

# A firmographic model for business establishments in Paris area

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## Abstract:

The integrated land-use transport modelling is more and more often required to design transport policy in the medium and long run. Relocation of firms and households are the key elements of the understanding of land use. Residential location is relatively well understood, while firm location remains a difficult issue, at the frontier of research.

The understanding of firm location is related to the provision of infrastructure. New infrastructure increases (or decreases, depending on the location) accessibility and thus modifies firm location and relocation. Household also relocate, to be closer to jobs. As a result, firm and residential density changes, and the attractiveness of the region also evolves.

Firmography is the demographic study of the firm. It involves birth, growth and death of the firms. It also includes the spatial dimension of the firm, namely location and relocation. There may be multi-plant firms, and international firms, which make the theoretical and the empirical study more delicate.

To take into account the equity effects, we need to take into account agents' heterogeneity. The microsimulation tools provides the best to have an explicit representation of agents with their specific vector of characteristics.

In this paper, we discuss a research work on the evolution of firms in the Paris area (Ile-de-France), the largest employment provider in France. We have chosen a firmographic approach to model evolution of the firms and of the employment over this region.

This study is based on a detailed registry of business establishments with at least one worker. We had access to a survey of establishments carried on two dates: 1997 and 2001. The dataset include an identity code for each establishment that is changed whenever it moves. This code permitted us to identify three cases, establishment created (or moved) after 1997, establishment disappeared (or moved) after 1997 or establishment stayed at the same address between 1997 and 2001. The establishment workforce is observed by gender. The establishment address is reported, too. In this study, we consider location at Commune (municipality) level. The data include the establishment activity sector in 700 classes. We group them in 11 categories; in particular, we distinguish personal services from business services. Using these data, we estimate three sub-models to study the evolution of the establishments.

The first one –the establishment disappearance model, explains the probability that an establishment located in the region in 1997 disappears or moves. We use a binomial Logit for this case. The most significant variable in this model is the establishment workforce that is represented in a piecewise-linear form.

The second model concerns the establishment workforce evolution. It relies on a log linear model of relative evolution of workforce as a function of local amenities and accessibility measures.

The third and last model concerns the estimation of firm's location choices. The estimates rely on a multinomial Logit. The explanatory variables include the size and composition of local population and employment, by activity sector. This model allows to take into account (to some extent), the centrifugal and centripetal forces acting between activity sectors. The composition of resident population has a significant effect on the location of some firms, in particular on service activities.

The models that were estimated are used to study different scenarios over the next 30 years. It has been assumed that the total number of jobs in each sector and over the whole region was predicted by other models (macro-economic models). It was necessary to develop an additional module given the fact that a relocation is treated in the data base as a death and a birth of a firm in another location. This module allows to guarantee that the total number of jobs coincides with a number exogenously given (control total). All these establishments are located by the location choice model.

The simulation results are fairly near to observed evolution of employments over the region. A discussion about the policy implications of our results completes the paper.