Consumers, city networks and commercial patterns

Executive summary

Retail firms provide consumers with goods and services for consumption. They operate in an oligopolistic market of differentiated goods, and they deliver either products or services at an observable price. They enter the local market, compete and, possibly, exit the market. The commercial pattern, defined as the provisional distribution of stores in a moment in time, is the result of every single location choice made by retailers who start competing.

For a store owner, entering the local market means dealing with many key decisions. First, store owners have to search for the best combination of store attributes. They should select the products (or services) to sell and their prices, the size of the place where the products (or services) are to be sold and the service level to be offered to consumers consistently.

Second, they have to search for the best location given the selection of store attributes. Indeed, the choice of location is one of the most important decisions in retail since location is not meant to be only a spot on a map. The city cannot be viewed as if it were located on a featureless plan on which all land is of equal quality. Location is the relative position that a retailer can occupy given the proximity to other stores on the one hand and potential consumers on the other hand. Moreover, it denotes the position in the urban network, which is structurally different from one place to another. Some places are more accessible than others; some other places are more visible than others by construction.

The selection of store attributes drives the location choice, of course. A supermarket, which is characterized by a wide assortment of product lines, should be located in a building that is large and easily accessible to consumers by car; parking spaces must be available. A tobacco store, which provides consumers with

a single product line, should preferably be located in a building at a place that is densely populated so that it is also perceived as accessible by pedestrian consumers. A high-end clothing store typically chooses a premium location where it is visible to consumers who are shopping and is possibly surrounded by many other top brands stores.

The thesis includes two empirical tests described in chapters 3 and 4 based on the analysis of a database that collects all the commercial licenses that have been issued in Turin (Italy) from 2005 to 2019. The tests aimed to investigate commercial patterns as the result of a long process where store owners, having selected a set of store attributes, search for the best location for their store. This important choice is based on certain objective accessibility measures and the perceived attractiveness of potential places.

The empirical findings of this study provided a new understanding of the internal dynamics of the retail industry and a new definition of what accessibility is. One of the more significant findings to emerge from this study was that population, which is a location attribute, can either be seen as the *stock of people* who live around a place or the *flow of people* passing through a location, driven by the streets in the urban network. Moreover, depending on the destination of the consumers' journey, the flows of people are of different quality in the eyes of a store owner, and the importance for a store to be located where the flows of people are intense strongly depends on the category of the merchandise that the store sells. Further, the category of merchandise that the store sells is a key feature based on which a store owner can select the best location with regard to the population living in the surrounding, the density of other stores in the surrounding and the flow of people passing through the streets in the urban network. Indeed, in chapter 3, we first show that stores selling homogeneous products and stores selling comparable goods can benefit differently from being located in population hotspots and commercial areas. Second, we demonstrate that daily commutes to workplaces do not benefit a retailer along the trip as much as journeys for shopping purposes do. Indeed, the higher the number of times a potential consumer passes by a location when getting to workplaces, the lower is the probability of finding a store in that location. By contrast, a typical building located on the route while making trips from store to store has a high probability of hosting a store.

Thus far, the thesis has considered the commercial pattern made by stores belonging to the same category: small stores. Next, the thesis proposes an original analysis of the competitive dynamics between stores of different sizes; the aim of chapter 4

was to investigate whether the opening of a supermarket is a threat for small stores in the neighborhood. Indeed, by offering a wide range of products and lower prices, supermarkets can attract consumers who were used to frequenting small stores before the new opening. It was observed and quantified that the probability for a small store to exist in a commercial pattern by competing with a newly opened big store depends on the capability the small store has to differentiate its assortment from the new entrant. Indeed, when a small store finds itself being forced to compete with bigger stores, the selection of the small store's *assortment* assumes a role of primary importance. Therefore, in order to avoid competition with the supermarket, a small store should diversify its supply with respect to one of the large retailers; the competition is reduced if small stores can diversify the assortment from that of the supermarket. This diversification, however, can only happen for stores that sell differentiated products for which the range of products is so wide that assortments can be different among stores. Indeed, if products are not differentiated (i.e., prices and other product characteristics are standard), stores can not select two different product lines and, hence, start competing, and such a competition is generally won by supermarkets.

Finally, much of the thesis was written in 2020 when most of us were confined to work in our homes and we could only purchase groceries and essential items in the area near our homes. The COVID-19 pandemic has imposed significant changes on our way of living, particularly with respect to households' spending patterns and movements. Of course, this is a transient state, and one can hardly predict the long-term changes in consumer behavior that the pandemic will generate. However, thanks to the original contribution of the thesis, we know that if consumer behaviors and movements within the city change, the urban retail system will likely change accordingly. We also know that retail stores selling non-essential goods have been forced to close for many months. In this scenario, the thesis is well suited to understand the possible impacts of changes in buying behavior on the metabolism of the urban retail system.

The work is organized as follows. Chapter 1 reviews the literature on retail location choices and urban network measurements. First, it paves the way for understanding typical consumers' behaviors, such as comparison shopping and multi-purpose shopping. Second, it describes some urban network measurements that were used in the empirical tests in the thesis. The empirical tests described in chapters 3 and 4 are the core of the thesis. However, in order to ensure a better understanding of the empirical tests, a comprehensive description of the Turin case study and the database is provided in Chapter 2.