DRISI
Caltrans Division of Research, Innovation and System Information

Research Results

Accounting for Interregional Travel in Regional Plans

A comparison of attribution methods

Planning, Policy, and Programming

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Accounting for Interregional Travel in Regional Plans

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WHAT IS THE NEED?

Transportation and land use decisions made in one region can have significant effects on the quantity and quality of vehicle travel between regions. The ex-ante travel demand models used to simulate the effects of these decisions are typically geographically limited to the cities and counties that make up a region and thus there is no explicit simulation of the effects of one region's planning, policy, and investment decisions on another. There is very limited research on the significance of interregional travel and the policy implication of methods used to allocate interregional travel. The California Department of Transportation has developed an activity-based microsimulation travel demand model (CSTDM) for the state of California, which was specifically designed to forecasts interregional vehicle travel. This model provides a unique opportunity to examine interregional travel at a large geographic scale with diverse geographic sub-regions.

WHAT WAS OUR GOAL?

The goal of this study was to gain a better understanding of the data and methods that are available to calculate spatial attribution methods for vehicle travel with the CSTDM and to understand how allocation of responsibility for interregional travel varies for different types of regions, policies, and methods.

WHAT DID WE DO?

Based on a review of the literature, four interregional allocation methods were identified: geographic, ecological footprint, 50/50, and cumulative additive. In this study, we use the CSTDM to simulate passenger and commercial vehicle miles traveled (VMT) over time from 2010 to 2040 and the introduction of a VMT tax in 2040. We then developed code to calculate the allocation

methods from the activity-based personal and commercial sub models in the CSTDM.

WHAT WAS THE OUTCOME?

The size of total passenger and short distance commercial interregional travel is significant. In the state of California, it is about 53 million daily VMT in 2010 and 81 million daily VMT in 2040. The share of passenger interregional travel relative to total travel is about 9% in both 2010 and 2040. For daily short distance commercial vehicle travel, the total is about 29 million VMT in 2010 and 42 million VMT in 2040.

The trip-based 50/50 attribution method underestimates both passenger and commercial interregional VMT compared to the more complete tour-based attribution methods. This method assumes that outbound VMT from home to the primary destination is the same as the inbound VMT. It also appears to penalize fast growing regions in which shares of interregional travel relative to all travel are declining, for example, in the San Joaquin Valley.

The choice to apply the ecological, geographic, or cumulative additive methods depends on where and what type of effect or policy is being examined. The ecological method allocates all interregional tour and trip VMT to a destination. The geographic method allocates interregional VMT to the region in which it occurs. The cumulative additive method takes the middle path by including elements of both the ecological and the geographic method. California is home to two major metropolitan areas with major international ports, one in the north of the state, the San Francisco region, and one in the south, Los Angeles regions. Travel between these regions occurs on Interstate 5 and State Route 99 through the largely rural, low-density San Joaquin Valley. The high level of pass through travel in the Valley for major destinations significantly increases the share of interregional passenger travel that is attributed to this region, which does not seem equitable. For example, policies in San Francisco and Los Angeles regions could be restricting housing development. On the other hand, if the Valley decided to self-fund a major highway expansion projects and this increases interregional VMT then, the application of the geographic method may be appropriate. Similarly, since the entire state of California benefits from the ports in the Los Angeles and San Francisco regions, it may be fair for other regions in the state to take responsibility for pass through commercial vehicle travel in the geographic method. Because of these issues, the equity implications, and not the ease of application, should be the determining factor when selecting an allocation method.

WHAT IS THE BENEFIT?

In a time of limited resources for transportation investment, California is in dire need of smart and accurate plans that can forecast the real challenges and needs of California's urban and rural regions. Interregional travel plays a significant role in this process and if accurately modeled and effectively incorporated can improve the current state of policy analysis in California.