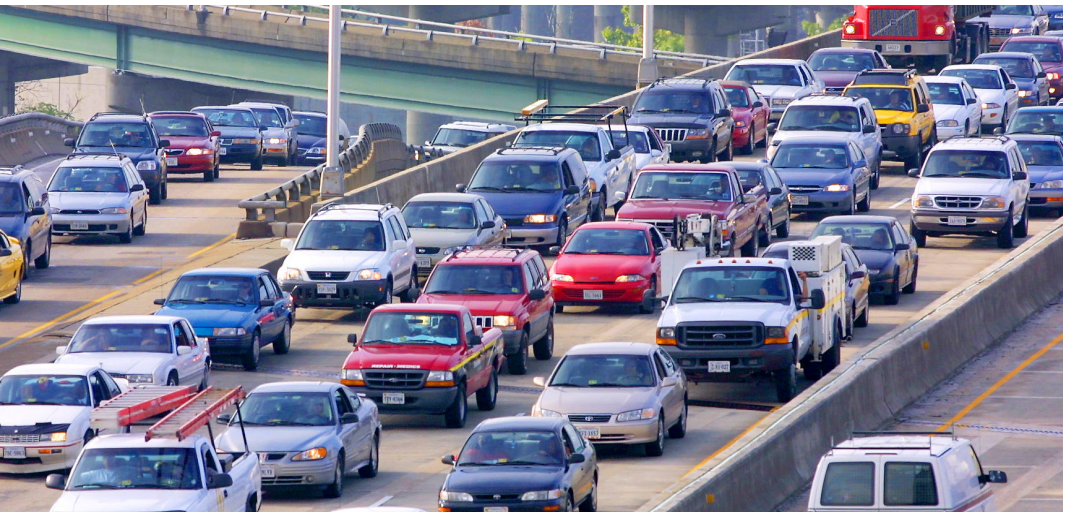


DOES COMPACT DEVELOPMENT INCREASE OR REDUCE CONGESTION?

This NITC study seeks to determine, using credible urban form metrics and congestion data, the net effect of compact development on area-wide congestion.

The Issue

From years of transportation research, we know that dense, compact development produces fewer vehicle miles traveled (VMT) than sprawling development. However, compact development also concentrates origins and destinations, which can increase traffic congestion. No one has yet determined the net effect of these two opposing forces on area-wide congestion. Proponents of compact development argue that it decreases congestion by encouraging fewer auto trips, while proponents of sprawl argue that spread-out, highway-induced development decreases congestion by acting as a "traffic safety valve" and funneling traffic away from dense areas.

Led by Reid Ewing of the University of Utah, this study seeks to determine which opposing viewpoint of sprawl and congestion is correct. With compactness/sprawl metrics developed at the University of Utah for the National Institutes of Health and congestion data from the Texas Transportation Institute's Urban Mobility Scorecard Annual Report database, researchers used structural equation modeling to estimate the long-term relationships between transportation and land use. They hypothesized that long-run relationships could be explained by these models since each urbanized area has had decades to arrive at quasi-equilibrium among land use patterns, road capacity, transit service, VMT and traffic congestion.

NITC
NATIONAL INSTITUTE for TRANSPORTATION and COMMUNITIES

Web: http://nitc.trec.pdx.edu

THE ISSUE

The net effects of sprawl or compact development on area-wide traffic congestion have been a subject of debate among transportation researchers.

THE RESEARCH

This project aims to settle the debate using:

- Congestion data from the Texas Transportation Institute's Urban Mobility Scorecard database;
- Compactness/sprawl metrics developed at the University of Utah.

IMPLICATIONS

Compact development may help at the margin, but the greatest reduction in congestion appears to be achieved through expansion of surface streets and higher highway user fees.

Photo: Auto traffic on a congested freeway

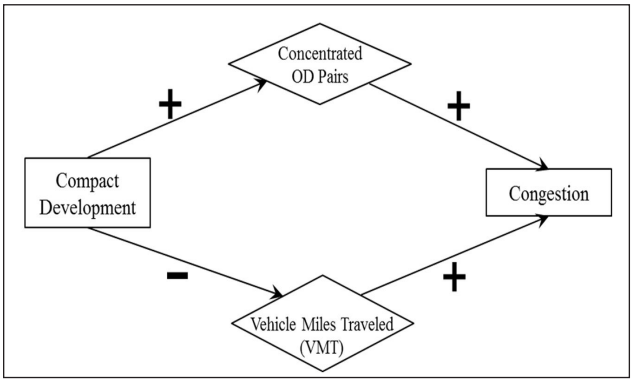
The Research

Researchers measured compactness, congestion, and other control variables for U.S. urbanized areas and related these variables to one another using multivariate methods to determine whether compactness is positively or negatively related to congestion and travel times.

Most of the relationships aligned with researchers' expectations, with some exceptions. One unexpected finding was that areas with more freeway capacity have as much delay per capita as those with less freeway capacity. Counterintuitively, expanding freeways appears to have the exact opposite effect of what is intended: increasing VMT without directly relieving congestion. The net result is null: considered in the context of developed land uses and urban transportation systems, compact development tends to have neither a positive nor a negative effect on congestion.

Implications

The most widely used compactness/sprawl index has, when both direct and indirect effects are considered, essentially no relationship to a widely accepted and cited measure of congestion. It is not clear from this analysis whether travel times are shorter or longer with sprawl, since travel distances are greater in sprawling development patterns. Common sense suggests that since origins and destinations are closer together in a compact development pattern, travel times may be shorter. But this represents a topic for further study.



Conceptual Framework

Compact development both concentrates origins and destinations (which can increase congestion) and reduces VMT (which can decrease it). This study aims to identify the net effect of both forces.

These findings are important for resolving the debate over this particular impact of sprawl, and also for policy planning. Congestion costs Americans billions of dollars in lost productivity, and policy should reflect the best ways to avoid this inefficiency. Developing in a more compact manner may help at the margins, but the greatest reduction in congestion appears to be achievable through expansion of surface streets and higher highway user fees.

PROJECT INFORMATION

TITLE: Does Compact Development Increase or Reduce Traffic Congestion?

LEAD INVESTIGATOR:
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PROJECT NUMBER:
2017-1020

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