

# Influence of Land Use on Travel Behavior in Santiago, Chile

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**In an attempt to expand the research base on the land use–transport link in the developing world, a microeconomic model developed in the industrialized world context is adopted. The analysis focuses on the influence of three gross measures of urban form on travel behavior in Santiago, Chile. Controlling for socioeconomic and demographic factors, the analysis attempts to demonstrate the influence of population density, relative share of commercial and service land uses, and relative share of vacant land on an individual’s propensity to make home-based, nonwork, non-school (HB NWNS) walking trips. Consistent with intuition, the model results suggest that the relative share of land devoted to commercial and service uses in the zone of trip origin increases the likelihood of making HB NWNS walking trips, whereas the relative share of vacant land decreases the probability. Somewhat surprisingly, population density in the zone of origin has no significant effect.**

Motorized transportation plays a crucial role in all cities—providing a primary means for exchange of goods and services and allowing people to satisfy the majority of their daily wants and needs. At the same time, its negative impacts—such as air pollution, congestion, and accidents—are now widely recognized in both industrialized and the developing countries (1, 2). Although improved vehicle and system technologies will help ameliorate some of motorized transportation’s negative impacts, a growing group of analysts, authorities, and advocates have been focusing increasingly on the potential contribution of land use strategies—particularly those characterized as neotraditional development, the new urbanism, new community design or, more generally, smart growth (3). Such strategies aim to create denser cities, reduce average trip length, improve service levels and reduce unit operating costs for public transport, and create better conditions for nonmotorized travel modes (i.e., biking and walking). Though intuitively attractive, such arguments are not easily supported by empirical analysis because of the difficulty in separating the effects of urban form from other factors influencing travel behavior, such as household size, relative travel costs, and socioeconomic characteristics.

Over the past 2 decades a growing body of research has aimed at improving the understanding of the influence of land use on travel behavior. The great majority of this work focuses on industrialized cities, especially those in the United States. To help understand the potential for land use strategies to affect transport system performance in cities in developing countries, the work presented in this paper builds on theoretical models developed in the United States

and applies them to data from Santiago, Chile. The research aims to extend existing theory, enable the comparison between empirical results in the developing world and those in the industrialized world, offer guidance on the potential to influence travel through changes in urban form in a specific city in a developing country, and establish a foundation for future work in that city and other cities in the developing world.

## LAND USE, URBAN FORM, AND TRANSPORTATION: THEORETICAL AND EMPIRICAL PRECEDENTS

### Land Use–Transportation Link: Theory and Scale

At the metropolitan level, the spatial distribution of residences, offices, schools, etc., shapes virtually all personal transportation activity. Such effects are normally modeled in regional travel forecasting exercises—sometimes in coordination with land use models—based at least partially on behavioral theory and underlying microeconomic concepts related to consumer choice and utility. At a local level, land use and urban form can also influence travel behavior by influencing what some researchers call “neighborhood accessibility” (4). The concept of neighborhood accessibility rests on the principle that neighborhood-scale factors—such as the local mix of land uses, street design and layout, and density of different activities—can influence travel behavior, such as people’s propensity to take pedestrian trips. Attempts to estimate the neighborhood-scale effects on individual travel have rarely been explicitly tied to behavioral theory. The empirical research presented in this paper moves toward local-level analysis of the land use–transportation link and aims to identify neighborhood-scale influences on travel behavior within a behavioral theory construct.

Neighborhood-scale urban form relates to the ideas underlying neotraditional development. Neotraditional development represents the stylized antithesis of the general form of suburban development that has proliferated throughout much of the post–World War II United States: single-use, low-density residential developments and office parks with street patterns and infrastructure geared toward accommodating automobile use. The new urbanist design principles directly counter the predominant neighborhood design characteristics of the past half-century and attempt to bring “community” back into communities through physical design.

From a transportation perspective, the basic premise is that local-level urban form characteristics can influence individual travel behavior by (a) reducing the number of motorized trips, (b) increasing the share of nonmotorized trips, and (c) reducing travel distances and increasing vehicle occupancy rates of motorized trips (5). These local-level characteristics can be categorized along three general

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