



The Data Center

Executive Summary

Predicting Real Estate Prices Using Travel Budgets and Urban Spatial Diffusion

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The MIT Data Center has an established program to study marketing spatial diffusion, the geographical forces that affect product adoption by consumers. While this is an interesting and profitable area of study, there are also other types of spatial diffusion that offer the promise of improved understanding about how geographical forces combine with other factors to influence the price of real estate.

Termed urban spatial diffusion, this area studies such things as location, traffic congestion, individual travel behavior, and commuting time as determinates of long-term trends in specific real estate markets. Expected outcomes of urban spatial diffusion studies include probable areas of residential and business expansion, and projected land and rent prices. All of this information is important when making private investments in real estate and for city and regional governments in zoning, infrastructure, and public service decisions.

One of the barriers to producing more robust urban spatial diffusion models involves the integration and interoperability of disparate data that often exists in different formats. The M Language and Dictionary currently under development at the MIT Data Center provides a new information technology infrastructure to achieve data integration on a large scale. This is the first step in building an interoperable modeling system where various urban spatial diffusion models can be applied with multiple sets of data at the same time.

Along with this information technology infrastructure, innovations in the modeling of urban spatial diffusion will provide new insights. Research has occurred as early as the 1820's to try to explain how urban areas expand through time. Taking place when the cities of Western Europe were growing rapidly, most of this work concentrated on financial forces such as transportation costs for agricultural or manufactured products to explain the pattern of urban center formation. Immediately after WWII, with the rise of suburbanization and cheap transportation alternatives involving the automobile, more emphasis focused on individual choice behavior as a primary factor in patterns of urban expansion. For example, city road congestion has an important affect concerning where people live in relation to where they work.

One method to formalize this study of individual behavior in the context of complex changes in urban density (and real estate prices) involves the use of travel budgets as a means of analysis. Individuals are constrained in terms of a budget, expressed as time and cost, for the amount they can spend to travel for a day. Within this constraint, travelers will maximize the amount of benefit, in terms of employment and leisure, that they can they obtain. These individual decisions collectively determine where people desire to live. With recent changes in petroleum costs, the dynamics of the travel budget have changed. Eventually, the real estate market will adjust to compensate for this change, and different patterns of pricing will result. Understanding in advance, where real estate prices will change provides deep insight to future potential profits and

losses. These types of insights are only possible through the rigorous modeling of urban spatial diffusion.

To learn more about how you can become involved with Urban Spatial Diffusion project through the MIT Data Center, please contact Ed Schuster at **Edmund_w@mit.edu**.

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