



Caltrans Division of Research,
Innovation and System Information

Research

Notes

Planning
Policy
Programming

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Project Title:
Business Establishment Survival and
Transportation System Level of Service

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Spatial Distribution of Economic Activities Relating to Level of Service

Identifying the role transportation system level of service plays on economic development and business establishment success.

WHAT IS THE NEED?

The spatial distribution of economic activities has a profound impact on urban organization and development. Businesses provide services and jobs that influence where people choose to live, where people travel to purchase goods and services, and the revenues of local jurisdictions. The spatial distribution of existing business establishments also affects location decisions of other business establishments, through competition and agglomeration. Spatial differences in business location and human behavior impact the regional transportation network in the form of accessibility, traffic circulation, and congestion. In this context, integrated models of land-use and transportation are used to further analyze the impacts of these changes in regional planning and policy. Researchers and practitioners are developing increasingly disaggregate modeling of these integrated systems. In order to develop this type of model, we must understand the behavior of relevant market agents such as households, persons, business establishments, and land developers that make decisions regarding their locations as well as personal travel and the movement of goods and services. This project will provide information about statewide planning modeling and simulation in the area of integrating land uses with travel behavior.

WHAT ARE WE DOING?

This project will be broken down into the following four key tasks. The first task is preparatory and will take approximately three months. The second will involve the development of spatial metrics for use in later steps, which should also take approximately three months. Tasks 3 and 4 will run concurrently, since feedback from each will inform the other until we identify the best combination of variables to produce informative models.



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California's transportation system

- Task 1 Assemble Data: In this task we will assemble data from various sources, including the National Establishment Time Series dataset; Yelp/Google Places records of establishment locations, customer ratings, and specialties; transportation network; Caltrans Performance Measurement System traffic volumes, and US Census data. We will match and verify recorded location identification information such as geospatial coordinates, addresses, and business types. A first step will be to purchase updated business establishment data and develop stable harvesting methods to extract data from Yelp and Google Places APIs. We will use widely available network data, as well as databases we have developed other public transportation and highway networks to create complete network datasets for multiple time points.
- Task 2 Develop Spatial Metrics: Using the data acquired in Task 1, we will develop a comprehensive set of spatial metrics that include accessibility indicators, summary level of service indicators at suitable geographic scales, relative location indicators, and grid-based density and diversity metrics. We will compute these metrics at multiple scales, including very fine scale (150 m by 150 m grid cell), Census blocks and block groups, and with network travel distance buffers. Some of the methods used in this task were designed as part of other projects, but they will take time and further effort to scale for the entire State of California.
- Task 3 Identify Useful Variables: We will test different statistical techniques to identify the best group of spatial metrics to use in the specification of probabilistic models for major business establishment life cycle events. The events we focus on are: birth of a business establishment, dissolution (death of a business establishment), relocation out of California, relocation to another California county, and no change. We will also study establishments that move into California and pull factors for the move.
- Task 4 Final Model Development and Policy Identification: We will identify the best fitting models that are consistent with economic theory, business practices, and empirical research, and report on land use policies emerging from their inspection. We will also analyze and illustrate model sensitivity in terms of elasticities to level of service and other local variables.

WHAT IS OUR GOAL?

The key contribution of this research study is to thoroughly analyze the external (local context, transportation network) and internal (business type, reviews) factors that influence the success and failure of business establishments. We hope to conclusively identify the role transportation system level of service plays on economic development and business establishment survival and success.

WHAT IS THE BENEFIT?

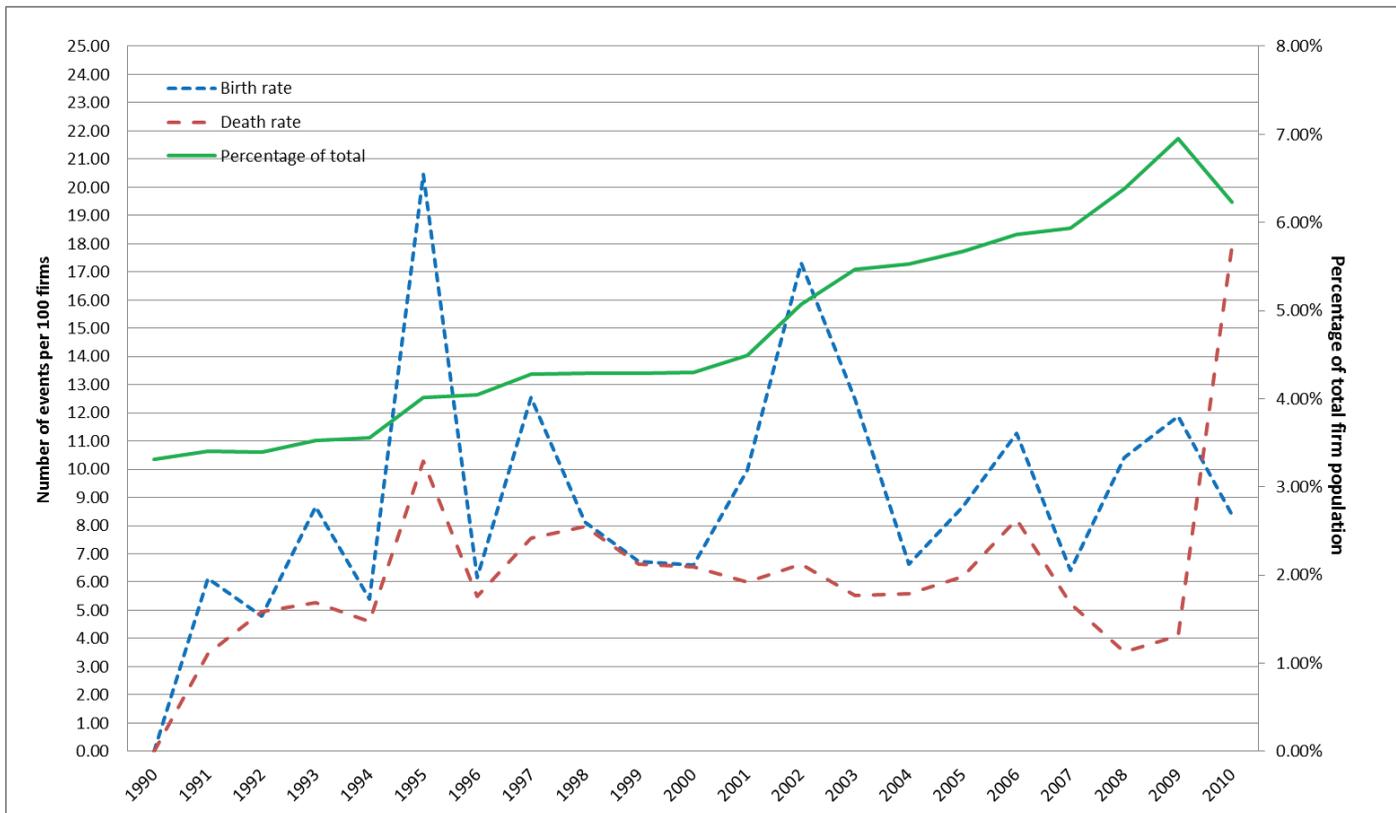
This research will fill a gap in empirically supported knowledge linking the survival and economic success of business establishments to the performance of the transportation system that serves these establishments. We will study and document this relationship for the entire State of California while controlling in a statistically robust way for a variety of factors influencing business life cycle events, such as closures, formation/birth, and relocation. We will draw lessons learned and develop suggested policies that increase economic development and business performance in order to boost the California's economic competitiveness. This project will also benefit future research by providing a better understanding of the types of the metrics and data sources that can be used to determine what areas and development policies are most conducive to business success.

WHAT IS THE PROGRESS TO DATE?

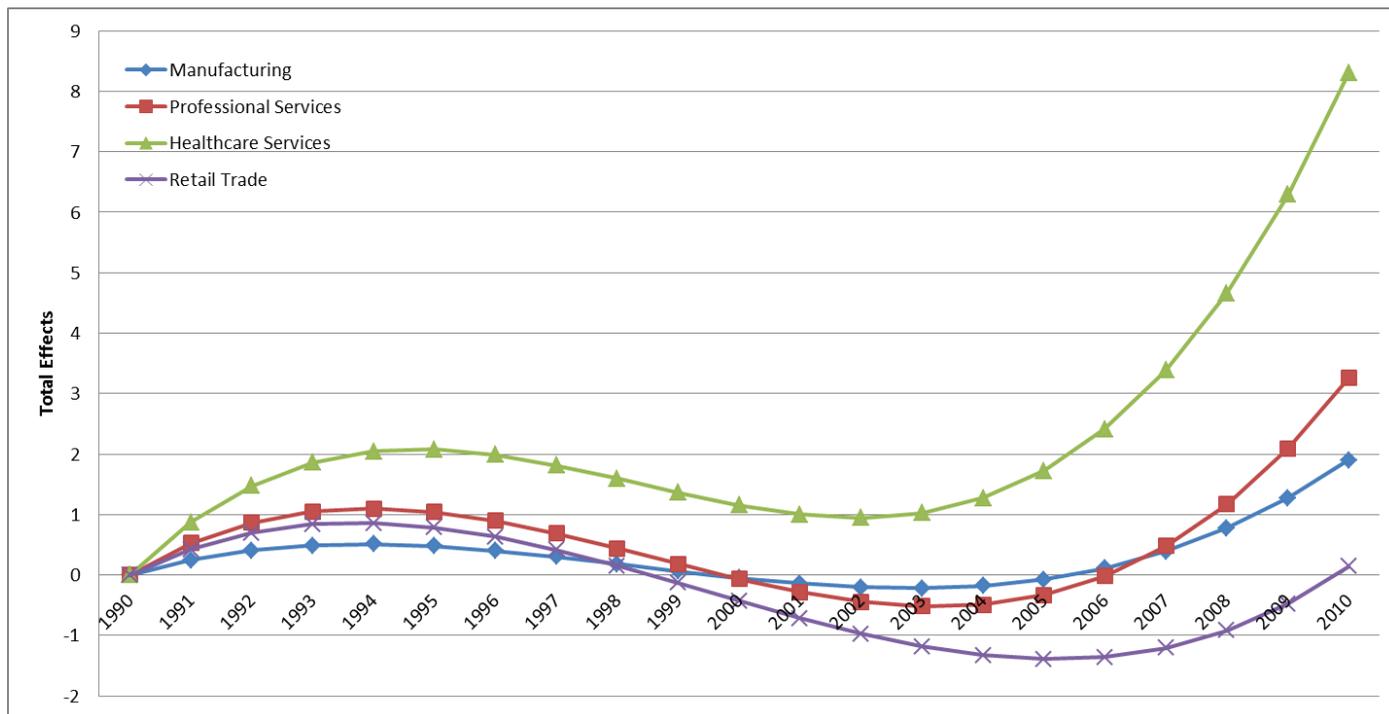
We commenced preparatory work on data assembly and explore the possibility of purchasing additional data. We are also working on identifying suitable highway networks.

Figures illustrating temporal dynamics of birth and death of business establishments produced in a previous project on this topic.

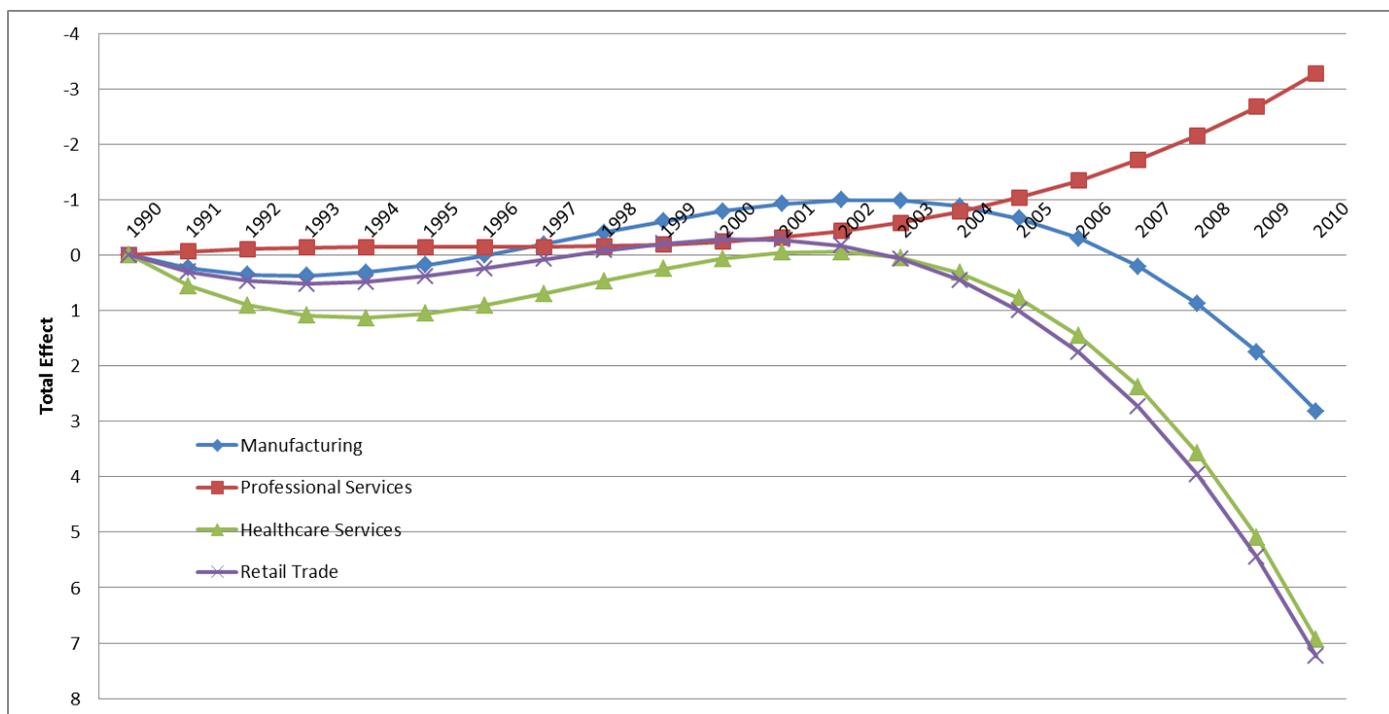
From: Ravulaparthi S.K. and K.G. Goulias (2014) "A comprehensive evaluation of locational determinants on birth and death of business establishments." Paper submitted for presentation at the 94th Annual Meeting of the Transportation Research Board, Washington, D.C., January 11-15, 2015. Also published as GEOTRANS Report 2014-8-05, Santa Barbara, CA.



Distribution of birth and death rates of business establishments in Santa Barbara County



Time effects of business establishment deaths



Time effects of business establishment births

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