# Regional and Urban Economics

Dental industry

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## Abstract

There are several factors to take in to consideration when deciding where a dental practice should be located. Spatial competition is a critical consideration in regional economics. Some of the factors influencing the decision making is retail agglomeration attributes, spatial monopoly and the attractiveness of a particular place of interest. This study aims to examine the dental industry and find the strategy most profitable for the dental industry.

The study utilize a quantitative research approach, employing spacial explanatory data analysis techniques to determine the location decisions of firms. Geographical data was collected from locations in Norway showing all dentists, central places, retail agglomeration and other points of interest such as the government regulated wine monopoly. Combined with regional income data a spatial regression analyses was used to identify the factors influencing the location decisions of firms.

Furthermore, the result indicates the distance to retail agglomeration areas and central places playes a significant role in the location decisions for firms. Firms are more likely to locate closer to these areas, which offer access to a larger customer base and lower cost of transportation. However, the results also suggest other factors, such as market size and completion also influence the location decisions for firms.

The studies findings have particular implications for policy-makers, developer, and dental practises seeking to maximize profits through strategic decisions. By understanding the importance of proximity to retail agglomeration areas and central places, these stakeholders can make informed decisions that benefit the local economy and improve competitiveness of the region. Perhaps more importantly prevent agrassive retail agglomeration areas from “killing down town”.

## Introduction

Our main task in this assignment is to perform an analysis of geospatial determinants of firm activity. More specifically we are to focus on the Norwegian dental industry in this regard, and see how geospatial determinants such as distances to shopping malls and CBDs (Central Business Districts), as well as population density can determine dental businesses income and general financial operations. As an example, central questions in this assignment will be; “Is it more beneficial to be highly centralized in urban areas with high population density and many competitors, or is it a greater advantage to be less centralized to the advantage that the nearest competing company is considerably further away?”, “Which determinants appear to be most significant for economic benefit?”

The theoretical framework for this study draws on Marshall’s agglomeration principles, which emphasize spatial aspects of economic growth. Hotelling’s game theory is used to explain spatial competition by location. Furthermore, adding the hybrid model whereas firms compete both in location and price, with consumers having a transportation cost and firms producing differentiated products. Alsonso’s bid-rent model and gravitational

models also provides insights into how dentists or other retailer makes location decisions in the context of regional growth.

The dental industry provides an interesting industry to study for this research because of its unique characteristics. Dental practices require a high degree of specialization and expertise. At the same time, they need to be easily accessible to consumers. Shopping malls and central places offer a continent location for dental practices that said competition for prime locations can be intense and push some in to spatial monopoly.

The result of this study indicates that dentist's with the highest income are usually located in central places in big cities. The findings are in line with already exciting theories especially supporting the gravitational models and agglomeration attributes. ?????? Proving a central location within large cities are the best location to maximize profit for Dental practices. ???

**Hypothesis**

The location choice of firms providing service to end consumers, significantly determine their ultimate growth potential.

**Research question**

What is the most profitable location for dental practice?

## Theoretical Framework

Location theory gives regional economics its scientific disciplinary identity and constitutes its theoretical methodological core Capello (2011). It has typically microeconomic foundation and uses theoretical models as well as adopting a statistical and geographical approach Capello (2011). Furthermore, the theory uses the concept of externalities in the spatial distribution of activities, thereby laying the territorial bases for dynamic approach to economic growth Capello (2011).

Regional growth theory involves spatial aspects of economic growth and territorial distribution of income Capello (2011). It also involves generating geographical advantages, in terms of easy or difficult access to a particular area Capello (2011).

Furthermore, Keynesian economics emphasizes the importance of consumer demand in driving economic growth. This may involve policies that involve consumer spending, such as incentives for buying local products or supporting small businesses or in this case preventing the the death of down town due to competition from shopping malls. Subsequently, increasing consumer demand, supporting business in a specific region. Promoting economic growth or preventing economic decline (**capello2016?**).

Harald Hotelling's locational equilibrium is determined by a logic of profit maximization whereby each producer controls its own market area. Productivity advantages of cities and urban clusters with a high density of firms increase profit by attracting a larger number of potential customers, and more productive workers Capello (2011). Furthermore, the attractiveness of a central location increase the cost of rent.

Alonso's bid rent model indicates the most profitable location for firms. Closer to the centre with agglomeration attributes or in rural areas with spacial monopoly and low rent. In gravitational models, the attractiveness of the retail location, represent the size of the retail centre. Furthermore, it depends on the variety of goods which can be purchased at the same location McCann (2013).

The model of potential has the capacity to measure the potential of attractiveness to a place. Bigger cities or more heavily populated areas have a stronger gravitational force. A possible indicator to predict places of growth potential for dentist practice or shopping malls Capello (2015).

**Interdependent location choice, the Hotelling's model (1929)**

The model assume that given the location of producers, and given demand uniformly distributed geographically (in linear or circular form) the market is divided into areas within each of which there operates a single firm in a duopoly environment. Furthermore, no relocation costs and demand only depend on location choice Capello (2015). The location game starts off with the total market of AB, firm A in the middle of location A and firm B starts in the middle of location B. One firm starts relocating closer to the other to take some of the customers in the other market area Capello (2015). The other respond by doing the same and the game continues until both end up in the middle of the market on the broader of AB. The end of the game is the position where neither can increase sales volume by moving position Capello (2015).

A simple explanation of why two dentists providing the same service, at the same price might locate next to each other. Nevertheless, despite increasing the transportation cost for patients. Perhaps the simplest way to explain why there is a natural tendency for retailers to cluster in space; a tendency which may help explain the existence of larger agglomeration economies.

**Hotelling-Bertand model (1979)**

The Bertrand model was introduced as early as in 1883 and demonstrate two firms competing by simultaneously setting prices for their homogeneous products. Furthermore, the consumers choose the product with the lowest price@tolotti2020. The model assumes that firms have identical production cost and consumers have perfect information about prices (**tolotti2020?**).

By combining elements from the two models a hybrid model of spatial completion was birthed by Salop in 1979 (**tolotti2020?**). In this model firms compete both in location and price, with consumers having a transportation cost and firms producing differentiated products (**tolotti2020?**).

**Marshall's agglomeration principles**

Marshall (1920) broadly divides externalities within agglomeration in three main categories potentially drive sales. Firstly, knowledge spill-over within industries or product specific technological knowledge. Furthermore, market transactions in terms of value chain transactions with industry-specialized buyers and suppliers. Lastly, competition for specialized production factors such as labour and product market competition Nielsen et al. (2021).

There are solidly established conclusions regarding the existence of agglomeration economies Puga (2010). However, less proof of their estimated magnitude. Hence, identifying the causes of agglomeration economies, is proving more difficult Puga (2010). Nevertheless, there is a large theoretical literature that develops these mechanisms Puga (2010). Duranton and Puga (2004) discuss these classifications and identify *learning, sharing* and *matching* as the main causes of agglomeration economies.

A larger market allows for a more efficient sharing of local infrastructure and facilities. Therefore, a variety of intermediate input suppliers, or a pool of workers with similar skills Puga (2010). Despite higher rent the dental industry and shopping malls, seams to reap higher benefits in more populated areas as they are dependent on being located where there is a higher volume of patients in order to drive sales. The attraction for the consumers and users of public facilities is overall cost reduction Puga (2010). Hence, the larger the population sharing facilities the lower the cost per user Puga (2010). Presumably, industrial factories and business clusters are more dependent on being close to raw materials and industrial action.

Furthermore, a larger market also allows for a better matching between employers and employees, improved chances of finding suitable and better quality of matches Puga (2010). Shopping malls require skilled workers to drive sales. However, they are not so dependent on highly educated workers as dentists whom according to resent study, tend to prefer bigger cities (as they are highly educated) Davis and Dingel (2020). More-so, cites provide a constant market for specialized skills and more productive work force Puga (2010). Perhaps, a possibility for higher wages being compensated by more efficient workers in bigger agglomeration economies. That said