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Understanding Economic and Business Impacts of Street Improvements for Bicycle and Pedestrian Mobility

Jenny H. Liu, Ph.D., Wei Shi

In response to growing concerns over climate change and rising social inequity, active transportation policy is currently experiencing significant growth in cities across the country, with advocates arguing for robust bicycle infrastructure. With various transportation modes competing for scarce resources (including right-of-way and transportation funding), city planners and transportation agencies often struggle with how to justify infrastructure investments for non-motorized modes, particularly when driving is still the predominant mode of transportation.

Placing new, robust bicycle infrastructure on major travel thoroughfares still garners intense political backlash in some cities, especially from local business owners who have concerns about revenue reduction because of the installation of new active transportation infrastructure with narrower travel lanes and removing parking. Although previous studies provide evidence suggesting that upgraded active transportation infrastructure can contribute to greater revenue for business establishments through an increase of consumers arriving via an active transportation mode, these studies have largely been descriptive, or exploratory, in nature as opposed to incorporating more rigorous quasi-experimental analysis approaches. This research addresses this technical gap by estimating business and economic impacts of bicycle street improvements using relatively straightforward econometric methods in a quasiexperimental research design.

A VARIETY OF DATA SOURCES

Different data sources were used, ranging from public employment and sales tax data to proprietary data sources. Researchers analyzed street improvement corridors in six cities: Indianapolis, Memphis, Minneapolis, Portland, San Francisco and Seattle.

Four types of economic data sources were collected for each city if available:

- Longitudinal Employer-Household Dynamics (LEHD) employment data,
- Quarterly Census of Employment and Wages (QCEW) employment and wages data,
- Retail sales tax data, and
- National Establishment Time Series (NETS) employment and sales data.

DIFFERENT ANALYTICAL APPROACHES

Researchers applied three analytical approaches:

- Aggregated trend analysis,
- Difference-in-difference (DID), and
- Interrupted time series (ITS) analysis

to evaluate the impacts of street improvements on corridor employment and sales. While there were some mixed results, researchers generally found that street improvements have either **positive impacts** on corridor economic and business performance, or **nonsignificant impacts**.

More importantly, this multicity multiapproach exploration allowed the authors to focus on a broader perspective than the individual findings in each corridor or city-detailed comparisons of the different available data sources and methodologies to elucidate the advantages, disadvantages and challenges of conducting research in this field. For employment and estimated sales data with the finest geographical scale, NETS and retail sales tax data would be the most appropriate data sources. However, the tradeoff of utilizing NETS data is that the most recently released data only includes information up to

2015, and sales revenue is an estimated number. Retail sales tax data and QCEW data can also provide accurate economic indicator data at very fine geographic detail, but non-aggregated data is typically confidential and researchers may not be able to access the disaggregated data needed for analysis. The LEHD data source may be the only comprehensive public data source that includes economic indicators at a census-block level.

Analyses additionally showed that the consistency of results varied by data source across the analyzed corridors, which may be due to a number of reasons related to the specifics of each data source: the fuzzy factor applied for confidentiality in the LEHD data, differences in business industry sectors' coverage and details across data sources, and varying geographical detail of each data source (e.g., census-block level in LEHD data versus block-facing level in other data sources).

TRADEOFFS INVOLVED IN EACH APPROACH

These differences and tradeoffs underscore the importance of using multiple data sources to validate economic outcomes and trends from street improvements, as well as the importance of understanding the local or regional context when interpreting these quantitative results.

We proposed three different methodological approaches to investigate the economic impacts on street improvement corridors. Aggregated trend analysis and DID analysis both utilize control corridors to understand the impacts on the treatment corridor, while ITS is an econometric technique that analyzes multiple time points on the treatment corridor itself.

While the aggregated trend analysis is a visual comparison of differences in trends and growth rates between treatment and control corridors, DID and ITS analyses are quasi-experimental econometric methodologies that allow the researcher to ascertain causality effects of street improvements on business employment and sales. In general, researchers found that the ITS analysis provides more robust results than the other two methods, since it is a method that does not rely on choosing or finding appropriate control corridors. However, this approach generally requires more data points post-intervention to achieve meaningful and valid impact estimations. For DID analysis,

when the control corridors are not perfectly comparable to their treatment 3 counterpart, validity issues in the econometric analysis may arise and lead to biased results.

In summary, this research explored a systematic framework for evaluating the economic development effects of corridor-level bicycle or pedestrian street improvements across a number of corridors in multiple cities.

It is our hope that the results of our research will encourage the application of similar corridor selection processes, data collection efforts and multimethod analyses in additional corridors and cities around the country, and will provide a solid basis for policymakers, planners and other stakeholders considering street improvement infrastructure for pedestrian and bicycle mobility to make evidence-based investment decisions.

ABOUT THE AUTHORS

The research team consisted of Jenny H. Liu, Ph.D., and Wei Shi of Portland State University.

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THE FULL REPORT and ONLINE RESOURCES

For more details, visit the project page at nitc.trec.pdx.edu/research/project/1161 to download:

- Summary Report
- Street Improvement Study Guidebook
- Aggregated Trend Comparison Template
- City Reports for Indianapolis
- City Reports for Memphis
- City Reports for Minneapolis
- City Reports for Seattle
- NITC Final Report: **Understanding Economic and Business Impacts of Street Improvements for Bicycle and Pedestrian Mobility**

Photo by Michael Lander

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