Factors influencing light-rail station boardings in the United States

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Abstract

Many US cities have recently built or approved light-rail systems to combat congestion, sprawl, and pollution. Critics question light rail’s ability to generate ridership in low-density, automobile-oriented, polycentric US cities with smaller downtowns. Proponents counter that sufficient numbers of homes and workplaces in convenient access to stations via walking, park-and-ride, or bus to develop feasible corridors connecting major residential areas with suburban concentrations of employment and the CBD. With this in mind, we used multiple regression to determine factors that contribute to higher light-rail ridership. Cross-sectional data on average weekday boardings were collected for the year 2000 for 268 stations in nine US cities representing a variety of urban settings. The results showed the importance of land use and accessibility. Employment, population, and percent renters within walking distance, as well as bus lines, park-and-ride spaces, and centrality, were significant. Dummy variables for terminal and transfer stations and international borders were all positive and significant. Total degree-days were negative and significant, lowering expectations for cities with extreme climates. Notably, the stations in the CBD generate much higher boardings, but these are explainable by the same variables present in lesser combinations at non-CBD stations and account for their generally lesser boardings. Importantly, a dummy variable for CBD location was not significant. The resulting model may be useful as a first-cut, one-step approach for predicting demand for possible light-rail alignments.

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