a parallel strand of my research in progress looks at case studies of transit expansions to investigate their impact on congestion and air pollution in cities. One such work [7] uses data on remotely sensed air pollution measures and travel times scraped at high frequency from Google Maps to evaluate Jakarta's latest mass rapid transit expansion in 2019. In another ongoing data collection effort, I am working with the Asian Development Bank to track long-term changes in travel times (from Google Maps), land use (from satellite imagery) and travel patterns based on GPS data (from phone call data records) in 10 South and Southeast Asian cities where they are planning large-scale mass transit expansions over the next 5 years.

Another of my research agenda tries to understand the determinants of driving speed within and across cities. To what extent do we travel slow because we travel on popular routes at popular travel times when roads are congested as opposed to because of inherently slow travel infrastructure (circuitous routes, unpaved roads, etc.)? We compare travel times from Google Maps on millions of counterfactual trips at different times of the day in 154 large Indian cities [3] to show that slower poor cities are slow at all times of the day, not just at popular times. This challenges the conventional wisdom that cities are slow or fast mostly because of traffic congestion and has important implications for the effectiveness of standard policy recommendations like congestion pricing. In a related work in progress [9], we expand our data collection to cover over 1200 cities around the world with scraped data on over a billion counterfactual trips.

To quantify the welfare loss from congestion, a different working paper [5] combines our travel times with travel surveys in Bogotá (which we find in [9] to be the most congested city in the world). We model the choice of individual departure times as a function of the time cost of travel, which in turn is a function of the number of travelers on the road. Using our estimates of this demand for and supply of travel, we uncover a very small deadweight loss from congestion, equal to less than 1% of a day's wage.

## **Projects Referenced**

[1] *Who Benefits from Faster Public Transit?* – Job Market Paper

[2] *Public Transit Access and Income Segregation* – Working Paper

[3] *Mobility and Congestion in Urban India*, with Victor Couture (British Columbia), Gilles Duranton (UPenn), and Adam Storeygard (Tufts) – Revise and Resubmit, *American Economic Review*

[4] *Racial Segregation in Housing Markets and the Erosion of Black Wealth*, with Sijie Li (Freddie Mac), Allison Shertzer (Pittsburgh) and Randall P. Walsh (Pittsburgh) – Working Paper

[5] *Measuring the Cost of Congestion in a Highly Congested City: Bogotá*, with Gilles Duranton (UPenn) – Working Paper

[6] *Profit Sharing and Peer Reporting*, with Jeffrey Carpenter (Middlebury) and Andrea Robbett (Middlebury) – Published in *Management Science*, 2018, Vol. 64, Issue 9, p.4261-4276

[7] *The Impact of Public Transit on Congestion and Pollution: Evidence from Jakarta's MRT*, with Arya Gaduh (Arkansas), Alex Rothenberg (Syracuse) and Yao Wang (Syracuse) – Work in Progress

[8] *Public Transit and Household Sorting in Pre-War America*, with Allison Shertzer (Pittsburgh) and Randy Walsh (Pittsburgh) – Work in Progress

[9] *Mobility and Congestion in World Cities: Evidence from Google Maps*, with Victor Couture (British Columbia), Gilles Duranton (UPenn), and Adam Storeygard (Tufts) – Work in Progress