Firm survival and road type location preference, evidence from Mexico City

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Research Question and Theoretical Background

This aim of this research is to find if there is a relationship between firm location and road hierarchy, and if location decisions regarding road type have an effect on the probability of firm survival.

Location theory for firms has evolved since the early model of Von Thünen (1826) through Marshall’s industrial districts (1890), Weber’s location triangle (1909) and Christaller (1933) and Lösch (1940) central place theory, to more recent models that have deepened the knowledge on how businesses benefit from agglomeration economies (Siedschlag et al., 2013), and how the latter generate similar businesses to locate in order to share both labour force and inputs for production. In this respect, agglomeration becomes a source of accessibility to local characteristics that either reduce costs or increase sales and/or production benefits as a result of synergy between firms, which in turns affects location decisions. For example, certain firms locate where there is a supply of local intermediary services (Henderson & Ono, 2008). High-tech firms, locate in the vicinity of universities to have access to knowledge sources (Audrestch et al., 2005), while shopping centres attract businesses in the service sector (Romero, 2015).

In terms of transportation infrastructure, Tsou & Cheng (2013) have looked at how different configurations in the road and public transportation networks affect firm distribution. Nilsson & Smirnov (2016) measured how main roads positively affect location, while Wang et al., (2014) determined the advantages of locating in central streets in terms of closeness, betweenness and straightness. Iacono & Levinson (2016) have researched the relationship between the growth of the transportation network and economic growth, while Behrens et al., (2009) found that as transport supply increases and its fixed costs decreases, the relocation of businesses and consumers becomes easier. Baviera et al., (2016) argue that walking accessibility is the primary locational characteristic for supermarkets to survive.

There have been multiple mentions as to how location affects the survival rates of firms although there is contradicting evidence. Wennberg & Lindqvist (2010) found that agglomeration economies increased the survival rate of firms, but also the number of jobs, and wages; while De Silva & McComb (2011), found that a high density of similar firms in a small area decrease the probability of survival. Basile et al., (2017), also found agglomeration to have a positive effect in survival rates though only in the service sector, together with diversity in the type of businesses that
locate together. Manzato et al., (2011) argue that different types of firms require different location characteristics in order to survive.

While there are multiple characteristics that have been studied in terms of location and its effect on firm survival there is little if any evidence on what the relationship is between road type and the location of businesses. Thus, our question is whether there are locational preferences of distinct businesses on specific types of roads and if so, do location decisions regarding road type have an effect on the probability of firm survival.

**Methodology**

Our Study Area is Mexico City. In order to answer or question, we use the city’s road network classified into 4 hierarchies: (1) Arterial roads, (2) One-way high capacity roads (OWHC) are known in Mexico City as ejes viales; (3) Mayor roads; and (4) Collector roads. We also use 35 selected firm types where households may acquire every-day consumer goods and services. Our data main data source is the National Directory of Economic Units (DENUE) that has lot level information on the location of businesses and their characteristics.

Since the research question is whether there is a relationship between firm location and road hierarchy our procedure involved two steps. The first step was to identify if there is a road category in which each of the selected types of firms prefer to locate for which we use a Location Preference Quotient (LPQ). We also calculate the degree of homogeneity that preference has for which an Entropy Index is applied. In a second step we evaluate whether firms that are located in their preferred road type, as measured by the LPQ, have a greater probability of survival than those that are located elsewhere. We do it with the use of a Logistic Regression where the dependent variable is firm survival in a 5-year period as a function of whether firms were located in their preferred road type together with 23 control variables. A full model is presented and compared with a more robust reduced model in which only 10 variables enter showing statistical significance.

**Results**

Our analyses show that different business in fact have a preference for specific types of roads, although they vary in terms of the strength of that preference. Some businesses are very homogenous (strongly preferring one specific type of road), while others are more heterogenous (preference does not vary widely between road types). In terms of survival, our model shows that
firms that locate in their firm class preferred road type, have 2.4 times more probability of surviving that those that locate elsewhere.

References


We believe this paper may in session number 4 or maybe session number 2