Criminal Investigations and Network Analysis
A DHS CENTER OF EXCELLENCE

GEORGE MASON UNIVERSITY

UTSA The University of Texas at San Antonio™

UNIVERSITY of WASHINGTON

Innovative Spatiotemporal Pattern Detection: Examining Changes in Crime Hot Spots Across Six U.S. Cities

LEAD PI: MARIE SKUBAK TILLYER
CO-PIs: REBECCA J. WALTER, ARTHUR ACOLIN

Dynamic Patterns of Criminal Activity

SUMMARY

Government officials and community leaders need to look beyond criminal justice system intervention as the sole means for creating safer communities. This project explores potential interaction effects to inform how to leverage small scale investment for greater returns in crime reduction. This fills critical information gaps at an important moment when development and investment opportunities are being renewed in underserved communities, igniting information exchange and dialogue with government partners and private investors on community and economic development activity and crime prevention.

PROBLEM STATEMENT

Phase I of this project used crime incident data for six U.S. cities (Los Angeles, Chicago, Seattle, San Antonio, New York City, and Philadelphia) over an eleven-year period to examine spatiotemporal crime patterns across street segments. Results revealed that indicators of investment (i.e., building permits and code enforcement) are negatively and significantly associated with changes in street segment crime over time. This raises the question of whether there are factors that amplify or depress the crime reductive benefits of economic investment. Phase II explores potential interaction effects to inform how to leverage small scale investment for greater returns in crime reduction using additional data sources to explore how neighborhood and street segment characteristics might moderate the effects of investment.

APPROACH

We use longitudinal datasets at the street segment level for six large U.S. cities over eleven years to estimate how changes in investment activity influence crime and whether effects vary by resident, built environment, and retail characteristics. These questions are answered using two address-level data sources, Data Axle's consumer data and business data, and census tract-level data from the U.S. Census Bureau's 5-Year American Community Survey estimates. Fixed-effect panel models allow us to observe the moderating effect of various segment characteristics on the relationship between investment and subsequent crime levels on street segments. We also explore crime type specific effects and examine the effects on nearby street segments to detect evidence of spatial displacement and diffusion of benefits.

ANTICIPATED IMPACT FOR DHS

As the federal government and elected officials consider major investments in infrastructure and community redevelopment, this project offers DHS an opportunity to provide guidance to public and private partners on how to strategically invest in communities to yield the greatest public safety benefit and spur additional private investment for sustained economic change. This project benefits DHS by filling critical information gaps at an important moment when development and investment opportunities are being renewed in underserved communities, igniting information exchange and dialogue with government partners and private investors on community and economic development activity and crime.