Hanna Kantola
Retail Success
JIBS Research Reports No. 2016-1

JÖNKÖPING UNIVERSITY
International Business School

Licentiate Thesis

Retail Success

The impact of space and agglomeration

Hanna Kantola

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Jönköping International Business School
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This licentiate thesis provides an economic analysis of the retail sector, focusing on the factors influencing sales and thus the retail performance of regions and shopping centers. The two essays presented in this thesis can be read independently of each other, but both rest on the theoretical framework of agglomeration economies in addition to consumer demand and supply theory.

Chapter one deals with a theoretical exploration of these issues and presents an overview of the retail industry, specifically from a Swedish point of view. The second chapter, "Determinants of Regional Retail Performance", analyses which factors influence the level of retail sales, within both durables and non-durables, in Swedish regions over a seven-year period. The study shows that agglomeration and retail diversity are influential factors when explaining why some regions perform better than others in terms of retail turnover. The last chapter, "External versus internal shopping center characteristics – which is more important?", investigates whether external or internal factors explain the performance of shopping centers. The results capture a higher overall effect from the internal factors, especially the tenant mix. However, agglomeration economies also play a role in explaining center performance. In both chapters, novel and detailed data over a whole country, in this case Sweden, are used. To sum up, the empirical results show that the success factor at a regional or a shopping center level in terms of boosting retail sales depends on the regional market size. However, even more important is the amount of product diversity available to the consumer, either at the regional or the shopping center level. This is also a feature that policy makers as well as center management can influence, as oppose to regional size, which must be seen as a more fixed or consistent factor.

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Licentiate Thesis in Economics

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Hanna Kantola
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Abstract

This licentiate thesis provides an economic analysis of the retail sector, focusing on the factors influencing sales and thus the retail performance of regions and shopping centers. The two essays presented in this thesis can be read independently of each other, but both rest on the theoretical framework of agglomeration economies in addition to consumer demand and supply theory.

Chapter one deals with a theoretical exploration of these issues and presents an overview of the retail industry, specifically from a Swedish point of view.

The second chapter, *"Determinants of Regional Retail Performance"*, analyses which factors influence the level of retail sales, within both durables and non-durables, in Swedish regions over a seven-year period. The study shows that agglomeration and retail diversity are influential factors when explaining why some regions perform better than others in terms of retail turnover.

The last chapter, *"External versus internal shopping center characteristics – which is more important?"*, investigates whether external or internal factors explain the performance of shopping centers. The results capture a higher overall effect from the internal factors, especially the tenant mix. However, agglomeration economies also play a role in explaining center performance. In both chapters, novel and detailed data over a whole country, in this case Sweden, are used. To sum up, the empirical results show that the success factor at a regional or a shopping center level in terms of boosting retail sales depends on the regional market size. However, even more important is the amount of product diversity available to the consumer, either at the regional or the shopping center level. This is also a feature that policy makers as well as center management can influence, as oppose to regional size, which must be seen as a more fixed or consistent factor.

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CHAPTER 1

Introduction and Summary of Thesis

Hanna Kantola

1 Introduction

Over the last 100 years, the retail industry has undergone radical changes. At the beginning of the 20th century, goods were still supplied over-the-counter at small, independent local retailers who had a limited amount of product variety. By the end of that same century, we had moved to a highly productive and efficient retail industry offering self-scanning and an overwhelming range of products. Retail firms have also grown at an exceptional speed and are today largely composed of huge international corporations. At the same time, consumers have become more aware and more mobile, creating demand for specialized goods and services from retail clusters in locations easily accessed by car.

One reason for the importance of studying the factors contributing to the performance of the retail industry is the economic size of this sector and, consequently, the substantial amount of resources devoted to it in any developed economy. One measure of the economic importance of this sector in terms of size is its contribution to GDP relative to other sectors. In 2014, the Swedish retail sector corresponded to approximately 17[1] percent of the country's total GDP and 6 percent of total employment (Statistics Sweden). The magnitude of this percentage is not unique for Sweden. The growing importance of the retail sector over the last few decades has also increased the awareness of this sector's influence on the regional economy.

According to Persky et al. (1993), the growth of a region is dependent not only on attracting external income but also on preventing the leakage of money out of the area. Hence, consumer services can play an important role in supporting economic growth. Williams (1996) presents two ways to prevent regional income leakage: (1) consumer services provide facilities that offset the need for and willingness of people to travel outside the region to acquire the

[1] http://www.scb.se/sv_/Hitta-statistik/Artiklar/Hushallens-konsumtion-driver-Sveriges-ekonomi/

service, and (2) locally provided consumer services can change local people's expenditure patterns by raising the proportion of total local spending on these services. The latter can be referred to as a positive spillover, where, for example, the establishment of a store such as IKEA is followed by a number of new retail and consumer service establishments, which in turn generates even higher economic growth for the region. At the same time, the characteristics of the region itself have an impact on the level of retail sales and are therefore fundamental for firm localization decisions (Jones and Simmons 1990). Nevertheless, the pure economic aspect is not the only reason for the importance of this sector. The retail sector certainly influences the welfare of the households, since everyday life is eased by the existence of the goods and services provided by this sector.

Given the above discussion, the purpose of this thesis is to analyze how spatial and consumer demand factors contribute to the performance of retailers at both a regional and a shopping center level. The results obtained from this study will be of help both for the location decision of the individual retailer or center developer and for the local policy makers in how to best create policy documents, goals and regulations that foster a thriving retail environment. A prospering retail sector will most likely add to the overall welfare of the region.

Theories concerning consumer demand, location theory and, specifically, retail geography are applied and tested on Swedish data. Sweden provides an interesting case study of the retail industry, since the country's retail sector has expanded massively over the last few decades. According to the Swedish Retail Institute (Rämme, Gustafsson et al. 2011), private consumption has increased more rapidly in Sweden compared to elsewhere in Europe during the last ten years. According to the European Shopping Centre Trust (2012), Sweden is also one of the top countries when it comes to retail space per capita as well as in retail productivity. Moreover, since the start of the financial crisis in 2008, domestic consumption has caused Sweden to outperform most other Western European countries in terms of GDP growth. As much as two-thirds of the GDP growth in recent years has come from total household expenditure. Thirty-six percent of this consumption is directed to the retail sector (Statistics Sweden[2]).

The thesis consists of two independent chapters, in addition to this introductory chapter. The second chapter of the thesis deals with understanding which factors affects retail performance at the regional level. The third chapter takes the issue down to the firm level, since it looks at the factors that influence the performance of Swedish shopping centers. The remainder of this introductory chapter discusses the historical and recent trends of the Swedish retail industry, and it provides a deeper discussion of agglomeration phenomena and consumer demand. The last section of this chapter summarizes the remaining two chapters of the thesis.

[2] http://www.scb.se/sv_/Hitta-statistik/Artiklar/Hushallens-konsumtion-driver-Sveriges-ekonomi/

2 Background

2.1 Historical background of the Swedish retail sector

Throughout history, the retail sector has predominantly been bound to city centers and marketplaces where people have been able to meet and exchange products and services. Until the mid-19th century, professional craft trades were actually forbidden outside Swedish cities. For the 90 percent of the Swedish population who lived in the countryside, the Freedom of Trade Act, which was introduced in 1864, was a major improvement, as small stores with a wide array of goods were established all around the country (Bergman 2003). Accessibility to shops increased rapidly for the average consumer. During the same period, Swedish society started its path towards industrialization, and increasingly more people moved away from the countryside into the growing cities. The population growth and the mechanization of the agricultural sector freed labor from this sector to be used in the manufacturing and service sectors instead. The urbanization process further accelerated the demand for consumption goods. Therefore, the combination of urbanization and industrialization were two of the major stepping stones in the development of the retail sector.

However, it was not until the middle of the 1900's that what can be viewed as the modern retail industry sprang to life in Sweden. Figure 1 shows the increasing growth of retail sales between 1956 and 2014.

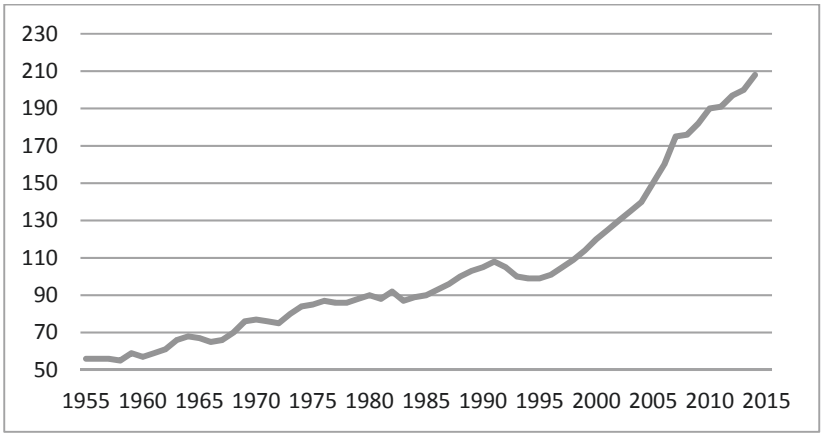

Figure 1: Retail sales 1956-2014, trade volume. Index 1995 = 100 (Author's own construction based on data from Statistics Sweden[3])

[3] http://www.scb.se/sv_/Hitta-statistik/Statistik-efter-amne/Handel-med-varor-och-tjanster/Inrikeshandel/Omsattning-inom-tjanstesektorn/6629/6636/ Detaljhandel/30451/

Figure 1 also shows that the industry has only experienced one longer period of decline, namely, the Swedish economic crisis that took place at the beginning of the 1990's. A series of deregulations took place in this sector in the wake of this crisis, and they have been one of the contributing factors behind the immense growth in retail sales since then (Jacobsson 1999).

Another factor contributing to the growth is changes in consumer behavior and preferences. It is a well-established fact that consumer preferences have altered over time, inducing changes in consumer behavior. The major contributor to the change in consumer behavior is the increasing dependency on car usage. Before the popularization of the car, the single most important factor determining accessibility was the proximity of the store to the place of residence. Today, when shopping trips by car are the most common, other factors such as parking space and multi-purpose clusters are more important to the perception of accessibility. Consumer behavior has also changed because a large proportion of women today are working, especially in Sweden. This means that there is less time for the household to do grocery shopping. The combination of car usage and less time available incentivizes households to make large bulk purchases instead of small day-to-day purchases. This is especially true for people living outside the immediate city center.

Yet another factor is the improved standard of living and rise in disposable income. Today, the average living space per person is far greater than it was one hundred years ago. The improved standard of living is also a consequence of new products such as freezers and refrigerators. These products also allow consumers to make larger purchases and reduce the number of shopping trips (Forsberg 1998). Finally, during the past few decades, Sweden has experienced a rapid decline in average household size. The share of single households has risen from 25 percent in 1970 to nearly 40 percent in 2014 (Statistics Sweden).

However, there is one more actor involved in explaining the success story of the retail sector besides the deregulations and the altered consumer preferences: the changing structure of the retailers themselves. The firm's goal to maximize profits through improved efficiency drives this structural change. This transformation was enabled through a series of important innovations, such as self-service[4], volume retail among big-box retailers and the development of more efficient distribution channels. The retail firms started to organize themselves according to the concept of chain stores with common supply, purchases and logistics in order to take advantage of scale economies. (Forsberg 1998). Hence, there is presently a declining number of stores. For example, the number of stores selling non-durables has decreased by 70 percent since 1951, from 36 000 stores (Amcoff, Möller et al. 2009) to roughly 10 517 in 2009 (SCB 2011). A major part of the stores that have disappeared were small stores in rural locations. In their place are stores clustered in regional center settings. The map in Figure

[4] Paying for and scanning goods by yourself in a supermarket is an example of self-service.

2 displays the spatial distribution of retail sales across the Swedish regions[5] and shows this clustering.

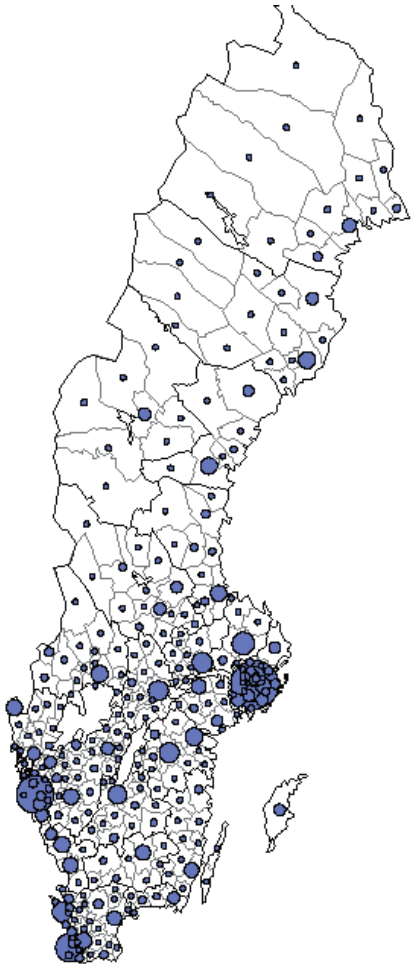

Figure 2: Total retail sales across Swedish regions

We can clearly see a clustering in the southern part of the country, especially around the largest cities. Other regions that perform well are the largest regions within each Functional Economic Region (FER).

Although the actual number of stores has decreased, the remaining units have become increasingly large. Today, a very large segment of the wholesale and retail sector is controlled by a few companies and chains. As an example, in

[5] The data used in the map are from 2013 (HUI Research).

Sweden, the three largest food chains (ICA, Coop and Axfood) together control almost 90 percent of the retail market for food (Blank and Persson 2006). These chains have been able to improve their competitiveness by building larger stores, which has enabled improvements in logistics and marketing. Independent retailers have had a difficult time meeting this competition. In addition, opening hours have been extended to meet consumers' needs, so the independent retailers have to struggle even more to keep up with the competition of the larger players. The geographical structure and locations have also been influenced by efficiency improvements. Co-location in shopping center settings has become increasingly popular among retailers due to advantages such as joint logistical solutions, lower rents and other agglomeration advantages.

During the 1970s, the trend of establishing externally located retail stores, e.g., hypermarkets, power centers and shopping centers gained a strong foothold in the Swedish retail market (Jacobsson 1999). As these external centers were established, the retail environment of the city centers faced a new kind of competition. Many city centers had, and to a large extent still have, a difficult time adapting to this structural change in the industry. As a result, sales levels in many Swedish cities plummeted overnight once the external shopping centers were established. The increased level of competition has been beneficial to consumers, as consumer prices on retail products have decreased relative to the general price level (Rämme, Gustafsson et al. 2011).

Finally, regional politicians have also changed the retail industry. By making decisions within the context of building regulations as well as transport networks, they have been involved in the formation of external shopping centers. This partly reflects an attempt to increase the inflow of purchasing power to their region. Meanwhile, there is hesitation among politicians in many regions to allow the establishment of new external centers. According to Bergström (1999), there is insecurity about the effects a new establishment will have on overall retail and employment. Regional politicians are concerned with questions such as: Will city center retail die? What will happen to the surrounding regions?

2.2 Recent trends in the Swedish retail sector

In recent years, Sweden's growth in retail sales has surpassed not only that in most other European countries but also that in most other countries. The latest forecasts for Sweden suggest a retail sales growth of, on average, 3.6 percent[6] per annum for the period 2014 to 2017. This can be compared to 1.3 percent per annum[7] for the rest of Western Europe.

Looking at the Swedish growth rate over a longer period, the impressive growth becomes even more evident. Table 1 presents the Swedish sales figures for durables and nondurables during 2013, in addition to the growth rate over five- and ten-year time spans, respectively.

Table 1: Swedish retail sales, 2013

	Sales, mSEK.	Turnover growth 2007-2013	Turnover growth 2001-2013
Nondurables	310 470	22 %	53 %
Durables	285 266	10 %	61 %
Total retail	595 736	16 %	57 %

Source: HUI Research, Snabbfakta 2014.

Over the whole period of 2001 to 2013, the highest growth rate was recorded in the durable sector.

The retail sector is traditionally very responsive to changes in the overall economy compared to other sectors. This is due to the very close link between income and expenditure. During the economic downturn in 2008 and 2009, most other countries saw a decrease in the volume of retail sales, but this was not the case for Sweden. Sweden persevered through the economic turmoil better than many other countries, and when the interest rate was lowered to a historically low level, it gave Swedish consumers good opportunities to consume. The growth is further fueled by steady population growth and rising disposable incomes. In addition, the changing nature of the Swedish demography is affecting and will continue to affect the industry. More retired elderly with good financial status and better health compared to previous generations makes this an important consumer group. Also, the share of first- and second-generation immigrants will increase, creating increasing demand for new products.

When looking at historical data as well as projections for the future, as is displayed in Figure 3, one can see a clear shift in average household consumption expenditure over time.

[6] Based on latest figures from www.hui.se

[7] Based on figures from Reynolds and Cuthbertson (2014). Oxford Institute of Retail Management.

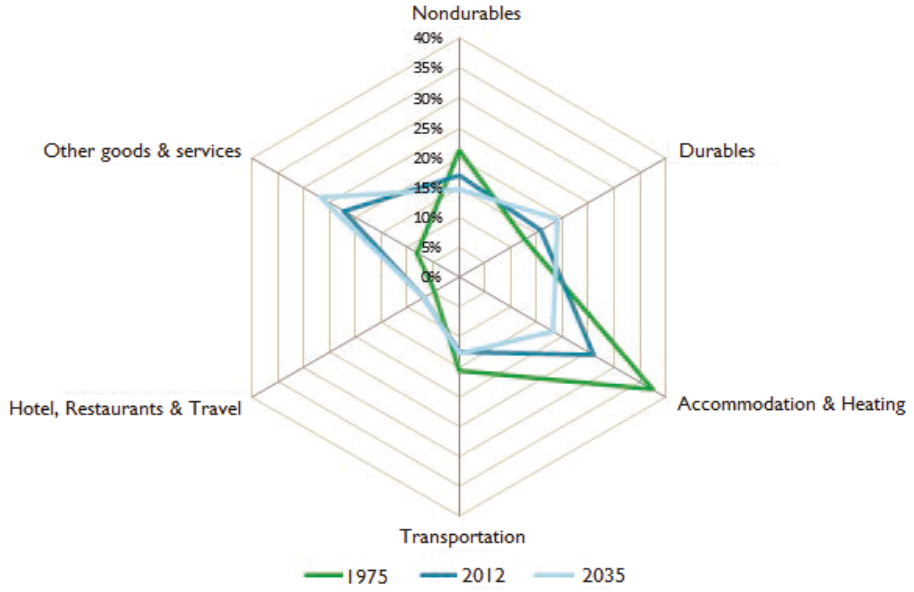

Figure 3: Household consumption over time (Source: WSP, 2014)

During the 1970's a very large proportion of household expenditures were devoted to accommodation, transportation and nondurables. Since then, we have witnessed a decrease in the spending patterns of these expenditure groups. Expenditure has increased in durables, hotel, restaurants, travel and other goods and services. It is believed that this trend will continue in the next 20 years.

According to Rämme, Gustafsson et al. (2011), the future of the retail industry in Sweden will be influenced by increasing internationalization and technological development. In recent years and decades, the development of retailing has been characterized primarily by global retailing, where large retail chains are operating in increasingly more countries. US retailers belong to the largest enterprises in this sector, followed by Japanese and UK retailers (Dragun 2003). Some 120 foreign retail chains are currently present in Sweden, the majority originating from Denmark, Norway, Germany and the UK (HUI, 2008). In an international context, however, the Nordic countries are regarded as a relatively small regional market. Overall, the shopping habits vary greatly across regions in Europe. For example, there are fewer but larger shops per inhabitant in Northern Europe than in Southern Europe (Flavián, Haberberg et al. 2002).

As for the technological progress, the registration and storage of consumer purchases enables advertising to be more adapted to individual shopping behavior, while constant access to online resources aids the consumer in the search process. The Swedish Retail Institute (HUI) also observes that retailers will increasingly have to compete in other areas than product price or

quality - they must also provide consumers with an enjoyable shopping experience (HUI, 2011). Examples of new features in the industry are the trends to offer performances by music artists, fashion shows and even the placement of entire amusement parks in some extreme cases.

Another retail concept experiencing high growth is e-shopping. Although store-based retailing continues to dominate and accounts for the overwhelming majority of retail sales in the past few years, e-commerce has seen faster growth than store-based retailing due to the strong growth of internet retailing. During 2014, e-commerce increased by 16 percent, which makes up 6.8 percent of total retail sales (HUI research, e-barometern 2014). This shopping format will most likely continue to gain in acceptance among consumers, boosted by convenience and generally lower average prices compared to store-based alternatives.

Moreover, the product life cycle of retail goods, e.g., fashion and home electronics, is continuously getting shorter. This trend is partly driven by the sector itself, with the intention of selling more. With the increasing debate about climate change and sustainability, this consumption behavior is growing increasingly more controversial. Alongside the development of short product life-cycles, the second-hand market has blossomed in recent years, especially online. Examples of such online channels are eBay, Tradera and Blocket.

2.3 Institutional influence and constraints

The regulation of retail activity has shaped the structure of retailing in many countries. In the case of Sweden, one such constraint is the Planning and Building Act (plan- & byggnadslagen, PBL), which regulates where retail establishments may locate. The building regulations vary in strength across different countries. In contrast to the retail development in the US, government intervention and influence has been strong in the western European countries, e.g., the UK and Sweden. A good example is the development of shopping centers. Within the city transport network, and associated with other social land uses, shopping centers had been established in line with the new town schemes that were developed in Sweden during the 1950's. While social planning was nearly absent in the US's center development process, the government played an active role in this development in both the UK and Sweden, while still encouraging private sector participation. However, the purpose of shopping center location regulation was not to make a profit but to provide inhabitants with a high level of accessibility to retail and other services. As a result of this controlled planning process, when establishing the new suburban communities, a shopping center hierarchy was created, with each hierarchical level being distinct in size and range of functions. (Dawson 1983; Forsberg 1998). In Sweden, there is presently no cohesive national policy for retail establishment, and the municipalities are free to decide for themselves where retail zones are to be established.

After a phase in the 1970's with relatively lenient policies when it came to establishing retail centers, the policy has most often been and currently is that new retail establishments should be carefully planned, with considerations for environment, sustainability and livability. Generally, all newly built residential and trade areas should fulfill the requirements for environmental sustainability. Politicians also fear the impact that the establishment of new shopping centers will have on the already established retailers in city centers. (Forsberg 1998). There have been numerous cases where the city centers have become impoverished because retailers moved their businesses to the new external centers or had to close due to lack of costumers. When there is no commerce going on in the city center, there is less need for restaurants and other similar establishments, and the city eventually becomes drained of all people. This makes the city less attractive for visitors, resulting in a downward spiral.

Furthermore, while most retailers have had to conform to national legislation with regard to operational legislation, such as health and safety at work, hours of operation and employment laws, the internationalization of retailing and the introduction of the internet has led to the establishment of legal frameworks across national borders. This is particularly relevant within the EU, where directives from Brussels are implemented by the national governments. The implementation of the euro also had a tremendous effect on the retail industry in Europe, both for those who participate in the euro and those who do not. Varying levels of VAT, general national price levels and exchange rate variations for those countries that are not in euroland have also encouraged extensive cross-border shopping between certain European countries.

3 Theoretical Framework

This section presents theoretical frameworks for the topics covered in each of the two chapters, reviewing relevant theories in the areas of consumer and localization theory.

3.1 Consumer Theory

To understand why consumers choose a specific store or shopping center, one must first understand the principles of consumer theory. Why, when and what do we consume? Consumer demand is what ultimately decides the volume of sales in a nation, region, shopping center or store.

3.1.1 Why consume?

The idea behind consumer theory is to explain the consumption behavior of individuals and households. Starting from a set of hypotheses, economists build up a model through a process of logical deduction to form the theory of consumers so that we can eventually can derive and explain the so-called law of demand. In reality, a consumer is faced with various kinds of commodities to choose from given his/her subjective preferences[8]. Commodities, in turn, can be divided into either goods or services, where each commodity is specified by its production, its location and its physical characteristics. Combinations of the choice between the different available commodities then form commodity bundles. The consumer needs to decide how much of his/her disposable income to spend on either retail goods or other types of products and services. Because the consumption possibilities of consumers are constrained by physical and/or logical restrictions, some commodity bundles are directly excluded. Since the consumer is assumed to trade in a market, the choices are further constrained by the fact that the value of the consumption should not exceed the consumer's wealth or income. With an aim to maximize utility, the consumer will be in an optimum state if, and only if, the purchasing power of money can effectively bring the consumer to a higher ranking of preference until all income is utilized. The budget set reflects the consumer's ability to purchase commodities and the scarcity of resources. It significantly constrains the choices available to the consumer.

Nevertheless, the consumer is still faced with a number of choices that lie within the budget constraint. This is where the issue of preferences comes in:

[8] Three assumptions are stated for the preferences of a rational consumer to hold: reflexivity, transitivity and completeness.

Should one go on a beach vacation for a week or spend that time making progress on an important long-term project at work? Should one choose an expensive apartment with a nice view far from work or a cheaper apartment without a view but close to the office? The choice is between hedonic and utilitarian alternatives that are at least partly driven by emotional desires rather than cold cognitive considerations. Hence, these choices represent an important domain of consumer decision making.

Luxury goods are consumed primarily for hedonic pleasure, while the necessities one must purchase are required to meet more utilitarian goals (Dubois, Laurent, and Czellar 2001; Kivetz and Simonson 2002). Hedonic goods are multisensory and provide for experiential consumption, fun, pleasure, and excitement. Flowers, designer clothes, music, sports cars, luxury watches, and chocolate belong to this category. Utilitarian goods, on the other hand, are primarily instrumental, and their purchase is motivated by functional product aspects (Dhar and Wertenbroch 2000; Hirschman and Holbrook 1982). Examples are microwaves, detergents, minivans, home security systems, and personal computers. Notice that both utilitarian and hedonic consumption are discretionary and that the difference between the two is a matter of degree or perception. Different products can be high or low in both hedonic and utilitarian attributes at the same time.

Finally, we can include a third component, conspicuous consumption (Veblen 1899), when trying to explain why we consume. In this case, the consumer purchases a good in order to signal high income and thereby achieve higher social status. A growing body of empirical work suggests that, contrary to what is usually assumed in consumer demand theory, current consumption level is not the only economic variable determining current utility. In an early work, Duesenberry (1949) explored the idea that households care not only about their own consumption level but also about their consumption level relative to that of other households in their reference group. For a brief survey and references to the recent literature on conspicuous consumption, see Heffetz (2004).

There is yet another dimension to consumer behavior: consumer habits. In a habit formation framework, a change in commodity prices or income will cause a change in quantity demanded of the particular good, which, in turn, will induce a change in tastes. Moreover, this change in tastes will lead to a new change in the level of consumption (Pollak 1970). On the other hand, changes in the demand for a commodity in the absence of price and/or income changes may be attributed to changes in tastes or habits. Habit formation underlies the consumption of most of the commodities available to consumers.

Habit formation has been modeled in rational (Spinnewyn 1981; Pashardes 1986) and myopic (Pollak and Wales 1969; Pollak 1970; Pollak 1976) frameworks. Rational habit formation considers both past and future consumption patterns to determine present consumer preferences. In myopic habit formation, on the other hand past consumption influences current preferences and, consequently, the current demand for a good (Pollak 1970;

Pollak 1976). Myopic habit formation may be relevant for the following two reasons: first, the consumer may have fixed commitments that do not allow her to adjust her consumption pattern according to changes in price and income (this may be the case with goods such as housing and cars); second, the consumer may be unaware of consumption possibilities outside the range of her past consumption pattern because of a lack of information (advertising, fashion and ethics) or an incomplete learning-by-doing consumption process (this may be the case, for example, with clothing, food, smoking, and recreation).

3.1.2 When and what to consume?

Given your budget constraint, your preferences decide what you will consume. In the retail sector, you can categorize most products into two broad types of commodity groups: durables[9] and nondurables[10]. When statistics are presented within the retail sector, this division is standard. However, retail goods are not the only things we can choose to consume. The retail industry is competing with other service-related products over the resources consumers have available to them, such as entertainment experiences.

If you choose to go on a holiday trip to Thailand, you most likely have to cut back on spending elsewhere, such as buying clothes and shoes. One way for retailers to compete with the experience sector is to combine that sector with retail. The result is that many traditional service sectors such as retail are now becoming more experiential themselves (Pine and Gilmore 1999). A good example is the new type of shopping centers that have been established over the last two decades, where shopping is combined with amusement park establishments (Mall of America is perhaps the most well-known example).

The actual demand for a good can be formed when watching an advertisement or hearing people talk in favor of a commodity. The final buying decision, on the other hand, may take place sometime later, perhaps weeks later, when the prospective buyer actually tries to find a shop that stocks the product. Much buying behavior is more or less repetitive in nature: the buyer establishes purchase cycles for various products, and these cycles determine how often a good will be purchased. While purchases of nondurables takes place on a frequent basis, durable consumption is more irregular. Spontaneous shopping behavior also takes place when the consumer, once in the store, forms a demand for a specific product. This purchasing behavior is referred to as impulse buying. Retailers try to take advantage of this impulse behavior by the way the stores are structured. It is no coincidence that the milk is situated at the far end of the

[9] Durables are consumer goods that do not have to be bought frequently, because they maintain their qualities over a longer time, e.g., clothes and electronics.

[10] Nondurables are consumer goods that have to be bought very regularly because they quickly turn bad or are consumed in one use.

supermarket, since this forces the consumer all the way through the store to buy this single, frequently bought product. Nor is it a coincidence that so-called mall anchors are always placed half-way between two entrances in a central location in the shopping center so as to create consumer traffic that will benefit less-known and less-frequently visited stores at the outskirts of the center.

What and when we consume is also regulated by trends and time of year: we are more likely to buy winter clothes just prior to the winter months rather than during the summer. In addition, fads and fashion plays a crucial role in the purchasing decision of consumers. Consumers who make early purchases of fashion apparel often pay a premium for being the first to wear the new styles. These consumers are often characterized as being relatively less price sensitive and more easily influenced than those who make their purchases later in the season (Allenby, Jen et al. 1996).

In today's world, the specific qualities and brands of goods also seem to play a significant role in what type of product consumers choose. Traditional demand theory is silent about the intrinsic characteristics of a commodity. Neither does it provide insight into how product quality variations affect consumer perceptions and decision-making behavior. It also provides limited explanation of how demand changes when one or more of the characteristics of a good change or how a new good introduced into the market fits into the preference pattern of consumers over existing goods (Lancaster 1966). Lancaster (1966) and Rosen (1974), therefore, formulated a new theoretical framework where products are treated as bundles of characteristics. According to them, a good possesses a myriad of attributes that are combined to form bundles of utility-affecting characteristics that the consumer values. Both Lancaster's (1966) and Rosen's (1974) approaches aimed to ascribe prices of attributes to the relationship between the observed prices of differentiated products and the number of attributes associated with these products. The Lancastrian model presumes that goods are members of a group and that some or all of the goods in that group are consumed in combinations, subject to the constraint of the consumer's budget. In comparison, Rosen's model assumes there is a range of goods but that consumers typically do not acquire preferred attributes by purchasing a combination of goods. Rather, each good is chosen from the spectrum of brands and is consumed discretely. The hedonic price approach also does not require joint consumption of goods within a group. Thus, Lancaster's approach is more suited to nondurable goods, whereas Rosen's model can be associated with durable goods.

Finally, the time of actual purchase can be influenced by factors such as opening hours, store atmosphere, time pressure, a sale, and the pleasantness of the shopping experience. The first factor, opening hours, can lower the cost of time, since it allows consumers to choose their own preferred time for shopping (Morrison and Newman 1983). Meanwhile, the existing literature in the field, which is mainly theoretical, indicates ambiguous results concerning the effect of extended opening hours on consumer behavior (Gradus 1996). When it comes

to atmosphere and pleasantness of the shopping experience, the general consensus from earlier studies is that extended hours does have a positive impact on consumer demand (Ghosh and Craig 1983; Thang and Tan 2003).

3.1.3 Where to consume?

As soon as a purchase takes place, consumers are faced with a variety of costs that are not included in the price of the actual good itself. These types of extra costs are referred to as transaction costs. Among the most easily identifiable are time and transportation costs. A less obvious transaction cost consumers most often face is an adjustment cost due to the desired good or service not being available at the purchasing moment. The adjustment cost occurs due to additional time and transportation costs arising due to that the consumer having to either search for the product elsewhere or face lower utility by choosing a less preferred substitute (Porter, 1974). Additional types of costs include storage and information costs. The former could arise as a result of bulk purchasing behavior. The latter could be due to the time it takes to obtain information concerning the product's characteristics and availability. The technological change that has occurred during the past twenty years, e.g., the introduction of online shopping, has revolutionized consumers' ability to easily access information about goods in terms of both availability and its characteristics. As a result, overall information costs have been drastically reduced. One of the major drawbacks of this new way of making purchases is that the consumer cannot assess quality hands on and instead has to trust the information provided on sites, information that can come in the form of, e.g., pictures and a product description.

The selection of an actual shopping location is influenced by the shopping objective at the time. As the needs change, so may the shopping locations chosen by the consumer. Therefore, it is plausible to argue that consumers' choice of any shopping location is first based on that location's ability to meet their supply threshold for their defined shopping objective. The supply threshold may be defined as the minimum level of supply of goods and services necessary to satisfy the consumer's shopping objectives. Christaller (1933) suggests a hierarchy of goods in the marketplace, arguing that the consumer wishes to minimize the cost spent on low-order goods, while high-order goods are purchased from centers that offer the highest value. Consumers generally make many shopping trips annually to purchase low-order goods such as groceries and other consumables and make fewer trips to purchase high-order goods such as clothing and household appliances. Against this background, a shopping dilemma may be defined as a situation in which consumers make their shopping decisions to maximize utility from shopping activity by selecting shopping locations based on their accessibility and their attractiveness. Accessibility is defined to include travel costs associated with getting to and from the shopping location. This is a function of gas prices, the vehicle's fuel

efficiency, the average travel speed, the travel time and the opportunity cost of shopping. Attractiveness, on the other hand, is the perceived value offered by a shopping location, defined to encompass relative product prices, retail mix, and the efficacy of completing shopping tasks. In selecting a shopping location, therefore, consumers may trade off particular attractiveness and accessibility characteristics against each other, but the trade-offs may vary by shopping objectives. Consumers improve their shopping decisions by learning (through trial and error) that particular locations offer better shopping value for certain shopping objectives than others. This learning often leads to the development of consumer loyalty to specific locations for specific shopping objectives (Cadwallader 1996).

The development of shopping centers has been a prominent factor when it comes to reducing consumer search and time costs. When stores locate in clusters, consumers can achieve an easier and cheaper overview of the products available without facing additional transportation costs, since the proximity between the stores enables the consumer to easily go from store to store. Ghosh (1986) showed that the benefits retail agglomerations confer on consumers depend on the consumers' location, that is, their point of residence relative to these agglomerations. Among many other scholars, Arentze and Oppewal et al. (2005) concur with these findings. They stress that retail agglomerations are typically located in or are part of larger agglomerations, which enables consumers to combine shopping with other activities. Due to the reductions in transactions costs, many consumers choose to shop at stores located in a shopping center setting over isolated located stores. Further advantages consumers can gain by choosing a shopping center are that these settings can offer additional amenities that are too costly for the individual store to provide, e.g., restrooms, playgrounds and free parking. Parking, especially free parking, is also one of the most crucial elements when it comes to whether consumers view shopping locations as accessible or not, since shopping trips are predominantly being made by car.

Research (e.g., McGoldrick 1992; Usterud et al. 1998) also show that the choice of consumption point differs among different groups of people. There are, for example, proportionally more people from peripheral parts of a region at the shopping centers than in the city center shops. The consumers in an external establishment have thus travelled a longer distance than consumers in the city center. The local population is instead overrepresented among the group who makes their purchases in the city center. Additionally, households with children are keener on choosing shopping centers over a city center than consumers from single households. The explanation for this is most likely threefold: (1) families with children have a higher probability of living in a house in the outskirts of a city; (2) families with children are even more dependent on the car when going shopping, and thus, they prefer better parking options; and (3) it is more convenient to shop "under one roof" with children.

3.2 Location Theory

Thus far, issues related to the consumer/demand side of the market have been presented. Now it is time to shift focus to the producer/supply side. According to traditional economic theory (Smith 1776; Marshall 1920), trade takes place when these two actors meet in a market and make an exchange. The producer is in direct contact with the consumer, and intermediaries are most often disregarded. The retail sector can be seen as such an intermediary, which may explain why there is a relatively limited amount of economic research on this industry. According to economic theories concerning distribution, there exist three basic economic activities: production, distribution and consumption. Production and consumption are often separate acts, especially when it comes to the production and consumption of retail goods. Because the processes are separate, there is a need for distribution channels. All activities that are necessary to bridge the distance between producer and consumer are labeled distribution activities. The retail sector is defined as an intermediary and is a part of the whole distribution system. The justification for the existence of intermediaries is that it brings efficiency gains the both the producer and the consumer. In line with this, location theory addresses the important questions of who produces what goods or services and in which locations? The location of economic activities can be determined on a broad level such as a region or metropolitan area or on a narrow level such as a zone, neighborhood, city block, or an individual site.

3.2.1 Where to locate?

Nearly 200 years ago, the primary concern of early scholars in the field, most notably von Thünen (1826), was the optimal location of farms in relation to cities, balancing land and transportation costs. Since von Thünen, many other scholars have proposed more-complex location models, incorporating the production of manufacturing goods and services. The early land use models that looked at a single market have now developed into more-complex bid-rent models with a Central Business District. Although there are common features across different industries, the location decision is influenced by various aspects depending on the sectors studied. Among the common features are the costs of interacting with input suppliers (McCann and Shefer 2004) and with consumers (Fujita et.al 1999; Brakman et.al 2001). For the retail sector, the interaction with the consumer is more important than that with the supplier. Also, the regional endowment, especially the size and amenities attracting households, is believed to have large impact on the retail sector because it determines the customer base and market share a firm can obtain (Florida, 2002).

Location models attempt to analyze location choice as a way to optimize market share. The best location for a new facility is at the point at which the

market share is maximized. It is generally agreed that the first modern paper on competitive facility location is Hotelling's (1929) paper on duopoly in a linear market. His model has given rise to the concept of the *Principle of Minimum Differentiation*. Hotelling considered the location of two competing facilities on a segment of land (two ice-cream vendors on a stretch of beach). The distribution of purchasing power along the segment is assumed to be uniform, and consumers use the closest facility. The model results show that the sellers will eventually cluster in the center in order to maximize their respective market shares. There has also been substantial criticism raised against Hotelling's theory, since it only takes two actors into account in a market.

One of the most famous approaches in trying to improve Hoteling's idea is Christaller's (1933) Central Place Theory. It provides a framework for analyzing the size and location of retail centers. The hierarchy of service centers represents differences in the availability of goods and services of varying order[11] given a population distribution. The model requires that three assumptions be made: (i) all parts of the market are supplied with all possible goods from a given number of centers, (ii) a central marketplace of a given rank provides the goods and services appropriate to its own rank in addition to all goods of lower order, and (iii) consumers travel to the closest facility that offers the service or good sought after (Dicken and Lloyd 1990). Consequently, one expects that larger central places have more central functions supporting the larger populations, more establishments, larger trade areas encompassing more people, and more business districts and shopping centers.

An extension of the Central Place Theory is the work by Lösch (1954), who examined the interplay between range and threshold. Lösch's work strengthens many of Christaller's suggestions, yet it differs in the consideration of hierarchies. The range is the maximum distance travelled to a facility, whereas the threshold is the total effective demand, or "critical mass", required to support a particular facility. The ratio between the total demand and the threshold level determines the maximum number of facilities that can be profitably located in a certain place. While Christaller (1933) assumed that any place that offers higher-order goods will also offer all lower-order goods, Lösch (1954) relaxed this assumption. It is also established that fewer trips are made as one resides farther away from the shopping location. The consumers who live close to low-order stores make more frequent trips to those stores, and the farther away the consumers live, the greater the decrease in the number of single-purpose trips.

Even though Christaller (1933) and Lösch (1954) came to different conclusions about the exact distribution of centers and the product variety offered at each site, substantial similarities are found. Both assumed that suppliers would locate such that the total market for each good would be divided into a system of hexagonal market areas of equal size. Normally, goods with

[11] Varying order of goods refers to how often and frequently goods are being purchased in addition to the required customer base that is needed for an establishment. For example, a food store is of a lower rank, while a jewelry store is of a higher rank.

higher production costs, requiring larger trade areas, would be available in fewer locations than goods with a lower cost of production.

The fixed cost in the retail industry predominantly consists of the investment in the building where the retailer is located. The consequence is that the cost of changing location is high. This is one explanation for why unprofitable retail firms remain at their sites. When the fixed location cost is paid however, the extra cost of increasing output is very low due to scale economies. Hence, larger retail units are more efficient than smaller ones. However, land rents also have to be considered. Retail firms demanding larger sales areas are more averse to locating in city centers, where land is more expensive than in more-peripheral locations. This causes different types of retailers to have different location strategies. Department stores have high fixed costs and tend to sell goods that are infrequently purchased (durables). At the other extreme are food stores, i.e., establishments with low fixed costs that sell goods that have high purchase frequency (nondurables). Despite having similar aggregate business volume to that of clothing stores, furniture stores have higher fixed costs, largely because of store size. Because they also deliver goods that are less frequently purchased than those in clothing stores, there are fewer furniture stores in a defined area (Betancourt and Gautschi 1988).

The cost of labor is the prime variable cost for the retail firm. Compared to other industries, labor is more of an adjustable cost in the retail industry, following the seasonal variation in sales (Anderson 1993). During the busy months of November/December, Christmas shopping induces most retail firms to hire temporary workers. This will also influence the retailers' location decision, since the firm benefits from having a large pool of workers to choose from.

To further analyze why location decisions vary between different types of retailers, the Land value model can be used, a model that is founded on the assumptions formulated in von Thünen's model. Land value theory, also known as bid rent theory and urban rent theory, first achieved recognition in a retailing context from the early work of Haig (1926). He argued that competition for an inelastic supply of land ensures that, in the long run, all urban sites are occupied by the activity capable of paying the highest rents and that land is thereby put to its "highest and best" use. Land value theory proposes that the location of different activities (retail setups) will depend on competitive bidding for specific sites. Haig's work formed the basis of Alonso's seminal land use model. Alonso (1964) constructed bid rent curves for each land use function, their slope reflecting the sensitivity of that activity to changes in accessibility. In an effort to attract customers from the entire urban area, thus necessitating the most central sites, businesses are prepared to bid the highest rents, but the amount they are willing to pay decreases rapidly with distance. However, Alonso's analysis is concerned with business, residential and agricultural land uses and is often considered too broad to show a true reflection of retail location. Yet, as stated by Brown (1994), it is a fact that the need for a central location varies between different categories of retailers. Consequently, bid rent curves can be constructed

for each retail function given their sensitivity to accessibility. High-order retail establishments such as department and specialty stores that aim to attract customers from the entire urban area and that require a central location are willing to pay the highest rents. Low-order retail establishments, on the other hand, are willing to trade off accessibility to the primary Central Business District's shopping streets for a lower rent level in a more peripheral shopping location. Consequently, this retail group forms less-steep bid rent curves (Fujita, 1988). Klaesson and Öner (2015) present clear evidence for this difference in distance decay of demand among different retail categories. The bid rent theory can provide an explanation for why we find department stores in the center of the city, while grocery stores are found on the outer fringe. (Fujita, 1988)

Early theories, however, have been criticized for making too-general assumptions about consumer behavior. The development of the consumer store-choice literature is extensive and may be classified into three groups. The first group relies on some normative assumptions regarding consumer travel behavior. The simplest model is based on the nearest center hypothesis. This hypothesis has not found much empirical support, except in areas where shopping opportunities are few and transportation costs are high. Research instead suggests that consumers trade off travel cost with the attractiveness of alternative shopping opportunities. The first scholar to discuss this issue in detail was Reilly (1931) in his "Law of Retail Gravitation". Reilly's Law states that the probability that a consumer will patronize a shop is proportional to its attractiveness and inversely proportional to the distance to it (Reilly 1931). In the early stages, these models were non-calibrated in the sense that the parameters of the models had an a priori assigned value, which gave these kinds of models certain constraints in their applications. From this theory, others have evolved such as the intervening opportunities model of Harris (1954) and Harris (1964) and Lakshmanan and Hansen's (1965) retail potential model.

The second group of models includes location models that use the revealed preference approach to calibrate the "gravity" type of spatial choice models. In contrast to Reilly's model, these models have been extended by using information revealed by observed behavior to understand the dynamics of retail competition and how consumers choose among alternative shopping opportunities. Huff (1962; 1964) was the first to use the revealed preference approach to study retail store choice. Huff's model uses distance (or travel time) from consumer's zones to retail centers and the size of the retail centers as input to find the probability of consumers going shopping at a given retail location. Huff (1962) was also the first to introduce the Luce axiom (Luce, 1959) of discrete choice in the gravity model. According to this axiom, consumers may visit more than one store, and the probability of visiting a particular store is equal to the ratio of the utility of that store to the sum of utilities of all stores considered by the consumer. This explains the phenomenon known as multi-purpose shopping behavior. The main critique of the Huff model is its over-simplification, since it considers only two variables (distance and size) to describe

consumers' store-choice behavior. Nakanishi and Cooper (1974) later extended Huff's model by including a set of store attractiveness attributes. The benefit of the revealed preference models over the normative methods is that consumers are not assigned exclusively to one store, and the models can be applied to cases where consumers' shopping habits are independent of store size. Despite their improvements, these second types of models also have their drawbacks (Craig, Ghosh et al. 1984): (1) They assess consumer utility functions without discounting for travel time. However, in reality, consumers reject stores beyond a certain distance. Consumers may also reject stores unless they have minimum levels of other attributes. (2) The parameters associated with characteristics on which the existing stores do not differ much can be low. Nevertheless, this does not imply that such characteristics are unimportant to consumers. Rather, because of their similarity across stores, other variables are used to discriminate among them, which is not captured in the model framework. (3) The distance decay parameter is highly dependent on the characteristics of the spatial structure. The implication is that when assessing the importance of location on store utilities, individuals consider not only the distance to that store but also the relative distance to other stores in the area.

The third group of models belonging to the consumer choice literature includes the models that use direct utility in the assessment of optimal location. These types of models eliminate the problem of the possibility of having low variability among the characteristic variables in the preference models. Instead of observing past choices, these methods use consumer evaluations of hypothetical store descriptions to form the utility function (Ghosh and Craig's 1983).

The rapid growth and expansion of multi-facility networks[12] in retailing has become more important for the firms' location decision. In today's highly competitive retail environment, firms can, for example, create competitive advantages by securing a strong market presence by locating multiple stores in the same market (Zhang and Rushton, 2008). Locating multiple units in one market has a number of synergy advantages: (1) it creates market presence so that all consumers in the market area have relatively good access to a firm's stores; (2) it allows for managerial efficiencies as well as scale economies in distribution, warehousing and transportation costs; and (3) it increases the efficiency of advertising and promotional expenditure in the local market. The growth of multi-store networks has encouraged the development of location–allocation models[13].

[12] Multi-facility networks refer to the same chain opening up a number of stores in the same market area.

[13] For a review of the development of location-allocation models, please see Brandeau & Chiu 1989.

3.2.2 Why co-locate?

When a firm chooses to locate in a cluster or a so-called agglomeration[14], demand externalities will arise, as consumers will benefit from economies of scope in searching, as discussed in the previous section. Studies of the effects of spillovers and external economies caused by agglomeration economies date back to Alfred Marshall (1920)[15]. Several types of benefits can arise when firms co-locate: (i) a specialized pool of skilled labor is formed that can lower a firm's search and training costs; (ii) due to labor mobility and social networks, firms can potentially gain some knowledge about the technology and processes of their competitors (while at the same time facing the risk of losing their unique knowledge in this context); (iii) suppliers will often co-locate in a cluster, lowering firms' costs; and (iv) when clusters exist, firms and the public sector often make significant investments in infrastructural development, e.g., improving roads, ICT and the educational system. Although these benefits can be of importance for the retail industry, Audretsch and Feldman (1996) concluded that it is especially industries where new economic knowledge plays a more important role that tend to exhibit a greater geographic concentration of production. Since the retail industry is so heavily reliant upon the demand side, this industry benefits from agglomeration due to the above-listed supply side features (points 3 and 4 above) (Erickson and Wasylenko 1980). When retail firms are clustered together, it reduces the consumer search and transportation costs. Consumers are assumed to have a love of variety and, in order to single out which product to purchase, the consumer is likely to engage in comparison shopping. Since consumers are assumed to act rationally, the number of visitors should increase in cluster formations due to a larger variety compared to if stores are located by themselves. Agglomeration theory explicitly states that variety is an important factor in increasing productivity in the traded-good sector (Fujita, 1988; Fujita and Thisse, 2002). A larger variety helps fulfill the consumer's needs in multipurpose shopping in order to reduce his/her search and transportation costs.

Earlier research by Larsson and Öner (2014) also shows that the willingness to co-locate is different between different types of retailers. Retailers of high-order goods such as durables have a greater tendency to cluster than retailers providing low-order goods such as groceries.

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[14] The concept of agglomeration economies goes back to *Weber, A. (1929). Theory of the Location of Industries*. Chicago IL, University of Chicago Press.
See Rosenthal, S. S. and W. C. Strange, Eds. (2004). *Evidence on the Nature and Sources of Agglomeration Economies*. Handbook in Economics 7. Handbook of Regional and Urban Economics. Cities and Geography. Amsterdam, Elsevier. B.V. .
who reviews the empirical literature that aims at identifying the sources of economies of agglomeration.

[15] Later also discussed by, e.g., Ohlin, B. (1933). *Interregional and International Trade*. Cambridge, MA, Harvard University Press.

Because more consumers are attracted to a center with an extensive level of co-location, this will push down prices due to competition. For the individual firm, the choice is thus between facing a larger inflow of customers or facing price competition. In fact, we have an interaction between the effect of market size and consumer transaction cost on the one hand and the effect of price competition on the other.

As discussed earlier, retail agglomerations in the form of shopping centers also provide a range of public services and facilities. These kinds of amenities would most likely not be available if the retailers were scattered as single store units, since the costs would be too high, while in a center setting, the costs are split among the center tenants (Oppewal and Timmermans 1999; Shun-Te Yuo, Crosby et al. 2003). To compete with the retailers in the center settings, many high-street retailers have started to organize themselves to offer some of the benefits of the center facilities, such as mutual opening hours and free parking during weekends. This brings us to the next section, where a discussion about the difference between the two types of retail settings will be discussed.

3.3 Shopping centers vs. high-street store organization

A shopping center is most often controlled by a single authority, the developer, who determines the number and type of stores that are included in the center, the rental prices the stores are charged, and the provision of common facilities and inputs at given prices. Empirical results indicate that the developers, by deciding how to allocate the center space to different tenants, can generate higher profits. A good example is the crucial importance anchor tenants have for the overall success of the center, as they draw patronage for non-anchor tenants by attracting customers to the center.

A further important dividing line between a shopping center or mall and traditional high street or inner city shopping is the implications for competition. One can assume that in an inner city setting, real estate will fall into the hands of the entrepreneur with the highest willingness to pay for the given property. This system will, in most instances, lead to large (inter-)national chains or exclusive boutiques occupying the prime real estate in any given inner city due to their ability to cover high rents. Some level of planning may, of course, occur here too. For instance, one can imagine that even the greediest of landlords may be reluctant to lease a prime property to a brothel or exotic dance venue. But there is no guarantee that two very similar shops catering to the same customer base will not be located adjacent to each other and thus invite cannibalism. At the same time, some stores can also be benefit from being located close to each other. This has to do with consumer comparison shopping. A good example of this is two car dealers that are located in the same area. Even though both dealerships offer the same product (a car), individual taste and comparing deals is eventually what the consumer will base his/her purchase on. Proximity between these types

of stores simplifies matters for the prospective consumer and benefits all car dealerships in the area.

In contrast to this, we observe the shopping center, or mall. In this setting, competition plays a rather modest role compared to the reality of a high-street shopping environment. A single real estate owner will, in most instances, control the entire entity and thus have complete control over which stores are allowed to be established in the center. We assume that this real estate entrepreneur is a rational and profit maximizing individual and that his choice of vendors in any given shopping center will reflect this. One should note, however, that this does not necessarily imply charging the maximum rent the vendors will be willing to pay. At least three aspects of the planner's choice will be of importance: competition, synergies and attractors. The competitive aspect explains why one is unlikely to find two very similar stores adjacent to each other in a shopping center. Note that this does not imply that there will never be more than one store of each type in a shopping center. One can, for example, imagine two athletic apparel stores with overlapping but not identical assortments. One can further imagine that this is linked to the second point, synergies. A planner may well recognize that customers may appreciate the convenience of having a large assortment while at the same time enjoying the variety of multiple stores. Going into even more detail, planning may also involve spatial aspects within a given shopping center. Examples include placing an attractor, or anchor, store relatively deep in the shopping center. This prompts shoppers to pass by a number of less-attractive stores on their way to the anchor and possibly be lured into these other stores.

4 Outline and Summary of the Thesis

The outline of the thesis is as follows. Chapter 2, "Determinants of Regional Retail Performance", analyses which factors influence regional retail performance. No similar European study has been found in the literature. Influencing factors are found to vary with the retail product group studied. However, the two major contributions of this chapter are the significant relationship found between regional sales and product variety and the correlation between retail turnover and the location of a shopping center in the region; neither variable has been included in earlier studies. The third and final chapter, "External versus Internal shopping center characteristics: which is more important?" describes which factors influence the success of various types of shopping centers. The dataset used includes all Swedish shopping centers and is assessed through a cross-section study for the year 2013. The study is unique in both the dataset used and its European setting. Earlier studies looking at center sales have focused on the North American market. Explanatory variables consist of both shopping center-specific data and the characteristics of the surrounding region. The results show that the most important factors explaining high-performing shopping centers is a favorable tenant mix and the prevalence of predominately external agglomeration economies, such as local market size. Since shopping centers are a heterogeneous group of establishments, the significance and strength of many of the variables change depending on which shopping center is studied.

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CHAPTER II

Determinants of Regional Retail Performance

Hanna Kantola

Abstract

Given the growth of the retail sector over the last few decades, it has become increasingly more important to understand which factors influence regional sales levels. A thriving retail environment implies profit generation for the industry itself, and it improves a region's attractiveness and inhabitants' quality of life. Consequently, differences in the degree of retailing between regions can be a source of regional economic differences. Employing a regional panel for the years 2007-2013, this study assesses factors that influence regional variations in nondurable, durable and total retail sales performance in the regions of Sweden. No similar European study has been found in the literature. Influencing factors are found to vary with the retail product group studied. It is found that local and total accessibility to purchasing power, competition level, employment share, average age of the population, store density in a region and the influence of border trade are important explanatory variables. However, the two major contributions of this chapter are the significant relationship found between regional sales and product variety and the correlation between retail turnover and the location of a shopping center in the region. Neither variable has been included in earlier studies, but it is possible that both can be stimulated by retail developers and other policy makers.

Keywords: Retail, durables, nondurables, turnover, regions, accessibility, market size, diversity, shopping centers.
JEL classification codes: C21, D12, L81, O18, R1

1 Introduction

When the world economies entered the new millennium, all highly industrialized countries had become so-called service economies. The retail sector has also become an integral part of regions' attractiveness and inhabitants' quality of life (Bergström and Fölster 2005). By having a developed and differentiated supply in the retail area, a region is able to attract both internal and external consumers (Cronholm and Bergström 2003). Failure to fulfill the needs of the consumer can cause income leakages out of the region. Williams (1996) presents two ways to prevent regional income leakage: (1) ensuring a sufficient level of retail facilities to offset the need and willingness of people to travel outside the region to acquire the service and (2) using local retail establishments to change local people's expenditure patterns by raising the proportion of total local spending on consumer goods and services. The latter can be referred to as positive spillover, where, for example, the establishment of a store like IKEA is followed by a number of new retail and consumer service establishments, which in turn can generate even higher economic growth by, for example, creating more employment opportunities within the region. A declining retail trade sector, on the other hand, means a possible loss of job opportunities and tax revenue. With the increasing growth of the retail sector, it is becoming increasingly more important to understand the connection between a prospering retail sector and economic growth and development at both the national and regional level. However, each location and trade area holds a different set of demand and supply conditions, which determine sales. The aim of this paper is to assess how demand factors, such as demography and wealth, and supply factors, such as location, variety and competition, influence the success of the retail industry.

Knowledge and understanding of the connection between retail sales and regional characteristics is fundamental for the individual retailer, as the retailer can then make informed choices and thus become more successful. Furthermore, many retail areas are highly planned and regulated by public authorities, which makes this research of interest for decision makers, since they are, or ought to be, concerned with how this sector influences the attractiveness of their region.

Several earlier studies (Russell (1957); Ferber (1958); Liu (1970); Ingene and Eden (1981); Yanagida et.al (1991); Gale (1996) and Shields and Deller (1998)) have analyzed the relationship between retail sales and different variables that influence regional retail performance, such as population, income, distance and size of regions. However, they are all relatively old or limited by the fact that they just focus on a specific area of a country or a single point in time. Due to the transformation of the retail industry over the last three decades, and because a large proportion of earlier studies are relatively old, there are strong reasons to believe that regional determinants may have changed. Additionally, all of the studies referred to are based on US data, and despite an extensive literature

search, no similar studies connecting regional characteristics to aggregate sector sales levels have been found from a European context. This chapter is therefore unique due to (1) its connection to the European retail market and (2) the structure of the dataset, which covers several years and thus ought to provide a more accurate picture of the interdependencies between retail success and spatial dynamics.

This study uses Swedish regional[1] retail sales data from the years 2007-2013. The data are assessed for the whole retail sector as well as for the durable and nondurable sectors[2] using a pooled OLS estimation and a fixed effect method. The variables include market potential measures, retail supply indicators, consumer characteristics and dummies reflecting the impact of border trade with neighboring countries and having a shopping center located in the region.

The results of this study add new knowledge and reveal differences between similar and earlier US studies. Among the most influential variables found in terms regional retail performance are regional store variety, a variable that is ignored in previous research, and store density. The accessibility measure adds new insight to how the local market size is of great significance, while the accessibility to areas outside the region plays a weaker and negative role in sales performance. The relative competition between the local region and the FER is, however, of great importance for both types of retail groups. A high degree of employment and the age structure in the region is found to be crucial for both retail groups. A location bordering another country is positive in terms of nondurable sales, and the establishment of a shopping center influences total sales positively. The impact of the location of a shopping center on regional turnover has not been tested in earlier and similar studies.

The remainder of the chapter is organized in the following manner. The second section discusses which factors can influence regional retail sales performance from the angles of the demand and supply sides. This includes aspects such as the nature of sector variety, agglomeration economies, space, income and demography. Section three presents the methodology, data and descriptive statistics. The empirical findings are presented in section four, which is followed by the analysis. The resulting conclusions and policy implications are then presented in section five.

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[1] The definition of a region is very different between countries, so also between the US and Sweden. In Sweden, a standard regional measure is a municipality, which is the smallest administrative entity. In the US, such entities are often referred to as standard metropolitan statistical areas (SMSAs). This municipality is then part of a larger county or functional economic region (FER). For the US, the entities that have status as a municipality vary from state to state. Cities, towns, boroughs, or villages are all common terms for municipalities. The inconsistency of the US municipality measure makes regional comparisons difficult and thus studies on a regional level tricky. Additionally, distances in Sweden are relatively short among the regions, while for the large size of the US, distances among regions are expected to be larger. In this study, the author refers to municipal data when using the term regional. Sweden is currently divided into 290 municipalities.

[2] For a definition of what is included in the three assessment groups, see Appendix Box A1.1.

2 Determinants of Regional Retail

From an economic perspective, the factors that probably determine the performance of the retail industry can be divided into two major groups: the demand side determinants include consumer characteristics, demography and wealth; the supply side, on the other hand, comprises industry characteristics such as the size of the market area, store variety and competition. In both cases, location, diversity and economies of agglomeration are viewed to be integral determinants for retail sales.

2.1 Demand side determinants

From the demand side, the prime precondition for how large the consumption level is expected to be is regional purchasing power. Most of the expansion of the retail industry since the Second World War can be explained by the real increase in per capita income (Jones and Simmons 1990). This relation is not only valid for the retail sector as a whole but also holds true when looking at regional sales. For example, in a cross section study of retail sales in SMSAs, Ferber (1958) and Tarpey and Bahl (1968) find a positive relationship between total income and total sales. Later research conducted by Liu (1970) and Ingene and Eden (1981), also at the SMSA level, not only supports the earlier findings but also reports a similar positive relationship at the per capita level. In recent research, Lee and Pace (2005) finds that there is an insignificant relationship between median household income and store sales.

Of course, income is connected to employment status. Due to this correlation between the two variables, the level of employment can also be seen as an indirect measure for the regional purchasing power. An aspect that needs to be taken into consideration in relation to income is the fact that the level of income varies during an individual's lifetime. Different scholars tackle this problem differently depending on the theory chosen, e.g., Friedman's (1957) permanent income hypothesis or Modigliani and Brumberg's (1954) life cycle hypothesis.

The family structure is also an important demand factor, since larger families have the possibility to share goods or make more-cost-efficient purchases (e.g., big-family-packs). Ingene and Eden (1981) find a negative relation between average household size and per capita retail sales, while Bawa and Ghosh (1999) find a positive relation between sales and number of children. One reason for this difference in results could be the construction of the variable estimating family size. While a larger family spends more money overall, the expenditure per person decreases. Hence, whether or not the study looks at aggregated or individual expenditures impacts the result of this variable.

The impact of population age on retail performance has been extensively studied. Walzer and Schmidt (1977) suggest that since older people, as a group, are less mobile, they tend to shop more locally compared to other groups. Additional support for this hypothesis is provided by Pinkerton et al. (1995), who find that age is the socioeconomic variable most strongly related to shopping within the region of residence.

Other demographic variables that have been tested in regards to retail sales levels include education level, gender and ethnicity. These variables will not be included in this study.

2.2 Supply side determinants

From the supply side, the increased level of agglomeration and industry concentration in densely populated regions (Cronholm and Bergström 2003) has played a vital role in retailing.[3] The underlying causes of agglomeration economies have been analyzed theoretically and verified empirically in numerous studies[4]. The major benefit of agglomeration is that cost reductions occur because economic activities are located in proximity to each other. These cost reductions occur for the producer as well as for the consumer (Glaeser, Kolko et al. 2001). The retail firm's optimal choice of location (considering income and location) depends on the demand for the variety it supplies. The demand itself rests on the spatial distribution of consumers. In turn, the optimal choice of a consumer (location and consumption) depends on the entire firm distribution and the variety of goods firms offer (Fujita and Thisse 2002).

Both theory and empirical studies indicate that a large market stimulates a more diversified supply pattern in a region (Andersson 1985; Henderson 1986). This increases the return for firms by raising productivity (Andersson and Klaesson 2005) and improving the well-being of the region's inhabitants (Quigley 1998).

Due to the prevalence of product variety, consumers are likely to want to make comparisons between goods. Until very recently, the main way to collect information about which goods are provided at each location has been to visit the site, which means paying the corresponding transportation cost[5]. Thus, when

[3] Christaller (1933) was the first researcher to investigate the clustering of marketplaces for different economic goods and services within the hierarchical system of urban centers. His Central Place Theory was later developed by Lösch (1954) to compare goods while avoiding transportation costs.

[4] The concept of agglomeration economies goes back to Marshall (1890). See Quigley (1998) or Rosenthal & Strange (2004), who review the empirical literature that aims at identifying the sources of economies of agglomeration.

[5] With the introduction of e-commerce, consumers now have another opportunity to compare goods while avoiding transportation costs.

stores are clustered, the consumer obtains an initial sunk travel cost, but once at the site, the visits to any store at the cluster location will occur at very low costs; the consumer enjoys scope economies in the search. Consequently, the probability that the consumer will visit a cluster of stores is higher than that for an isolated location, since the likelihood that he/she will find a good match at a lower price is higher there. Acting rationally, firms would then cluster to create a common marketplace with others (Brown 1993).

Shopping centers are the best examples of retail agglomerations. These types of establishments have been very successful in increasing market shares at the expense of peripherally located retail stores (Bergström and Fölster 2005). The large variety found in, for example, a regional shopping center attracts both local residents and consumers from cities and regions situated in the surrounding areas. Thus, a large region relative to its surroundings is likely to experience a net inflow of consumers, although this gain is generated at the expense of the neighboring regions. Consequently, the relative size of the region, given its surroundings, is of importance for its ability to attract retail firms. Smaller regions located in proximity to larger regions may, for that reason, experience a so-called "agglomeration shadow-effect" or a "Christaller-effect" (Krugman 1993; Hugosson and Petersson 2001; Andersson and Klaesson 2005).

Connected to this issue is the home market effect from the new economic geography (NEG) literature. According to the NEG literature, there exists circular causation of both backward and forward linkages. For example, if a larger number of firms locate in region A, a greater number of varieties are supplied there. Consequently, workers and ultimately consumers in that region have better access to a larger number of varieties in comparison with workers in other regions. Hence, all else equal, workers/consumers in region A get a higher real income, encouraging more workers to migrate towards this region. The consequential increase in the number of workers/consumers generates a larger market in region A than in the other regions (Fujita and Krugman 2004)

Services such as retail usually necessitate physical proximity between supplier and consumer. In accordance with the Central Place Theory, the farther away a consumer or a household is from a store, the less likely he/she is to buy something (Christaller 1933; Lösch 1954). Given Tobler's (1970) first law of geography, as the distance increases, the number of shopping trips decreases. According to Beckmann (1999), the total consumer cost of a purchase is then equal to the holding cost (e.g., storage cost and possible deterioration of the product) per unit of time in addition to the transportation cost incurred by the number of trips. The initial sunk travel cost can be compensated if one is able to purchase many items at the one selected shopping destination, which explains consumers' willingness to do multi-purpose shopping.

2.3 Durable versus non-durable goods

Consumers buy an enormous variety of products. Some are goods that will last for many years; other items are consumed on the spot. Durable goods tend to have a long, useful life. Goods consumed in a short time or that have a useful life of less than three years are classified as non-durable (Sullivan and Sheffrin, 2003). The dividing line is not always rigid. For example, people sometimes use a piece of clothing for less than three years. Nevertheless, a predominant proportion of studies made within the retail area apply this distinction between product categories. The data for this study are also structured according to this division[6]. The reason it is important to make a distinction between different retail goods is that retailers within the various segments act differently in the choice of location. A consumer will alter his or her spending and travel patterns depending on which product he or she is intending to purchase. For example, there is a consensus that the degree of clustering is related to specific categories of goods (Kivell and Shaw 1980). While retailers of durable goods, such as female clothing stores, display the most-clustered distributions, nondurable retailers, such as supermarkets, are the least agglomerated (Brown 1993; Larsson and Öner 2014). Store clustering is also limited by the different market thresholds required for various retail types (Klaesson and Pettersson 2004).

An earlier study by Young (1975) shows that the impact of travel distance[7] varies between department store-type shopping (equivalent to this chapter's durable goods) and shopping for day-to-day convenience goods (nondurables). Young (1975) argues that regional centers will have durable department store shopping, while nondurable goods will be represented by smaller community shopping plazas. Market penetration by the nondurables declines sharply with distance, while the range of the durables extends considerably longer. The outcome is that durables shopping trips take place more frequently outside one's own community relative to nondurables (Young 1975). Consequently, the size and retail variety offered in neighboring regions should be of greater weight for the durables sector.

[6] For a list of the categorization, see Box A1 in the Appendix.
[7] Distance measured as travel time by car.

3 Empirical Approach

This section is divided into three subsections, in which the first illustrates the data, the second presents the variables used and the third explains the model itself.

3.1 Data

The empirical analysis is based on a cross-sectional dataset of 290 Swedish regions observed over the years 2007-2013. Information concerning these regions was obtained by retrieving data from Statistics Sweden (SCB) and the Swedish Retail Institute (HUI). Since the aim of the chapter is to check for what effect certain chosen regional characteristics (divided into demand and supply characteristics) have on the retail performance of a region, a retail index was used for assessment. The index is defined as the relation between retail sales turnover in durables, nondurables and total retail given and the size of the sales area. The size is determined by the average sale in the country times the number of inhabitants in the region.[8]

To investigate the geographical distribution of successful and less-successful regions in terms of retail sales levels, maps are constructed. Figure 1 shows three maps of Sweden where the regions are shaded according to the retail indices, which in turn can be divided into total retail index, durable retail index and nondurable retail index. Looking at the maps, one can see that the highest total sales index can be found for population-wise large and medium-sized regions, in addition to regions bordering other countries. However, the interesting finding is found when comparing the durable and nondurable sales indices. The two rightmost maps indicate that the performance of durables and nondurables is very spatially different.

[8] The indices are pre-constructed and found in the database operated by the Swedish Retail Institute. http://www.handelnisverige.se/

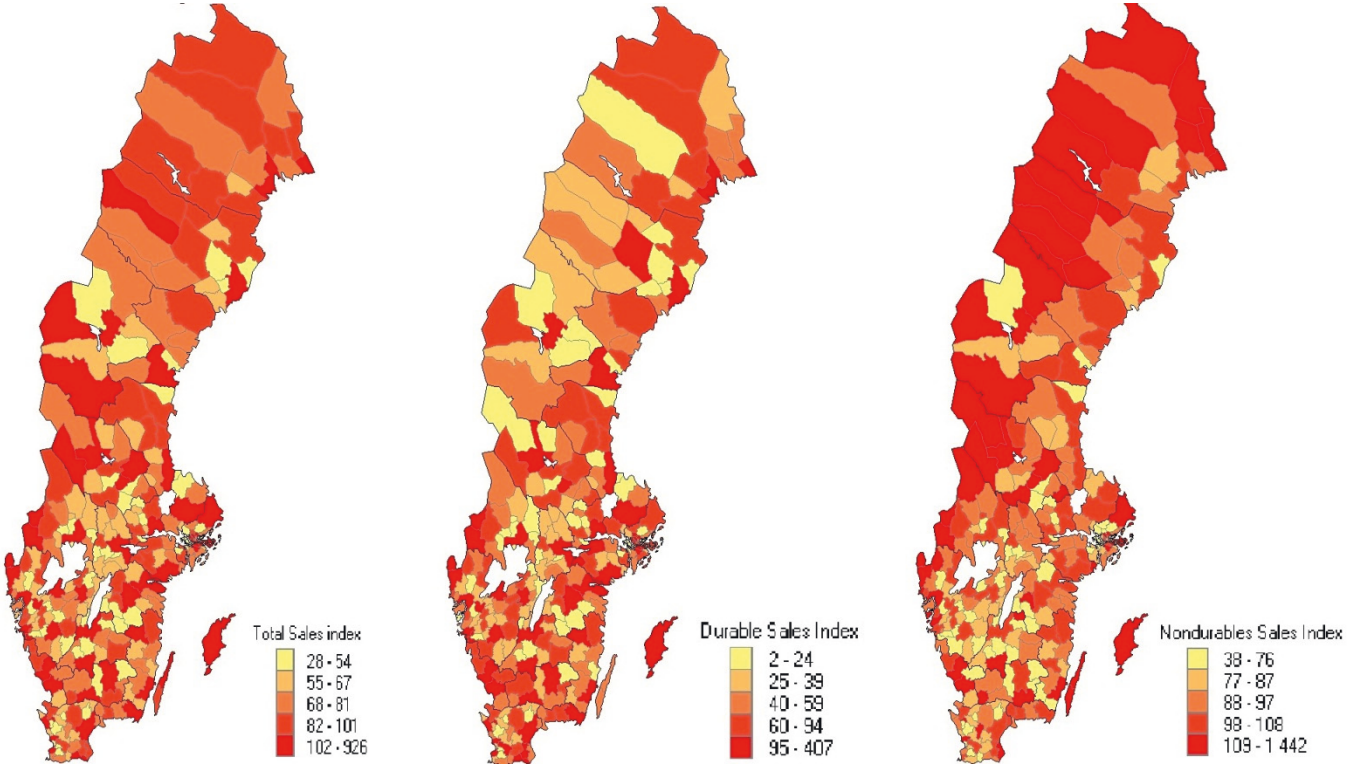

Figure 1: Country maps of retail indices.

While the nondurable sector is more homogenous in its spatial structure, the durable sector is more dispersed—with concentration in the central regions of an FER. The concentration of durable sales to the largest region within a region is also generally expected, since this is where larger retail trade hubs (e.g., regional shopping centers) are located. Additionally, earlier findings have shown that we are willing to travel longer distances for durable goods purchases. Nondurables, on the other hand, are bought in closer proximity to home. This is also supported by the structure of the nondurables map.

The maps also allow us to observe the impact of border trade, thus enabling us to draw the conclusion that the demand in some small, very rural regions is driven not just by domestic demand. Regions like Eda, Strömstad, and Årjäng are known to attract consumers from Norway, especially due to the lower prices of goods and services in Sweden.

When ranking all the regions for the year 2013 (see top five and bottom five performers in Table 1), the effect of the border trade really becomes evident.

Table 1: Ranking of top and bottom regions in terms of the retail indices

Ranking	Total retail index	Durable Retail index	Nondurable Retail index
1	Strömstad	Falkenberg	Strömstad
2	Eda	Haparanda	Eda
3	Haparanda	Burlöv	Årjäng
4	Falkenberg	Strömstad	Åre
5	Årjäng	Eda	Åstorp
290	Nykvarn	Kungsör	Bjuv
289	Salem	Perstorp	Salem
288	Kungsör	Boxholm	Nykvarn
287	Storfors	Salem	Krokom
286	Knivsta	Nordanstig	Kungsör

Of the top five regions for the total retail index, four are border regions and the fifth (no. four) is a tourist region. The worst performers are out-commuting regions in rural areas and regions in close proximity to a larger supply of retail in the bordering regions, e.g., Knivsta, Salem and Nykvarn.

If we instead look at the real sales values without normalizing for the size of the region, the ranking becomes somewhat different, as shown in Table 2. The top-performing regions are found to be the largest cities of the country, with the exception of Strömstad, in terms of nondurable sales.

Table 2: Ranking of top and bottom regional retail performers, real values

Ranking	Real Total sales	Real Durable sales	Real Nondurable sales
1	Stockholm	Stockholm	Stockholm
2	Göteborg	Göteborg	Göteborg
3	Malmö	Malmö	Malmö
4	Uppsala	Uppsala	Uppsala
5	Västerås	Huddinge	Strömstad
290	Storfors	Kungsör	Storfors
289	Bjurholm	Boxholm	Ydre
288	Ydre	Perstorp	Bjurholm
287	Boxholm	Storfors	Dorotea
286	Dorotea	Bjurholm	Boxholm

The regions with the lowest sales values are logically some of the countries smallest regions.

3.2 Variable description

The following three categories represent the dependent variables and have been discussed in the previous section.

- **Total retail sales index**
- **Durable sales index**
- **Nondurable sales index**

The retail sales index is the relation between retail sales turnover in durables, nondurables and total retail given and the size of the sales territory. The size is determined by the actual sales level divided by the sales base multiplied by 100. The sales base is the number of inhabitants in region r multiplied by the average sales turnover per person in the country as a whole (country =100). A value under 100 implies an outflow of retail purchasing power, while a value over 100 implies an inflow of consumers (HUI, 2006). A distinction between the retail categories can be found in Table A1 in the appendix.

The independent variables used in this chapter can be divided into two groups: demand side variables and supply side variables. The demand side variables correspond to factors connected to the actual consumer and, consequently, influence the purchasing power of a trade area. Therefore, these variables should have an impact on retail performance. Supply side variables, on the other hand, correspond to those factors that influence the amount of retail present in a trade area.

3.2.1 Demand side variables

The independent demand side variables of the regression analysis are the following:

Employment: This variable is the share of employed people of the total population (age 16-65). This variable is seen as a proxy for the purchasing power of the region instead of using income and is assumed to have a positive relation to sales levels.

Children: This variable controls for the effect the number of children has on sales. This variable is based on the average number of children per woman in the region. The expected effect is ambiguous, given earlier research.

Age: This variable is defined as the average age of the inhabitants of the region.

Tourism: This variable controls for the effect that a large inflow of visitors has on the regional sales level. It is constructed by the share of people in the region employed in typical service and tourism sectors (based on SNI-codes/NACE codes) as a share of total employment. This variable is assumed to have a positive correlation with sales.

Border dummy: This variable is added in order to capture the effect that the inflow of foreign consumers has on the sales levels in a region. The foreign countries are Norway, Denmark and Finland. A region is set as a border region if it has an immediate border with any of the above countries or has direct ferry or bridge connections. The variable is assumed to have a positive impact due to the results found in section 3.1.

3.2.2 Supply side variables

From the supply side, the following independent variables are included in the construction of the model.

Accessibility to demand within driving distance: To investigate the impact of market size/agglomeration on retail sales, this chapter adapts Johansson *et al.'s* (2002) method of applying an accessibility measure to the empirical analysis. A region's accessibility is defined as the sum of its internal accessibility (*i*) to a given opportunity, *D,* and its accessibility to the same opportunity in all the other regions (*j*) in the set *N*= 1,..., n of regions.

$$A_{tot}^{i} = \sum_{i}^{n} D_i \exp(-\lambda t_{kl}) \quad (1)$$

where A^i_{tot} is the total accessibility of region *i*. D_i is a measure of a certain opportunity, e.g., population, GRP or education in each region; λ is the distance decay parameter; and t_{kl} is the time distance between region *l* and *k*. The measure will take into account both size effects and the spatial layout of the municipalities.

The value of λ differs depending on the commuting flows inside municipalities, inside regions and between regions. λ_r is 0.02 for local accessibility, λ_{ir} is 0.1 for intra-regional accessibility and λ_{er} is 0.05 for extra-regional accessibility. The values resemble an s-shaped curve in which the willingness to commute is high within the local municipality, lower in an associated FER, and high again for actors commuting outside the FER (Johansson et al. 2002).

To determine market size, the variable wage sums, *Y*, is used as a proxy since it measures regional purchasing power. The demand for retail goods is expected to be high where the purchasing power is high.

Adhering to the method applied in Johansson *et al* (2002), the total market accessibility of each municipality is divided into three components, as shown in equation 2:

$$Acc_{tot}^{i} = Acc_{r}^{i} + Acc_{ir}^{i} + Acc_{er}^{i} \quad \forall m \tag{2}$$

The three components consist of **local** *(Acc^{i}_{r}),* **intra-regional** *(Acc^{i}_{ir})* and **extra-regional** *(Acc^{i}_{er})* **market accessibility**, respectively. While municipal accessibility only takes into account purchasing power within its own boundaries, intra-regional accessibility is the accessibility to other municipalities within the FERto which region *i* belongs. Extra-regional accessibility is the region's accessibility to regions belonging to other functional regions. These three components are defined in equations 3 to 5.

$$Acc_{r}^{i} = Y_i exp\{-\lambda_r t_{ij}\} \tag{3}$$
$$Acc_{ir}^{i} = \sum_{k \epsilon R} Y_k \, exp\{-\lambda_{ir} t_{ik}\} \tag{4}$$
$$Acc_{er}^{i} = \sum_{l \in R} Y_l \, exp\{-\lambda_{er} t_{il}\} \tag{5}$$

Slope coefficient accessibility dummy: To account for the fact that the retail trade index emphasizes the smaller regions over the larger, a dummy variable is added to account for this effect. The accessibility value for the main region within an FER is multiplied by one and the remaining regions by zero.

Competition: This variable takes into account how large the retail sales are within the entire FER. The total sales value of region *i* is divided by the total sales of the FER.

Variety (Total/Durable/Nondurable): The variety variables are calculated as the number of 5-digit SNI-retail sectors (NACE codes) represented in region *i* out of the total maximum. In total, there can be a representation in 58 sectors (40 in durables/18 in nondurables). Due to the prevalence of consumers' taste for variety and multipurpose shopping behavior, this variable is assumed to have a positive relation to sales.

Store density: To further control for the effect competition has on sales, a store density variable is added to the model. The variable is constructed by taking all the retail store units available in the region and dividing it by the region's size in square kilometers.

Shopping center dummy: A region is given a 1 if a shopping center is allocated in the region and zero otherwise.

3.3 Descriptive statistics

Before the construction of the model itself is discussed, a few words on the descriptive statistics will be given. From the correlation matrix (see table A1 in the appendix), it can be seen that there is a relatively high correlation between the total accessibility measure and the three individual units. Additionally, there exists a high correlation between the competition, variety and store density variables and the regional, intra-regional and extra-regional accessibility measures. Consequently, two separate regression models will be estimated. The regional accessibility measures will be replaced by the variables total accessibly and competition in the second model.

Table 3 displays the descriptive statistics, where the minimum, maximum, mean and standard deviation values are included.

Table 3: Descriptive statistics, (number of observations = 2030)

Variables	Min	Max	Mean	Std. Deviation
Total retail sales index	23	926	83.19	59.66
Nondurable sales index	36	1442	100.33	80.95
Durable Sales index	2	407	65.56	56.41
Local Accessibility	126	170861	3725	10725
Intra-regional Accessibility	1	182156	135184	26641
Extra-regional Accessibility	0.12	15495	2453	2136
Total Accessibility	315	223103	19695	30220
Competition	0	1	0.25	0.34
Total product variety	0.21	1	0.64	0.2
Durable product variety	0.13	1	0.64	0.21
Nondurable product variety	0.18	1	0.65	0.19
Store density	0	0.34	0.01	0.03
Shopping center dummy	0	1	0.3	0.46
Employment share	0.6	0.88	0.78	0.04
Average no. of children	0.97	3.28	2.04	0.24
Average age	36.1	49.4	42.94	2.56
Tourism	0	0.34	0.03	0.03
Border dummy	0	1	0.08	0.28

Table 3 indicates large variations across the Swedish regions in terms of per capita retail sales, especially in in nondurables. The distribution reveals one

distinguishing outlier—the region of Strömstad, well known for its substantial cross-border trade with Norway. The dummy variable for border trade will capture this effect on sales. We can also see that a shopping center is allocated in 30 percent of the Swedish regions.

Furthermore, the scatter plots indicate that the data should be expressed logarithmically. All variables, except for the accessibility slope dummy variable, are hence expressed in their logarithmic form, and therefore, the estimated coefficients can be interpreted as elasticities.

3.4 The Model

The model is regressed over total, durable and nondurable retail sales indices. A graphical illustration of the model is presented in Figure 2.

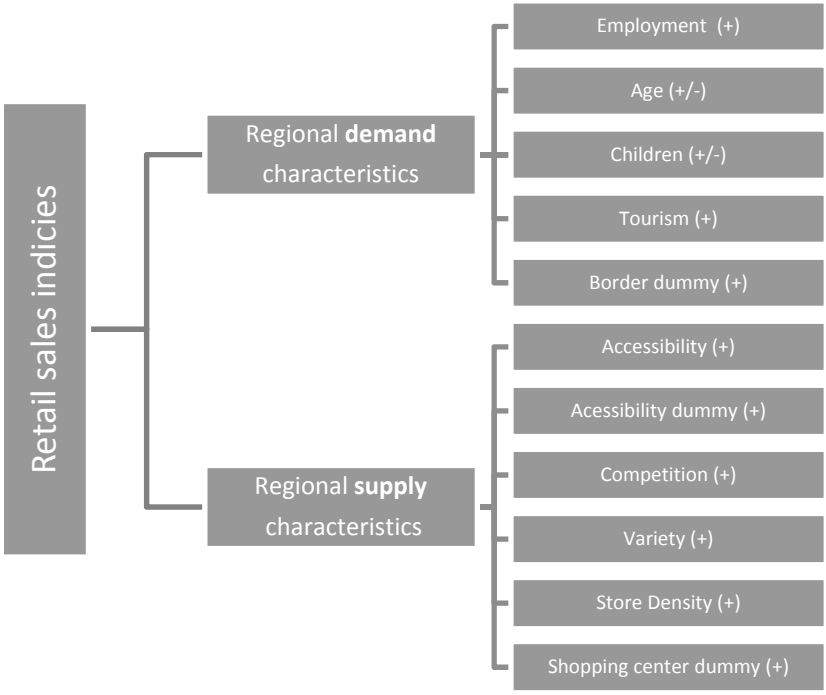

Figure 2: Model Illustration of factors hypothesized to influence regional retail sales

The empirical model states that regional retail sales are a function of: *accessibility (Acc)* to market size, relative *competition (C),* sector *variety (V), store density (D), employment (E)* share, average *age (A)*, average number of *children (Ch)* per family, degree of *tourism (T)* in the region and *dummy* variables for proximity to a foreign country *(BD)* and shopping center occurrence *(SD)*. Figure 2 makes a clear distinction between two groups—supply determinants and demand

determinants—following the structure of the theoretical section. The model is expressed as the following equation:

$$\ln S_{i,t} = \alpha + \beta lnE_{i,t} + \beta lnAcc_{i,t} + \beta lnC_{i,t} + \beta lnT_{i,t} + \beta BD_{i,t} + \beta lnA_{i,t} + \beta AD_{i,t} + \beta lnCh_{i,t} + \beta lnV_{i,t} + \beta lnD_{i,t} + \beta lnSD_{i,t} + \varepsilon_i \quad (6)$$

where *i* represents region and *t* time.

The regression models are performed using a panel data approach for the period 2007 to 2013. Both pooled OLS and a fixed effect model are used for assessment. Initially, the fixed effect model is chosen over the random effect model due to the results of a robust Hausman. However, one should keep in mind that a fixed effect model may work less efficiently if regional variables change slowly over time (Cameron and Trivedi, 2009). Because the fixed effect model estimates the effect from variations in a variable for each region, there must be variation across time. A test to examine whether the variation between different regions is larger than the variation within the region over time is performed. The result shows that there is a larger variance between regions than within the regions across time. The low within variance (corresponding to less than three percent) causes the results to be inefficient, with a large standard error in the fixed effect model. Consequently, the models are also estimated using a pooled OLS.

To assess the properties of the pooled OLS, separate ordinary least square estimations are performed. When running these separate regressions, no trends were found for the different beta values. Furthermore, because dummy variables cannot be included in a fixed effect model, the pooled OLS model allows us to test our three dummy variables.

To address spatial autocorrelation, a Pesaran and Friedman's test of cross-sectional dependence is applied to the models. The result of this test shows no spatial autocorrelation. One of the reasons for this result is the use of the accessibility measure in the dataset. This measure has been shown to reduce the effect of spatial autocorrelation because it incorporates the influence the surrounding regions have on region *i* (Andersson and Gråsjö, 2009).

4 Empirical Results and Analysis

The results of the models are presented in Table 4 and are principally found to be in line with the expectations. To retrieve these results, a pooled OLS and a fixed-effect model have been used.

4.1 Regional supply determinants

When looking at the nine size and supply accessibility variables in the regression, it can clearly be seen that durable turnover is particularly sensitive to these parameters, whereas market size is of less significance for nondurables. This corresponds to the Kivell and Shaw (1980) and Öner (2014) studies, where it is found that the importance of market size and agglomeration is of various weight for different retail goods. This makes sense, as one does not buy or consume, e.g., more food in a larger region than in a smaller one. Since this product category is purchased more often than durables, people have a tendency to purchase them closer to home in order to decrease travel costs. Durables such as furniture, on the other hand, benefit from agglomerations and market size due to the increasing variety of goods in cluster areas.

The effect of accessibility to purchasing power outside one's own region is negative for local sales. This is explained by the so-called agglomeration shadow effect, or the Christaller effect, as it is also known. If situated next to a larger region, which will most likely offer a larger share and variety of retail products than one's own local market, then the consumers will make their consumption in the larger region. The effect is largest and most robust for the durable sector. The effect of regional size on sales decreases with distance, and regions outside one's own FER only play a minor role in terms of durable regional retail performance.

As for the second market potential measure, the relative competition level of the region, all three retail groups are found to have a positive and significant relation. The more sales there are in one's own region compared to neighboring regions, the better region *i* perform. The large internal market thus attracts consumers from the surrounding regions, which is once again a reflection of the agglomeration-shadow effect.

Table 4: Regression results for the effect that supply and demand characteristics of a region have on its retail performance. Dependent variable: Retail indices for total, durable and nondurable retail.

Variable	Total retail				Durable retail				Nondurable retail			
	Pooled OLS		Fixed Effect		Pooled OLS		Fixed Effect		Pooled OLS		Fixed effect	
Regional supply determinants												
Local Accessibility to demand	0.187** (0.010)		0.162** (0.033)		0.506** (0.324)		0.537** (0.084)		0.078** (0.009)		0.020 (0.036)	
Intra-regional Accessibility to demand	-0.011** (0.003)		-0.041* (0.035)		-0.030** (0.007)		-0.156* (0.091)		-0.018* (0.006)		-0.011 (0.003)	
Extra-regional Accessibility to demand	-1.75e-4 (0.006)		0.006 (0.006)		-0.026* (0.0134)		-0.005* (0.123)		-0.004 (0.003)		-0.037 (0.032)	
Total Accessibility to demand		0.019* (0.009)		0.051** (0.175)		0.265** (0.016)		0.068* (0.042)		0.058** (0.008)		0.040* (0.019)
Slope coefficient dummy: Main region in FER dummy	-5.5e-6** (-7.2e-7)	-1.7e-6** (-4.7e-7)	-7.7e-7** (-1.13e-6)	-1.3e-6* (-8.2e-7)	-1.0e-5* (-4.2e-6)	-4.2e-6** (-9.7e-7)	-7.3e-6* (-8.70e-6)	-4.03e-7* (-1.9e-6)	-5.0e-6** (-1.8e-6)	-2.20e-6** (-4.12e-7)	-5.95e-6 (-3.82e-6)	-4.65e-7 (-9.25e-7)
Competition		0.059** (0.005)		0.215** (0.019)		0.247** (0.102)		0.515** (0.047)		0.022** (0.004)		0.0813** (0.022)
Variety		0.513** (0.027)		0.042* (0.019)		1.254** (0.040)		0.184** (0.033)		0.243** (0.023)		0.043** (0.138)
Store Density		0.037** (0.006)		0.085** (0.019)		0.173** (0.010)		0.285** (0.042)		0.029** (0.005)		0.016 (0.019)
Shopping center dummy	0.182** (0.190)	0.131** (0.017)			0.283** (0.060)	0.325** (0.035)			0.124** (0.015)	0.080** (0.014)		
Regional demand determinants												
Employment	1.045** (0.170)	1.090** (0.120)	0.179** (0.064)	0.206** (0.061)	0.931** (0.255)	1.244** (0.252)	0.698** (0.159)	0.876** (0.147)	0.894** (0.113)	0.836** (0.105)	0.157* (0.069)	0.095 (0.068)
Children	0.046 (0.062)	0.032 (0.055)	0.020 (0.011)	0.013 (0.011)	0.087 (0.115)	-0.160 (0.115)	0.009 (0.027)	0.013 (0.027)	0.051 (0.051)	0.036 (0.048)	0.027* (0.012)	0.021 (0.012)
Age	0.973** (0.173)	0.872** (0.154)	0.817** (0.202)	0.602** (0.139)	1.728** (0.324)	1.501** (0.284)	1.808** (0.339)	1.790** (0.335)	1.109** (0.146)	1.227** (0.134)	1.330** (0.224)	0.876** (0.154)
Tourism	0.175** (0.013)	0.153** (0.011)	0.102* (0.006)	0.09* (0.005)	0.174** (0.024)	0.281** (0.024)	0.014 (0.015)	0.012 (0.408)	0.170** (0.011)	0.149** (0.010)	0.005 (0.006)	0.005 (0.007)
Border dummy	0.260** (0.030)	0.196** (0.026)			0.230** (0.060)	0.271** (0.051)			0.453** (0.026)	0.226** (0.022)		
Constant	3.33** (0.713)	5.14** (0.098)	1.78** (0.643)	4.44** (0.171)	6.012** (1.338)	4.86** (1.021)	6.34** (0.608)	6.19** (0.427)	3.91** (0.607)	5.55** (0.085)	2.53** (0.705)	4.41** (0.193)
Number of observations	2030	2030	2030	2030	2030	2030	2030	2030	2030	2030	2030	2030
R^2 (overall)	0.52	0.60	0.29	0.35	0.53	0.58	0.18	0.16	0.49	0.46	0.13	0.18

** indicates significance at the one percent level, * indicates significance at the five percent level. Cluster-robust standard error in parentheses. The Pooled OLS estimation is performed using year dummies. No first-order autocorrelation in the data. All coefficients besides the slope dummies are logarithmic values.

The two retail supply variables inside the region—the variety and density of stores—are found to be important elements when estimating potential turnover. The variety variable confirms a strong link to retail sales, especially in terms of durables. Consumers' preference for variety is thus an important component in explaining retail performance, a variable that has been left out in earlier studies. From the correlation Table A1.1, it is also evident that market size and variety have a positive relation. The larger the region, the larger the variety, and the larger the retail sales.

The density variable reveals a strong positive relation for all the regressions, pointing to the importance of accessibility to stores. The significance of the density variable varies between the two goods sectors, and the elasticity is found to be lowest regarding nondurables. These results are in line with the Ferber (1958) and Liu (1970) results.

Finally, the shopping center dummy reveals a very positive effect on the performance of regional retail. The effect is once again found to have the largest impact on the durable sector. This could be explained by the fact that a larger fraction of the durable sector than the nondurable sector is agglomerated in such clusters.

On a total retail sales basis, market size, competition, product variety, store density and shopping center prevalence are all found to be significant.

4.2 Regional demand determinants

The model also includes five demand determinants that are most likely to have an influence on the retail performance of a region: employment share, average age, average number of children per household, tourism and a location near a foreign country.

The proxy for income, employment, is found to have a very strong and positive effect in all the regressions. A positive income elasticity of demand is associated with normal goods, and thus, an increase in income caused by higher employment levels will lead to a rise in the quantity demanded. The highest elasticity is found for durables, which are then the most sensitive to income changes. The results match those of Ingene and Eden (1981).

For the included regional demographic variable, average age, the significance is very strong in explaining total and durable retail turnover. Hence, these results corresponding to those from earlier studies (e.g., MacMillan, Tung et al. 1972; Deaton 1992; Jappelli and Modigliani 1998; Fernández-Villaverde and Krueger 2001; Gourinchas and Parker 2002; Ingene and Eden 1981).

The second demographic variable, average number of children in families, is not found to have an effect on the regional sales performance in any of the regressions.

When looking at the tourism variable, we find a substantial and stable effect on how much turnover a region is able to achieve in terms of the pooled

OLS regression. However, the effect is much weaker in the fixed effect model and is only found to be significant in terms of total sales. A significant economic impact of tourism on the regional economy has been verified in several earlier studies, e.g., Crompton (2006) and Tyrrell and Johnston (2001; 2006).

The border dummy reflecting cross-border trade between a foreign country and Sweden reveals a very strong link to sales performance, as the variable is found to be significant across all regressions. This is explained by the large proportion of Norwegians driving to Sweden mainly to purchase food and beverages. Many of the Swedish regions bordering Norway have therefore had large increases in the establishment of large supermarkets, despite these areas often being small and rural, e.g., Strömstad and Charlottenberg.

5 Concluding remarks

This chapter has confirmed and added understanding to what factors are influential when explaining the regional variations in retail performance. The study itself was performed using a panel data analysis between the years 2007 and 2013 across all Swedish regions. The data were grouped into three categories according to product group: (1) durables, (2) nondurables and (3) total retail. A pooled OLS and fixed effect model was then used for assessment.

The regression analysis demonstrated a statistically significant relationship between all the retail sales indices: the local size of the region, total accessibility to a large span of purchasing power, competition within the FER, the amount of diversity present in the retail sector in a region, store density within the region, employment share, average age, the presence of a shopping center in the region and, finally, being located close to a national border. However, the significance of these factors varies with the category studied. In addition to the abovementioned variables, accessibility to purchasing power outside the FER only has an effect on the durable goods, which in this case is negative. The effect that the number of children in each family has on regional retail performance is very low and is only found to be weakly significant in the pooled OLS regression for nondurables. The weight of tourism industry present is found to have a very strong and positive effect on sales in the pooled OLS model, while not showing any effect in the fixed effect model.

Although a majority of the included variables are factors that are difficult or even impossible for a policy maker to influence, e.g., being located close to a border or not, there are a few things we should keep in mind. Given the results obtained, one can conclude that to enhance total retail sales within a region, one should place emphasis on promoting cluster formations and establishments in as many sub-sectors as possible. This is most easily done for regions where the market size is sufficiently large, since there exists a positive correlation among market size, sector variety and density of stores. Nonetheless, policy makers in smaller regions ought to be aware that this positive correlation exists. For center developers, this should provide incentives for keeping centers as diverse as possible. Regional policy makers may keep in mind that the establishment of a shopping center in the region may improve the region's overall retail performance by increasing total expenditure.

Several attributes of this chapter contribute to the existing literature on regional retail performance. First, all other studies found have focused on the North American market, so this chapter adds a European perspective.

Also, the structure of the dataset is unique since it covers several years and includes all regions of a country and thus ought to provide a fuller picture of the interdependencies between retail success and spatial dynamics. Finally, the two variables that policy makers and retail developers can most easily influence are shopping center presence in a region and product variety, neither of which

has been presented in earlier studies. Yet, this chapter shows the significant effect that these two variables can have on regional retail performance.

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Appendix

Box A1: *Definition of what is included in the retail sales measurement*

Nondurables:

- groceries
- perfume and cosmetics
- tobacco
- newspapers
- flowers
- drugs and

Durables:

- clothes
- shoes
- accessories
- textiles
- furniture
- iron- and building equipment
- household equipment
- lighting
- paint and wallpaper
- other home equipment
- photo
- sport
- radio and TV
- watches, gold and optics
- books and paper
- music
- toys
- computer and phone equipment
- other

Total retail:
Nondurables plus durables

Source: HUI, 2007

Table A1: *Pearson Correlation Matrix*

	Nondurable sales index	Durable sales index	Total sales index	Local Accessibility	Intra-Regional Accessibility	Extra-Regional Accessibility	Total Accessibility	D. Main region in FER	Competition	Total Variety	Nondurable variety	Durable variety	Store density	D. Shopping center	Employment share	Children	Age	Tourism	Border dummy
Nondurable sales index	1																		
Durable sales index	.548**	1																	
Total sales index	.839**	.894**	1																
Local Accessibility	.149**	.638**	.495**	1															
Intra-Regional Accessibility	-.341**	-.082**	-.203**	.218**	1														
Extra-Regional Accessibility	-.232**	.028	-.094**	.199**	.442**	1													
Total Accessibility	.257**	.174**	.007	**.586****	**.790****	.455**	1												
Dummy Main Region in FER	-.066**	-.245**	-.207**	.523**	.035	.030	.230**	1											
Competition	.458**	.474**	.528**	.294**	**-.648****	-.272**	-.457**	.229**	1										
Total variety	.258**	.702**	.556**	**.841****	.219**	.207**	.545**	.259**	.206**	1									
Nondurable variety	.244**	.634**	.518**	**.798****	.222**	.188**	.545**	.265**	.141**	.902**	1								
Durable variety	.252**	.691**	.542**	**.811****	.205**	.203**	.512**	.242**	.221**	.984**	.813**	1							
Store density	.024	.349**	.232**	**.619****	.684**	.409**	.482**	.299**	-.299**	.631**	.616**	.601**	1						
Shopping center dummy	.210**	.492**	.435**	.622**	.180**	.090**	.444**	.264**	.173**	.562**	.543**	.537**	.479**	1					
Employment share	.279**	.218**	.296**	-.147**	.151**	-.039	.112**	-.161**	-.269**	-.079**	-.071**	-.079**	-.075**	-.067**	1				
Average no children	.166**	.210**	.219**	-.227**	.089**	.044*	.018	-.138**	-.199**	-.189**	-.182**	-.184**	-.065**	-.127**	.203**	1			
Average age	.164**	.198**	.071**	-.547**	-.569**	-.238**	-0.41	-.208**	.312**	-.477**	-.476**	-.448**	-0.364	-.479**	-.174**	-.101**	1		
Tourism	.542**	.395**	.524**	.269**	-.329**	-.295**	-.181**	.214**	.386**	.245**	.258**	.227**	-.013	.216**	-.157**	-.264**	.083**	1	
Border dummy	.440**	.102**	.284**	-.147**	-.483**	-.384**	-.416**	.019	.327**	-.137**	-.096**	-.147**	-.341**	-.031	-.182**	-.010	.186**	.418**	1

CHAPTER III

External versus internal shopping center characteristics

- which is more important?

Hanna Kantola

Abstract

During the last century, the retail sector went through major transformations. One major contributor to this transformation process was the establishment of (planned) shopping centers. The aim of this chapter is to test whether it is external or internal factors that have the greatest impact on the performance of shopping centers. Internal factors correspond to features that the shopping center management can influence. External factors, in contrast, are features that are seen as fixed or very difficult for the center to change, e.g., regional attributes. The dataset includes all Swedish shopping centers and is assessed through an OLS model for the year 2013. The study is unique both given the structure of the dataset and that the study is performed in a European setting. The results show that the most important factors for explaining high-performing shopping centers is a favorable tenant mix and the prevalence of predominately external agglomeration economies such as local market size. However, because shopping centers are a heterogeneous group of establishments, the significance and strength of many of the variables change depending on which type of shopping center is studied.

Keywords: Retail, shopping centers, sales, regions, agglomeration economies & tenant mix
JEL classification codes: C21, D12, L81, O18, R10.

1 Introduction

First introduced in Europe and later primarily developed in the US, shopping centers today are prevalent in cites all around the world and have become a characteristic feature of the modern urban landscape. The birth of shopping centers has changed consumers' spatial shopping behavior, transformed the patterns of access within the city and its surroundings and contributed to the growth of large (multi-) national chains.

Notable is that shopping centers are distinctly different from the other two major shopping locations: the city center and local business strips. The shopping center building is pre-planned as a merchandising agglomeration unit for interplay among tenants. Its site is deliberately selected by the developer for easy access to attract customers from a market area. Within the shopping center definition,[1] the centers and malls are different in both form and size, ranging from the smallest residential area shopping centers up to massive regional shopping centers. The different classifications of center types are based on the size of the center, its function and the tenant mix. All of the various categories of shopping centers have experienced substantial growth in terms of numbers, sales area and sales revenue in recent decades. A thorough understanding of what makes a center successful[2] is therefore essential. Not only does knowledge of the shopping center and its surroundings provide a basis for estimating potential sales but it should also provide a guideline for shopping center developers in terms of future investments in land, building, traded goods, area utilization and promotional activities. On this basis, the aim of this chapter is to try to untangle what is most important for the performance of a shopping center - internal or external factors?

Research concerning the sales potential of shopping centers includes Central Place Theory (Christaller 1933), retail agglomeration models (Weber 1929) and retail demand externality theories with their valuation of shopping centers and their rents (Ghosh 1986; Fisher and Yezer 1993; Pashigan and Gould 1998; Mejia and Benjamin 2002). Christaller's theory (1933) of single-purpose shopping trips to nearby centers has transformed into theories of multi-purpose trips to distant agglomerated centers, while Hotelling's (1929) idea of competition under spatial duopoly has evolved into the clustering of similar shops, which explains the prevalence of numerous similar sellers in the same shopping center.

Many researchers who have specifically studied shopping centers have not used actual center sales level data but rather shopping center rent level data as an estimate for center performance (Sirmans and Guidry 1993; Gatzlaff, Sirmans et al. 1994; Gerbich 1998; Hardin and Wolverton 2001; Shun-Te Yuo,

[1] See Table A1 in appendix for definitions.

[2] Both the Urban Land Institute (ULI) and the International Council of Shopping Centers (ICSC) measure shopping center performance in terms of non-anchor retail sales per square foot.

Crosby et al. 2004; Des Rosiers, Thériault et al. 2005). Logically, rent levels should reflect the performance, and thus the sales level, of centers (Gerbich 1998; Mejia and Benjamin 2002). However, one flaw with this measure is that large retail chains, which are attractive for the center developer because they act like an anchor store, can negotiate rent levels. Thus, large and successful retailers often pay lower rent levels than the actual market price.

Four earlier empirical US studies are the only ones found focusing on various factors that influence aggregate center sales levels (Lakshmanan and Hansen 1965; Okoruwa, Nourse et al. 1994; Eppli and Shilling 1996; Mejia and Eppli 2003). Of these four studies, only the most recent combines the external and internal dynamics, which presumably influence the actual sales levels of shopping centers. However, Mejia and Eppli's study does not address what matters the most, the internal or the external shopping center characteristics.

To answer this question, this chapter will compare the elasticities of the beta coefficients of the independent variables. All variables have been classified as either external or internal for the center. The study examines data from 358 shopping centers across 111 Swedish regions[3]. Despite minor restrictions,[4] the dataset in itself is unique, since it covers all available centers of a country. The dataset is split into and assessed as four groups: all Swedish centers, city malls, and externally located and residential area shopping centers. No such earlier comparison has been found within the literature. Previous shopping center studies have either looked at one specific shopping center category or a mix of all of them.

The results show that the most important factors for explaining high-performing shopping centers is a favorable tenant mix and the prevalence of predominately external agglomeration economies such as local market size. However, since shopping centers are a heterogeneous group of establishments, the significance and strength of many of the explanatory variables varies depending on which shopping center group is being studied.

The structure of the chapter includes a brief overview in section 2 of the history of shopping center development. This is followed by a presentation of the theoretical framework in section 3. These sections will lay the foundations for the empirical model presented in section 4 together with the methodology, descriptive statistics and data. Section 5 includes the results and the analysis. Comments and conclusions are then presented in section 6.

[3] When discussing the term region, the author refers to municipal data. Sweden consists of a total of 290 municipalities.

[4] Only centers with a rental square meter area of more than 5000 are included in the sample. The minimum cluster is 5 stores, so many superstores (e.g., ICA Maxi) are excluded from the total sample. See Appendix Table A2 for a full review.

2 Development of shopping centers

The shopping center industry is a relatively new industry, although its origin can be traced back to the 18th and 19th centuries in Europe (Dawson 1983). Initial developments in the US market took place from the 1920's onwards as a result of the increased mobility of consumers given the popularization of the car and improved infrastructure. Yet, it was not until the mid-1950's that the expansion of this sector took off, when it was discovered that placing two department stores in one center increased both stores' profits (Eppli and Benjamin 1994). Further economic gains were also found by establishing out-of-town shopping centers, due to the lower land prices, and thus lower rent costs, compared to city-center locations. In addition, the co-ordination of deliveries was found to result in cheaper transportation costs. Both of these clustering externalities enables the prices of goods to be lower, which in turn attracts the consumer (Bergström and Fölster 2005).

In the European context, the British shopping center industry has been, and still is, an influential and prominent builder of planned centers. Alongside Britain, some of the earliest centers were those developed in Sweden (Dawson 1983). Within the city transport network, and associated with other social land uses, shopping centers were established in line with the new town schemes[5] that were developed in Sweden during the 1950's (Westerman 1966; Dawson 1983). While the role of social planning was nearly absent in the US center development process, the government played an active role in this development in both Britain and Sweden, while still encouraging private sector participation. However, the purpose of the center provision was not to make a profit but to provide its inhabitants with a high level of accessibility to retail and other services. As a result of this controlled planning process, when establishing the new suburban communities, a shopping center hierarchy was created, with each hierarchy being distinct in size and range of functions. The centers range from small (i) local, (ii) neighborhood, and (iii) district centers to (iv) large regional centers (Dawson 1983). What they have in common is that they have all experienced a high growth rate, both in absolute numbers and total market share, over the last few years. Table 1 below shows statistics over center development and sales levels in Sweden between the years 1995 and 2013.

The data tell us that there has been a 50 percent increase in the number of center establishments over the past 20 years. At the same time, the gross leasable sales area has increased by more than 250 percent, implying that old centers have expanded in size.

[5] During the 1950's and 60's there was a major shortage of accommodation in Sweden. This led to the planning of large new residential areas (the so called "the million home programme"). When these areas were built, shopping centers were included in the planning scheme.

Table 1: 10 Years of Swedish Shopping Center Development

	1995	2000	2005	2013	Increase 95-2013*
Number of shopping centers	236	293	338	358	52%
Leasable retail area m^2	2 389 800	3 391 680	4 650 625	8 526 400	257%
Total Retail sales, m.SEK	296 900	344845	429 003	595 736	100%
Shopping Center Retail sales	61 523	102 145	139 806	243 480	296%
Shopping center share of total retail sales	20.7%	29.5%	32.6%	40.9%	
Shopping center sales/GLA (SEK)	25 754	30 116	30 062	28 556	

Source: Centrumutveckling, *Köpcentrumkatalogen 06/07* and HUI Research, 2014
* Measured in current prices.

Overall, we can also verify from the data that shopping centers have taken an increasing share of total sales over the period. In 1995, only 20 percent of total retail expenditure occurred in a shopping center setting, while the same number today has risen to 40 percent. From the sales per gross leasable area, we can see that the shopping center market now tends to be somewhat saturated, since we have seen a decrease in these values over the last few years. The stagnation in the Swedish market is not just a one-country phenomenon—it has also been seen in countries such as the UK and US[6].

Given the varying types of shopping centers, it is crucial to define what this chapter considers a *center* before going deeper into a theoretical and empirical discussion. The most common and recognized definition of a shopping center is formulated by the US Urban Land Institute (ULI) (1985). According to ULI (1985), a shopping center is defined as:

> *"A group of commercial establishments, planned, developed, owned, and managed as a unit, with off-street parking provided on the property and related in location, size (gross floor area), and types of shops to the trade area that the unit serves - generally in an outlying or suburban territory."*

However, since Sweden is a relatively small country, especially in population, the retail units are built at smaller scales to reflect the market potential. If the international definition were to be strictly followed, many Swedish shopping centers would not measure up, i.e., all so-called trading centers would be excluded. Therefore, the author has decided to define a shopping center based on those centers found and listed in the Swedish Shopping Center Directory.

[6] Source: Statista.com

3 Determinants of shopping center sales

According to earlier research (Mejia and Benjamin 2002; Des Rosiers, Thériault et al. 2005), retail sales are affected by both spatial and non-spatial factors. The standard model of retail sales is modified to assess shopping center sales, and the spatial and non-spatial factors can thus be split into six broad categories. Figure 1 displays these connections.

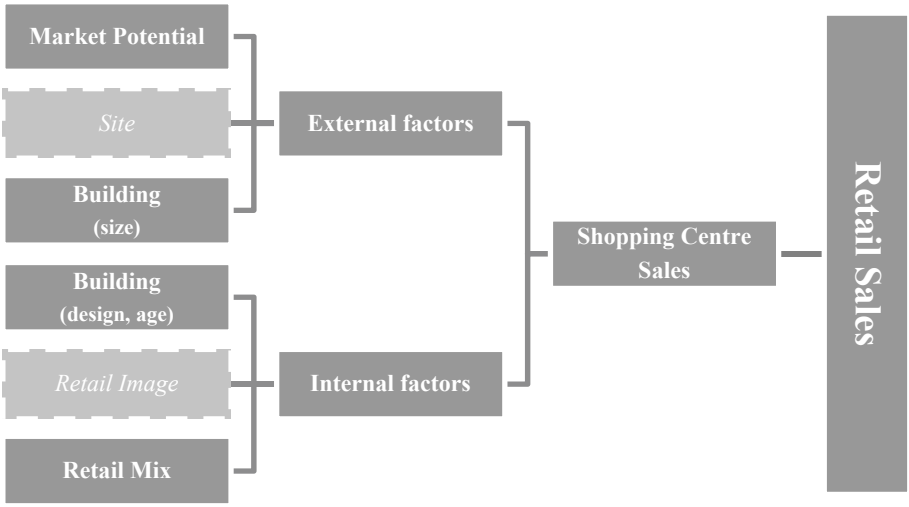

Figure 1: *Conceptual model; Factors that Affect Shopping Center Sales Performance.* (based on a figure in Mejia and Benjamin, 2002. Author's own construction)

Across geographical markets, there exist differences in level of competition, population size or level of agglomeration and purchasing power, factors that all influence the levels of sales and can thus be viewed as determinants of the market potential in an area. The *site*, on the other hand, involves the visibility and accessibility of a center in the regional market, while the structural features of the *building* (e.g., size, age and layout) are also understood as factors that may influence sales. While size of the center is a spatial component, the age and layout of the building are non-spatial factors. Earlier research highlights two additional non-spatial factors: the first, *retail image*, is the consumer's perception of the store attributes; the second, *retail mix*, is the composition of the types of stores found in the center, e.g., diversity, anchors and (non-)chains (Mejia and Benjamin 2002). This chapter will, however, exclude site-specific and consumer perception aspects from the analysis due to a lack of such data.

3.1 External factors

A market consists of both buyers and sellers, and the sales of the retail market are thus influenced by the location decisions of these two types of economic agents. Consumers base their two-stage shopping decisions on: (i) which good to buy, which in turn is decided by weighing the benefits and costs of different goods in order to maximize the expected utility; and (ii) at which location and center to make the actual purchase. The decision is based on the resources available for transport and the probability of finding the good of intended purchase. Sellers, on the other hand, want to maximize expected profits by taking advantage of the consumer demand. Given demand and supply, certain costs occur. On the demand side, are transportation, search, storage and information costs, while the supply side is influenced by site-specific costs such as rent, wages, logistics and storage.

If first looking at the demand side, earlier research shows that there are two important factors for determining sales: (i) the purchasing power of the market area, which is reflected through both income and demographic variables, and (ii) the level of agglomeration of stores, which reduces consumer search and transportation costs.

Regional average income versus retail sales has been analyzed in numerous studies, with varying outcomes. Russell (1957) finds no such correlation. Nevertheless, a majority of later researchers have found a positive and significant relation. Among those who found a significant relation between purchasing power and retail sales are Ferber (1958), Liu (1970), Ingene & Yu (1981), all assessing sales against income.

Demography, e.g., age, household size and education, also has an influence on retail sales levels according to earlier studies (Liu 1970; Ingene and Lusch 1980; Ingene and Yu 1981; Okoruwa, Nourse et al. 1994; Lachman and Brett 1996), since these variables also influence the regional purchasing power. However, the demographic variables will be excluded from this study.

Instead, as explained earlier, the most important feature for explaining consumers' willingness to shop in a center setting is the gain obtained by shopping in a retail cluster. The largest gain comes in the form of time and search cost reductions (Betancourt and Gautschi 1988). When stores are clustered, the consumer obtains an initial sunk travel cost. But once at the site, the visits to any store at the cluster location will occur at very low additional costs—the consumer enjoys scope economies in the search. Without multipurpose shopping opportunities, consumers have to make more trips to obtain the demanded goods (Ghosh 1986). Retail agglomerations in the form of shopping centers also provide a range of public services and facilities, services that would not be available if the retailers were scattered as single store units, since the total cost of these services is split among the center tenants (Oppewal and Timmermans 1999; Shun-Te Yuo, Crosby et al. 2003).

Agglomeration economies are also important for the supply side. The cluster benefit appears as both internal and external economies of scale. The benefit derived from the internal agglomeration effect explains why both homogenous and heterogeneous retailers decide to locate under the same roof. Central Place Theory (Christaller 1933; Lösch 1954) and multipurpose purpose trips explain the clustering of heterogeneous retailers. Why homogeneous retailers also agglomerate is not explained by this theory; rather, the explanation is found in the principle of minimum differentiation. Hotelling (1929) was the first to introduce the theory of clustered homogeneous firms, though it was Boulding (1966) who explicitly used the term *"principle of minimum differentiation"*.

The external effects, on the other hand, arise from the fact that larger, more populated regions tend to attract more suppliers, in this case retailers, due to the principles of agglomeration economies. There is a large body of theoretical literature on spatial agglomeration[7]. The theory states that firms are drawn to cities by the possibility of serving large local markets from a few store/plant units at low transportation cost. The idea is related to Harris' (1954) influential market-potential function, which states that that the demand for goods produced or sold in a location is the sum of purchasing power in other locations, weighted by transportation costs. Over the years, this model has been reformulated in numerous ways, one of which is Johansson *et al.*'s (2002) method of calculating accessibility to markets, which will be used later in this chapter.

Earlier studies, such as Ingene and Yu (1981), Wilde (1992) and Eppli and Shilling (1995a), conclude that both market size and clustering positively affect retail sales as a result of the reduction in consumers' search costs. Search cost reductions presumably increase center attractiveness. However, Mejia and Benjamin (2002) state that an insignificant relation may occur because consumers can choose to shop in neighboring regions. This implies that the size of the surrounding regions also plays a role in determining the successfulness of the center. Additionally, a large population size does not automatically lead to higher sales per store if those sales are exhausted by the fact that new retailers will be attracted to the market area as a result of the higher demand (Mejia and Benjamin 2002). Consequently, another supply side aspect is the level of competition prevalent in the market area.

If centers are located in very close proximity to each other, the benefit derived from the rise in attractiveness brought by the increased opportunity of multi-purpose shopping could actually act as a positive component for center sales. Studies that have looked at the benefit of colocation include Johansson and Forslund (2006) and Larsson and Öner (2014).

[7] For a full review of the principles of agglomeration economies, see, for example, Quigley (1998) or Rosenthal and W. C. Strange (2004), who review the empirical literature that aims at identifying the sources of economies of agglomeration.

The next section discusses factors that are connected to the building itself and that have been shown in earlier research to have an effect on the volume of retail sales.

3.2 Internal factors

The features of the building can be divided into spatial and non-spatial components. First, and most importantly, it is the actual size of either the center or the individual tenants that influences sales. Through his gravity type model, Huff (1963) was the first to theoretically connect market share to the size of the retailer. Later researchers empirically verified this correlation. Eppli and Shilling (1996) show that larger shopping centers generate more sales per square meter than smaller ones. Brueckner (1993) also finds the same positive relation but on a store basis.

A second spatial building aspect highlighted by Mejia and Benjamin (2002) is the placement of the retailers within the center itself. Research indicates that sales can be improved by clustering similar stores. Likewise, a store's sales are influenced by being centrally or peripherally located in the center. This location decision is important because a majority of consumers do not circulate the whole shopping complex (Brown 1992; 1994).

One feature of the building is its quality of facilities, e.g., the design, center age and time since renovation. Mejia and Eppli (2003), Hardin and Wolverton (2001) and Sirmans and Guidry (1993) find a negative relation between age and shopping center sales/rent levels. The relation between the design and shape of the building and sales levels is ambiguous. Whereas Eppli and Shilling (1995b) find no such relation, Oppewal and Timmermans (1999) argue that design alters consumers' perception and influences the attractiveness of the center, which can be expected to influence sales. Hence, a good design could, for example, offset another center flaw, such as an inferior location, and give the center a higher sales level than it otherwise would have had. Dennis, Marsland and Cockett (2002) also suggest that an enclosed center is more attractive for consumers, which would suggest higher sales levels in those centers. This factor really ought to have an impact on sales for Swedish shopping centers due to the varying weather conditions throughout the year in Sweden.

A large fraction of the research on shopping centers has focused on explaining how the mix of center tenants can influence and maximize sales levels (Brueckner 1993; Gerbich 1998; Mejia and Eppli 2003). Previous research has suggested that tenant mix is one of the most crucial factors for the success of a shopping center, since it can differentiate the center from its competitors (Abratt, Fourie et al. 1985; Kirkup and Rafiq 1994; Anikeeff 1996). Traditionally, the tenant mix will comprise one or more anchor tenants, a variety of smaller stores and some food stores. Each of these categories is integrated to create the center's (micro) retailing environment. The anchors represent the core of the center.

Their function is to attract visitors to the center (Brueckner 1993; Pashigan and Gould 1998; Mejia and Eppli 2003). The smaller stores then contribute by offering complementary products, while the provided food services act to prolong the visit (Gerbich 1998).

Brown (1991) claims that the combined factors of the tenant mix and the location of these anchor tenants are important factors when explaining the total amount of time spent in the shopping center. The centers' aim should be to include all the shopping requirements of the consumers in order to economize the consumers' time spent shopping (Berman and Evans 1995). Hence, developers of retail centers deliberately integrate stores in clusters to take advantage of consumers' multipurpose shopping habits (Ghosh 1986). While the clustering of heterogeneous goods offers consumers a large variety, the clustering of homogeneous retailers increases the selection of particular goods, thus reducing both the search and uncertainty costs (Eppli and Benjamin 1994). Furthermore, the mix of (inter-)national chains, local stores, franchises and independent stores also influence the center sales levels. Traditionally, chain stores have been found to be more stable and profitable, probably due to the impact of scale economies in such things as management activities (DeThomas, Wenthe et al. 1988; Claycombe 1998; Litz and Stewart 1998).

Studies also show that consumers select both their choice of center (Bellenger, Barnett et al. 1977) and their frequency of trips (Stoltman, Gentry et al. 1991) based on the variety and supply of the tenant mix. However, variety is not the only element in the mix of tenants. Whether or not the stores are national or local in type also influences how consumers view the retail supply of a center.

To summarize, the theoretical literature appears to have captured at least some of the essential factors in determining the sales level for shopping centers. A majority of the empirical studies have confirmed that all of the following factors have effects on a center's performance: the purchasing power within the center's market area, the size of both the market and the center itself, the surrounding competition, the center's age, the tenant mix and enclosed shopping center buildings.

4 Methodology, Descriptives and Data

4.1 The Data

Data covering 358 shopping centers were provided from the Swedish Shopping Centre Directory. Only centers with a rental square meter area above 5000 and a minimum clustering of 5 establishments are included in the dataset. Due to missing data for some centers, the total number of observations is somewhat reduced when estimating the model.

The shopping centers are divided into nine different categories (see appendix table A2). The categorization of retail tenants is consistent with general sector standards. The sample is then grouped into three center groups based on center similarities. As seen in Table 2, City Malls is the most frequent type of center and will form its own group. Retail parks, Regional shopping malls and Outlet centers form the second group on the basis that they all are mainly located outside city centers and residential areas. The last group comprises centers that are located and built for the purpose of being a cluster of convenience stores for residents, namely, Neighborhood and Community centers. Since Theme Centers do not fit any of the above groups and only comprise one observation, this center type is excluded from all regressions except at the aggregate level.

The data are from the year 2013 and are the most recent data of their kind[8]. The dataset is a combination of shopping center-specific data and regional market characteristics, which are divided into internal and external factors influencing the center's performance. Shopping center sales per square meter will be tested using OLS against various explanatory variables, which have been grouped as internal or external factors. The aim of the chapter is to see which of the two groups is most influential for determining center performance. A full description of the variables is found in the next section.

Taking a closer look at the geographical distribution of the shopping centers across Sweden, we can see a clear concentration of the centers in the southern parts of the country (the more densely populated areas). Figure 2 maps how many shopping centers are located in each municipality. The centers are located in 111 of the 290 Swedish municipalities. The municipality with the most shopping centers is Stockholm (35), followed by Gothenburg (17) and Malmö (13). Obviously there is a close correlation between the number of center establishments and regional size.

[8] The Swedish Shopping Center Directory has been owned and operated by Datscha AB since 2014. Due to the new ownership structure of the database, there have been alterations in the collection and measurement of the data from previous years. Hence, only a one-year analysis is possible.

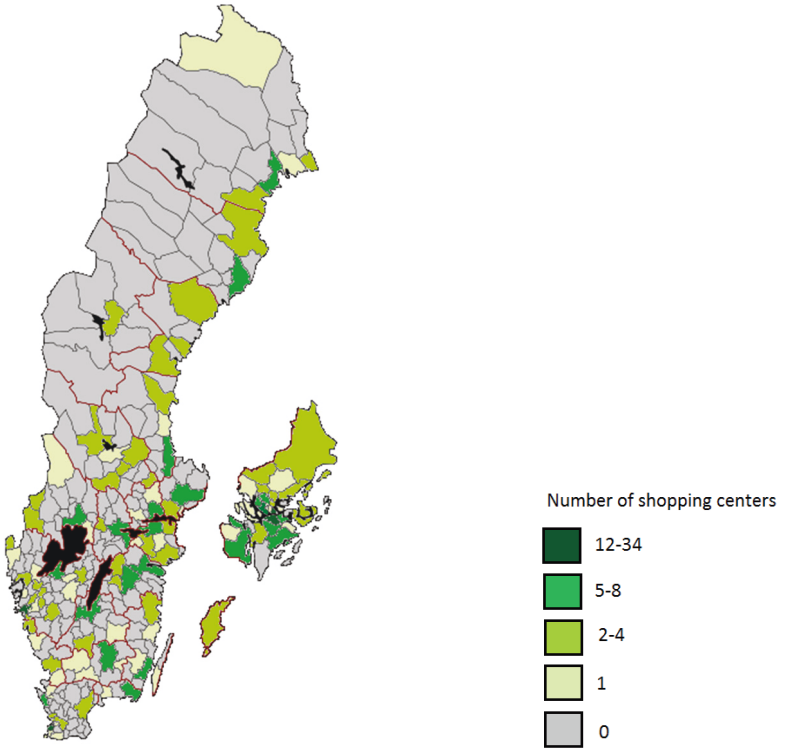

Figure 2: The geographical distribution of shopping center establishments across Swedish regions. Author's own construction based on DATSCHA data.

From Table 2, we can observe that city malls are the most common shopping center category, closely followed by retail parks.

Table 2: Leasable area, turnover and market share by shopping center type, 2013

Group	Shopping center type	No.	Leasable Retail area m^2	Retail turnover (m SEK)	Turnover per leasable m^2	Market share among all SC (%)
Residential area SC	Neighborhood SC	22	142 775	4 271	29 914	1.8
	Community SC	59	911 650	27 920	30 626	11.5
	City Mall	109	1 306 375	41 199	31 537	17
Externally located SC	Outlet SC	5	59 550	1 995	33 501	0.8
	Regional Mall	43	1 837 750	59 869	32 577	24.7
	Super-regional Mall	1	57100	1 480	25 919	0.6
	Retail park	108	2 992 975	74 226	24 800	30.6
	Regional retail park	10	1 171 900	31 600	26 965	13
	Total	*357*	*8 480 075*	*242 560*		*100*

Source: Swedish Shopping Center Directory, Datscha

Over 50 percent of all sales taking place in a shopping center environment are done in regional malls and retail parks, as can be seen from the market shares. An explanation of this is found when looking at which types of stores are located within the different shopping center groups. The data reveal that IKEA largely has its stores located in these two types of trading centers. IKEA not only generates high sales figures on its own, but it also acts as an anchor attracting other stores to locate in the same center.

The highest sales per leasable retail square meter are found within the group of externally located shopping centers. Ranked first are the outlet centers, followed by the regional malls.

4.2 The Variables

The dependent variable in the model is the sales per square meter of gross leasable area (GLA) for three types of shopping center environments.

- City malls
- Residential Area shopping centers
- Externally located shopping centers
- All shopping centers

The independent variables that are included in the model to test their correlation with sales are grouped into two categories—external variables and internal variables—based on the discussion earlier. External variables are variables that are impossible or very difficult for the shopping center management to influence. Internal variables, in contrast are variables that can be changed by the management of the shopping center.

4.2.1 External variables

The first independent variable to test is the market potential measure, or rather the **accessibility to demand.**

According to Johansson *et al.*'s (2002) model, a region's accessibility is defined as the sum of its internal accessibility (*k*) to a given opportunity, *D,* and its accessibility to the same opportunity in all the other regions (*l*) in the set *N* ={ 1,..., *n* } of regions.

$$Acc^{i}_{tot} = \sum_{i}^{n} D_i \exp(-\lambda t_{kl}) \qquad (1)$$

where Acc^{i}_{tot} is the total accessibility of region *i*. D_i is a measure of a certain opportunity, e.g., population, GRP or education in each region, λis the time

sensitivity parameter, and t_{kl} is the time distance between region *k* and *l*. The measure will take into account both size effects and the spatial configuration of regions.

Since this chapter evaluates the customer base available to the shopping center, population is chosen as the variable in the accessibility measure. Population is denoted as *D* in equation 1.

The total market accessibility of each region can then be divided into three components, as shown in Equation 2:

$$Acc_{tot}^{i} = Acc_{r}^{i} + Acc_{ir}^{i} + Acc_{er}^{i} \quad \forall m \tag{2}$$

The three components consist of municipal (Acc^{i}_{r}), intra-regional (Acc^{i}_{ir}) and extra-regional (Acc^{i}_{er}) market accessibility. Municipal accessibility takes into account the purchasing power within the municipality's own boundaries, and intra-regional accessibility is the accessibility to other municipalities within the Functional Economic Region (FER) to which region *i* belongs. Extra-regional accessibility, in contrast, is the region's accessibility to regions belonging to other FERs. Each component is defined in equations 3 to 5.

$$Acc_{r}^{i} = D_i \, exp\{-\lambda_r t_{ij}\} \tag{3}$$
$$Acc_{ir}^{i} = \sum_{k \in R} D_i \, exp\{-\lambda_{ir} t_{ik}\} \tag{4}$$
$$Acc_{er}^{i} = \sum_{l \in R} D_i \, exp\{-\lambda_{er} t_{il}\} \tag{5}$$

The second variable is the **purchasing power** of the municipality where the shopping center is located. The purchasing power is estimated as the average household net income.

The variable **competition** is estimated as the share of people employed in the retail industry out of total employment in region *r*. This should reflect whether the local market has a high or low concentration of retail establishments. Preferably, one would want to use a distance matrix between all the different shopping centers. However, since the author could not obtain such data, this proxy for competition was chosen.

The fifth and final external control variable is whether or not the shopping center is co-located: **co-location of SC**. This is a dummy variable reflecting the proximity to another shopping center. A center is viewed to be co-located if one can easily walk between the two centers. If that is the case, the shopping center dummy is assigned the value 1; otherwise, it obtains the value 0.

4.2.2 Internal variables

The issue of agglomeration was discussed in the earlier section. However, economies of scale are not solely external to the shopping center. An agglomeration value that the center management can, to some extent, influence is the **center size.** This variable is calculated as the total number of stores available in shopping center *s*.

The majority of internal variables influencing the shopping center performance deal with the tenant mix. To test the homogeneity of a shopping center, a Herfindahl index is calculated for each center. This index measures the **concentration of the product categories** within the shopping center and is calculated as the sum of the squares of market share for each firm. The Herfindahl index[9] is defined as (Shun-Te Yuo, Crosby et al. 2004):

$$HI_i = \sum_{c=1}^{n} \left(\frac{U_c}{U_i}\right)^2 \qquad (6)$$

where HI_i is the Herfindahl index for center i, U_c the total number of stores in retail category c, U_i the total number stores in shopping center i and n is the total number of retail categories[10] in the shopping center industry. The higher the value, the more uniformly distributed the retail mix.

To not limit the assessment to the concentration of the tenant mix, a variable assessing the impact of **product diversity** representation is added as a control variable. This measure counts how many of the 40 different retail categories are represented by stores in each center. The higher the number, the greater the variety of stores in the center.

A third measure, the frequency of **chain stores**, is introduced to assess the impact the tenant mix has on the center's success. For this measure, the ratio of national chain tenants in terms of total center tenants is calculated for all centers.

For all three abovementioned tenant mix variables, theory suggests that the more diverse a center is, the better its performance, due to consumers' preference for multipurpose shopping.

The final tenant mix variable is the **anchor type** variables. These are dummy variables measuring the correlation between different categories of the largest anchor tenant in the center and the overall center performance. The anchors can be divided into six different categories selling food, clothes, and home, sport and leisure equipment. The final two dummy groups reflect the

[9] The HI was initially developed to measure the diversity of industrial sales in communities. Holden & Deller (1993) started to apply it to retail market performance.

[10] The total number of possible categories is 40. See appendix Table A1 for a complete summary of included product categories.

presence of IKEA and/or Systembolaget (the Swedish Alcohol Retail Monopoly) at the center.

Added are two **center age** control variables, considered as time elapsed since the center was built and since it was last renovated. The two variables are assumed to have the opposite effect on center performance. The longer the time since renovation, the less attractive a center should become for the consumer, resulting in lower sales. However, the longer a center has been established, the more renowned its trademark should have become.

Lastly, a control variable for whether or not the center is covered is added. The Swedish climate, with long, cold winters, should favor centers that offer consumer shelter from outside weather conditions.

4.3 Model formulation

The descriptive statistics are presented in tables A3 and A4 in the appendix, illustrating the large differences that exist among shopping centers in Sweden. Due to the large variance present in the dataset, the model will be estimated in logarithmic form in order for the data to more closely follow a normal distribution. This implies that the coefficients can be interpreted as elasticities, which in turn enable us to draw conclusions on which types of factors are the most important when explaining the success of a shopping center—external or internal variables? By comparing the beta coefficients, we can see which factors correlate the most and the least with the center sales. Based on the economic theory forming the model and the insight of the descriptive statistics, it is expected that product concentration has a negative effect on sales, whereas regional size, tenant mix, center age and being an enclosed center are assumed to have a positive correlation.

The correlation table A4 shows low levels of bivariate correlations among the independent variables, indicating that multicollinearity[11] is not a large problem in the dataset. However, the correlation table presents figures above 0.7 for the accessibility measures and for product concentration versus product diversity, which justifies a separation of the two tenant mix variables in addition to the accessibility measures when running the regressions. Consequently, for each of the center groups, two separate regressions will be made. The models to be estimated are as follows:

[11] Also, when retrieving the VIF and TOL, the values are found to be well within any critical levels. White's General Test cannot reject the presence of heteroscedasticity. Consequently, an OLS regression with robust error will be used for the estimation.

$$\ln Center\ sales_{i,c} = \alpha + \beta lnAccessibility_i^{r,ir,er} + \beta lnPurchasingPower_i + \beta lnCompetition_i + \beta lnColocation_i + \beta CenterSize_i + \beta Diversity_i + \beta lnChains_i + \beta lnEnclosed_i + \beta lnAge_i^{built} + \beta AnchorType + \varepsilon_i \quad (8)$$

$$\ln Center\ sales_{i,c} = \alpha + \beta lnAccessibility_i^{tot} + \beta lnPurchasingPower_i + \beta lnCompetition_i + \beta lnColocation_i + \beta CenterSize_i + \beta ProductConcentration_i + \beta lnChains_i + \beta lnEnclosed_i + \beta lnAge_i^{ren} + \beta AnchorType + \varepsilon_i \quad (9)$$

The model will first be regressed over all centers *(c),* with shopping center dummies included in order to account for the heterogeneity between types of shopping centers. Then, the dataset will be regressed over the three center type groups individually.

First, a nested multilevel model was applied to the dataset. However, because there are insufficient observations per level, as in municipalities compared to shopping malls, the model did not work well. In addition, there are so many municipalities with one observation that it becomes difficult to nest the data in a meaningful way. An OLS model is chosen on this basis, bearing in mind that it would have been preferable to understand the level-specific effects. However, the choice between using a nested multilevel model or an OLS should not essentially change the estimated parameters.

There is also a need to discuss the issue of endogeneity. When studying the influence of competition, center size and co-location on shopping center sales, there might exist reverse causality, which may have consequences on the interpretation of the empirical results. Instruments are a commonly used technique to address such a problem. The choice of instruments should be based on the assumption that the instrumental variables represent exogenous retail characteristics that have a lasting influence on competition, center size and co-location, but not on the present level of sales. Good instruments fulfilling this requirement are extremely difficult to find. Instead the selection on observables assumption is advocated, referring to the seminal work of Barnow, Cain and Goldberger (Barnow, Cain et al. 1980; Barnow, Cain et al. 1981), where the regressor of interest is assumed to be determined independently of potential outcomes after accounting for a set of observable characteristics. By including many controls in the regression, the partial effect of the variable of interest can be consistently estimated.

A final note before the results are presented concerns the dummy variable controlling for the presence of an IKEA store in the center. IKEA is only found in the external shopping center group, and the variable is therefore removed from the regressions concerning residential shopping centers and city malls.

5 Results and Analysis

From the results in table 4, we can conclude that the different groups of shopping centers show different correlations among the dependent variable, sales per square meter (GLA), and the independent variables.

The common influential values in the sample refer to the center's internal features in the form of the tenant mix. The tenant mix plays a significant role in the center performance across all groups. However, in order to easily follow the results and ultimately draw some conclusions, this section is divided into one section covering the external variables and one section discussing the internal.

5.1 External variables

The first four variables presented in table 4 concern agglomeration. In this chapter, the agglomeration effect is measured both from an external and an internal perspective. Regional size, measured as the *municipal, intra-regional, extra-regional* and *total accessibility* to population, controls for the external market potential. The coefficients of the municipal parameter are all positive and significant in three of the four center groups. It is found to be insignificant only in the case of residential area shopping centers. The largest effect on center performance is found in the case of city malls. The larger the municipality in which the center is located, the higher the sales level. In this case, a one percent increase in population generates approximately 0.24 percent higher sales per GLA, all else equal. For the external centers and the total center group, the result is more modest, with an elasticity of 0.05. The significance of these groups is in line with earlier research (Sirmans and Guidry 1993; Mejia and Eppli 2003) and confirms the positive externality brought about by agglomeration economies. The reason for the insignificance for the residential area shopping centers could be that the market area of this center group is most likely smaller than the municipality, since the clientele is found in the immediate surroundings of the center.

Both the intra-regional and extra-regional accessibility variables are found to be insignificant in all regressions, except in the external shopping centers. Here, a weak, positive correlation is found between the size of the surrounding regional market and the external centers. This enables us to say that the catchment area of the external centers is larger than for the other center types. A consumer is willing to travel outside his/her own municipality to shop at these locations.

Table 4: *Result of OLS Regression with robust error explaining the shopping center sales per GLA*

	All SC		Residential Area SC		City Mall		External SC	
	External factors							
Municipal access to population	0.060** (0.025)		0.094 (0.058)		0.243*** (0.071)		0.050* (0.036)	
Intra-regional access to population	0.015 (0.017)		0.002 (0.046)		-0.013 (0.043)		0.019* (0.021)	
Extra-regional access to population	-0.075 (0.031)		-0.041 (0.076)		-0.093 (0.062)		-0.042 (0.040)	
Total access to Population		0.071*** (0.024)		0.050 (0.061)		0.192*** (0.067)		0.045*** (0.033)
Purchasing power	0.148 (0.160)	0.201 (0.158)	0.205 (0.470)	0.095 (0.409)	0.470 (0.399)	0.107 (0.417)	0.292* (0.184)	0.318* (0.178)
Competition	0.080 (0.088)	0.123 (0.082)	-0.211 (0.234)	-0.112 (0.160)	-0.605 (0.356)	-0.262 (0.367)	0.182 (0.110)	0.154 (0.103)
Co-location	-0.065 (0.054)	-0.067 0.052	-0.023 (0.139)	-0.041 (0.135)	0.162* (0.107)	0.223** (0.107)	-0.019 (0.070)	-0.029 (0.075)
	Internal factors							
Center size	0.036 (0.033)	0.036 (0.027)	0.053 (0.071)	0.090 (0.179)	0.051 (0.053)	0.017 (0.056)	0.097*** (0.036)	0.091*** (0.032)
Product concentration		-0.176*** (0.048)		-0.367*** (0.115)		-0.151*** (0.054)		-0.159*** (0.060)
Product diversity	0.270*** (0.042)		0.365*** (0.120)		0.357*** (0.132)		0.214*** (0.044)	
Chain stores	-0.017 (0.050)	-0.018 (0.045)	0.084 (0.093)	0.128 (0.154)	0.120 (0.121)	0.033 (0.127)	-0.213 (0.081)	-0.119 (0.075)
Enclosed center	0.187*** (0.049)	0.171*** (0.055)	-0.203 (0.139)	-0.125 (0.127)	0.212 (0.403)	0.322 (0.107)	0.302*** (0.056)	0.311*** (0.063)
Center age - built	0114*** (0.030)		0.142** (0.069)		0.165* (0.093)		0.111*** (0.002)	
Center age - renovated		-0.0025 (0.026)		-0.099* (0.059)		-0.046 (0.061)		-0.003 (0.034)
IKEA	-0.079 (0.059)	-0.080 (0.106)					-0.008 (0.102)	-0.008 (0.097)
Systembolaget	0.272*** (0.059)	0.316*** (0.058)	0.386*** (0.141)	0.302*** (0.135)	0.292** (0.117)	0.424*** (0.124)	0.171** (0.086)	0.189** (0.080)
Food anchor	0.032 (0.065)	0.027 (0.062)	0.122 (0.206)	0.160 (0.180)	0.023 (0.106)	0.125 (0.117)	-0.084 (0.097)	-0.071 (0.082)
Clothes anchor	0.023 (0.696)	0.016 (0.055)	0.155 (0.145)	0.173 (0.140)	0.188* (0.107)	0.106* (0.114)	0.105 (0.082)	0.104 (0.077)
Home equipment anchor	-0.168** (0.055)	-0.182** (0.052)	-0.234* (0.197)	-0.318* (0.166)	-0.201* (0.112)	-0.172* (0.111)	-0.133** (0.066)	-0.112* (0.061)
Sport & Leisure anchor	-0.094 (0.066)	-0.059 (0.064)	-0.047 (0.180)	-0.031 (0.164)	-0.102 (0.130)	-0.087 (0.138)	-0.067 (0.090)	-0.074 (0.082)
c	8.946*** (2.137)	7.366*** (2.013)	10.126** (5.891)	11.431** (5.431)	12.905*** (5.261)	10.880*** (5.356)	7.098*** (2.470)	6.344*** (2.266)
R^2-adjusted	0.302	0.312	0.388	0.384	0.370	0.384	0.329	0.321
Number of obs.	289	289	74	74	83	83	132	132

The model is regressed in its logarithmic form; thus, all coefficients can be interpreted as elasticities.

Note: *standard errors* are stated in the brackets. *** significant at 1%, ** significant at 5% and * significant at the 10% level

The final external agglomeration variable, *total accessibility*, follows the municipal accessibility measure in its results. This variable specification captures the relevant market potential derived from the entire Swedish demand for any shopping center regardless of its location. The total accessibility measure is a catch-all variable, since it captures the effects of many scale-related attributes in the market.

Purchasing power can only be statistically verified in the case of external shopping centers. The correlation is, however, positive across all regressions. The weak relation between purchasing power and center sales per GLA could be explained by the fact that the chapter applies a one-year cross-sectional study. Because there exists a lagged relation between income and spending, if we know that our income is going to change in the future, we tend to adjust our present consumption. A time-series approach should therefore be more suitable for testing the relation between sales and income. An explanation of why external shopping centers are affected by the disposable income of the municipality could be that the stores within this center group focus on selling durable goods that are not seen as necessities. Any increase in income therefore increases expenditure in this center group.

Theory also suggests that *competition* should be a heavily influential variable and ought to be negative for shopping center sales. However, none of the regressions show any significant results for the variable chosen as a proxy for competition. Hence, in future studies, a distance matrix would be preferable for testing.

The final external variable, which is found to have a significant relation with center sales, is *co-location*. The significance of this variable is only valid for the city mall group of shopping centers. The reason for this positive relation could be that when the city malls are clustered, it gives consumers more stores to choose from in one central location and becomes a focal point in the competition with the high-street stores.

5.2 Internal variables

When instead focusing on the internal variables, we find that they have the most robust results for all the shopping centers.

Looking first at the final spatial measure, that is, *center size*, we can see a positive and significant relationship with center sales only in the case of external shopping centers. This is in line with the results found by Sirmans and Guidry (1993), Hardin and Wolverton (2001) and Shun-Te Yuo, Crosby et al. (2004) in terms of rent levels and center size. Since rent should be a reflection of sales, these earlier results lend support to this chapter's findings.

The type of anchor, the tenant variety and a higher share of (inter-) national chains are stated to affect the center positively.

In line with earlier research (Mejia and Eppli 2003; Shun-Te Yuo, Crosby et al. 2004), the tenant mix is found to be a very strong predictor for shopping center sales. The variables included in this study focusing on the tenant mix are product concentration, product diversity, share of national tenants and the type of anchor store located at the center. Tenants offering *product variety* is the single most important explanatory variable when explaining the success of a center. The greater the diversity found among the tenants, the higher the sales. The elasticity when looking at all centers clustered together reaches 0.27. Also, if the center exhibits too high levels of concentration of the same type of tenants, the center sales decrease for all center types.

From the results, it is also apparent that the type of anchor tenant located in the center affects the sales level. Earlier studies that have also found an anchor-tenant effect are Sirmans and Guidry (1993), Gatzlaff (1994), Eppli and Shilling (1996) and Des Rosiers, Thériault et al. (2005). The one anchor type that brings higher sales to all center types is the location of *Systembolaget*, the Swedish wine and alcohol monopoly. This result is interesting from a political point of view, since a government-owned company can influence center sales. Hence, choosing to locate in a specific setting can either promote or discourage the profit of private owners. Having a *clothes anchor* in a city mall is also more preferable than choosing another anchor type. The results also show that adding a *home equipment* anchor is not good for sales, since centers that have such an anchor perform worse than others. Somewhat surprisingly, no IKEA effect is found on GLA sales. If one were to instead look at the total sales figures, the results would have been different.

Earlier studies (Dennis, Marsland and Cockett, 2002) have also found that an *enclosed* center has higher sales levels due to consumers being attracted to this type of center building. This ought to really be true in the case of Sweden, where the outside climate is very unstable. The effect is tested with the use of a dummy and is found to have a positive correlation with the regressions performed on the total group of shopping centers and the external centers. Both City Malls and Residential centers in an overwhelming majority of the cases were covered units; hence, this variable exhibits very little variance, which explains its insignificance. Since the parameters can be interpreted as elasticities, we can say that an enclosed external shopping center exhibits 31 percent higher sales per square meter than an open air center.

Earlier findings (Sirmans and Guidry 1993; Hardin and Wolverton 2001; Mejia and Eppli 2003) have also found evidence that an older shopping center has lower sales levels than a newer one. This is not the case in this study. The *center age* has a positive impact on the performance of centers across the whole dataset. The interpretation of this result is that the Swedish consumer values an established center and that the older centers have been successful in keeping their market shares when new establishments enter the market. A second age variable has also been added in terms of time since *last renovated*. This variable is only found to be significant and negative for the residential shopping centers. Thus, a

less modern inside and outside environment influences sales negatively. This group may be more sensitive to the age renovation parameter because many of these centers were established during the accommodation shortage period of the 1950-60's, when the "Million Home program" was established as a policy platform. Today, many of these neighborhoods are low-income areas with a high share of immigrants. As opposed to the other center groups, residential centers in such areas have largely been neglected in terms of renewal and renovation. Additionally, other non-retail establishments, e.g., health care and municipal administration offices, are often located in this kind of center. Property owners' rent levels are based on tenant sales; hence, if a large proportion of the tenants are non-sales-(profit)-organizations, then it is likely that the incentive of the owner to improve the center environment will decrease.

6 Conclusion

This chapter has studied the determinants of shopping center performance by using a combination of center-specific and regional-specific data. The aim was to see whether it is the external factors or the internal features of the center that are most influential in determining the center's performance.

The dataset includes all[1] shopping centers in Sweden, divided into nine different categories, based on which the data are split into and assessed according to four different groups: city malls, external and residential area shopping centers and all centers. No such comparison has been found in the earlier literature. An ordinary least squares regression with robust error is used for estimation.

The regression results show that the most prominent variable types generating the most robust results and the highest elasticities belong to the tenant mix variables. Offering a high diversity of products and a low concentration of one group of retail tenants while adding specific types of anchors are factors that can explain why some shopping centers perform better than others. The size of the municipality in which the shopping center is located also plays a crucial role when trying to explain the center performance.

However, the shopping centers form a heterogeneous group of establishments, and thus, the variables that impact the performance differ between center groups. For future studies, it would therefore be beneficial to study the performance over a longer period and at a more detailed level. More observations would enable a study of each of the nine center categories individually.

To conclude this chapter, it is apparent that these results are important for developers and shopping center owners in their understanding of how to increase or influence their centers' revenue and turnover in the future. A direct

[1] See Table A2 in the appendix for an overview and limitations.

implication of the empirical findings is that retail managers should consider the size of the region when deciding to establish a shopping center. The larger the region, the higher the likelihood of performing better relative to centers located in smaller regions. Nevertheless, it is specifically the features inside the center that play the largest role when explaining the success of a center, and these features are the easiest for the center management to influence or alter. Retail managers should put great effort into forming the optimal tenant mix within the center. An optimal tenant mix implies a large variety of products or services available within the center while not having too high a concentration of one type of retailer. If the manager can also persuade the management of the Swedish Wine and Alcohol Monopoly, Systembolaget, to locate at his/her center, the probability of outperforming competitors will be large.

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Appendix

Table A1: *Product categories*

Types of store, total number of categories 40	
Department store	Shoes
Specialty grocery store	Optician
Candy store	Pet shop
Grocery store	Jeweler
Kiosk	Shoemaker
Beverages	Doctor
Florist	Nail salon
Phones	Gas station
Electronics	Amusement, e.g., cinema
Home furnishing	Hotel
Furniture	Health/gym
Crockery	Bank, exchange office
Books/culture	Travel agent
Games	Hair dresser
Toys	Café
Sport- & leisure equipment	Restaurant
Women's clothing	Fast food restaurant
Men's clothing	Pharmacy
Children clothing	Cosmetics/hygiene
Bags & accessories	Other

Based on author's own division of the data from DATSCHA into store categories.

	Type of Shopping Center	Concept	Square meters (GLA)	No of shops	No of inhabitants in market area	Type of Stores/Services	Obs No
Residential area SC	**Neighborhood Center**	Close proximity to convenience goods and personal services.	5 000 – 7 000	7-15	15 000	A smaller supermarket (anchor) combined with consumer services (dry cleaning, hair dresser, etc.) to cover basic daily necessities.	22
	Community Center	Durable and convenience goods in addition to various services. Often a presence of local-level public service facilities, e.g., library and local offices of government agencies.	7 000 –20 000	16-35	30'-60 000	One/two major supermarkets, a few national durable chains. Broader range of services than in the local center, in addition to some form of coffee or food services.	59
	City Mall	Placed in the city center	5000 GLA -> Often small structures			Various sorts of durable goods combined with some food options or convenience goods.	109
Externally located SC	**Outlet Center**	Located outside the city center and residential areas.	Average 15 000 GLA			Selling goods at discount prices	5
	Regional Mall	All retail categories Entertainment	20 000-70 000	50-80	100 000	One or more department stores, such as hypermarkets, large supermarkets, large national chains, restaurant services.	43
	Super-Regional Mall	All retail categories Entertainment	>70 000	Min 80		Several department stores, such as hypermarkets, large supermarkets, large national chains, restaurant services.	1
	Retail Park	Agglomeration of retail stores without original planning. Often placed in close proximity to another shopping center, e.g., out-of-town.	5000-70 000	5 and upwards		Number of large stores in varying sectors. The stores are grouped together with/around a common parking space.	108
	Regional Retail Park	Agglomeration of retail stores without original planning. Often placed in close proximity to another shopping center, e.g., out-of-town.	>70 000	Min 5		Number of large stores in varying sectors. The stores are grouped together with/around a common parking space.	10
	Theme Center	*Focus on entertainment*	*>5000*			*Cinema, bowling*	*1*

Table A2: *Shopping Center Descriptions*

All shopping centers with a rental area of more than 5000 square meters are included in the sample. The minimum cluster is 5 stores; hence, many superstores (e.g., ICA Maxi) are excluded from the sample. Definition from the Swedish shopping center directory, DATCHA

Table A3: *Descriptive statistics of shopping center groups*

	Min.	Max.	Mean	Std. Deviation	Min.	Max.	Mean	Std. Deviation	Min.	Max.	Mean	Std. Deviation	Min.	Max.	Mean	Std. Deviation
	All Shopping centers				City Malls				External Shopping Centers				Residential Area Shopping Centers			
SC sales/m²	5 357	164 000	35 550	17 178	5 357	107 474	36 885	18 206	8035	68 736	31 794	11 467	14 349	164 000	41 108	22 735
External factors																
Municipal access	7251	623 958	142 294	184 769	14 333	623 958	170 127	201 389	7 251	623 958	106 931	147 508	8 540	623 958	178 515	217 723
Intra-regional access	0	751 020	156 185	188 202	0.000	328 035	87 504	113 531	0.000	737 114	167 528	213 136	0.000	751 020	219 630	181 845
Extra-regional access	1.57	87 142	20 814	16 716	1.576	87 142	22 593	18 698	1.576	87 142	20 451	15 977	2 486	70 775	19 312	15 384
Total access to Population	11 951	964 523	319 293	297 358	22 373	964 523	280 226	306 831	11 951	964 523	294 911	276 222	15 566	964 523	417 457	307 075
Purchasing power	178 771	563 920	243 703	41 348	178 771	332 670	242 064	32 041	178 771	563 920	245 170	49 156	185 975	399 901	242 525	34 776
Competition	0.023	0.352	0.073	0.032	0.043	0.108	0.070	0.013	0.032	0.353	0.077	0.041	0.023	0.194	0.072	0.028
Co-location	0	1	0.35	0.447	0	1	0.459	0.501	0	1	0.347	0.478	0	1	0.198	0.401
Internal factors																
Center size	5	208	35	33	5	180	20.761	17.994	5	208	41.407	42.87	6	71	27.815	14.270
Product concentration	0.033	1	0.120	0.086	0.049	0.609	0.127	0.071	0.045	1.000	0.131	0.106	0.033	0.278	0.090	0.043
Product diversity	0.021	0.891	0.362	0.179	0.087	0.761	0.337	0.133	0.022	0.891	0.369	0.218	0.087	0.674	0.383	0.142
Chain stores	0	1	0.573	0.236	0.059	1.000	0.581	0.190	0.000	1.000	0.657	0.211	0.000	1.000	0.392	0.245
Enclosed	0	1	0.688	0.471	0	1	0.982	0.135	0	1	0.401	0.492	0	1	0.790	0.410
Center age - built	1	133	27	17	1	133	32.250	18.410	1	61	21.434	16.546	1	60	32.455	15.815
Center age - renovated	0	51	10	9	1	34	10.219	6.781	1	48	8.116	7.193	0	51	15.139	12.427
IKEA	0	1	0.050	0.218	*0*	*0*	*0.000*	*0.000*	0	1	0.108	0.311	*0*	*0*	*0.000*	*0.000*
Systembolaget	0	1	0.324	0.468	0	1	0.229	0.422	0	1	0.365	0.483	0	1	0.370	0.486
Food anchor	0	1	0.318	0.446	0	1	0.431	0.497	0	1	0.216	0.412	0	1	0.889	0.316
Cloth anchor	0	1	0.709	0.454	0	1	0.560	0.498	0	1	0.802	0.399	0	1	0.210	0.409
Home equipment anchor	0	1	0.330	0.470	0	1	0.294	0.457	0	1	0.449	0.498	0	1	0.123	0.331
Sport & Leisure anchor	0	1	0.182	0.386	0	1	0.193	0.396	0	1	0.204	0.404	0	1	0.123	0.331
No.	358				109				167				81			

Table A4: *Correlation Table*

	Sales per square meter	Municipal access	Intra-regional access	Extra-regional access	Total access to population	Purchasing power	Center size	Competition	Colocation	Diversity	Chain stores	Product categories	Covered	Center age - built	Center age - renovated	Ikea	Systembolaget
Sales per square meter	1																
Municipal access	0.293**	1															
Intra-regional access	0.200*	0.374**	1														
Extra-regional access	-0.071	0.122*	0.040	1													
Total access to population	0.291**	0.720**	0.880**	0.241**	1												
Purchasing power	0.009	0.004	-0.051	-0.060	-0.036	1											
Center size	0.038	0.067	0.113*	0.101	0.123*	0.014	1										
Competition	0.028	0.110*	-0.022	-0.004	-0.046	0.023	0.284**	1									
Colocation	-0.030	0.016	-0.125*	0.017	-0.084	-0.084	0.103	0.052	1								
Product concentration	-0.193**	-0.054	-0.170**	0.010	-0.170**	-0.041	-0.164**	0.076	0.180**	1							
Chain stores	-0.096	-0.147**	-0.248**	0.004	-0.240**	-0.014	0.237**	-0.094	0.193**	0.166**	1						
Product diversity	0.330**	0.251**	0.255**	0.023	0.324**	0.019	0.400**	0.075	-0.007	-0.738**	-0.063	1					
Covered	0.200**	0.179**	0.049	0.101	0.141**	-0.001	-0.082	0.011	0.044	-0.100	-0.088	0.317**	1				
Center age - built	0.214**	0.261**	0.162**	0.110*	0.271**	-0.032	-0.066	-0.046	0.082	-0.342**	-0.280**	0.457**	0.310**	1			
Center age - renovated	-0.060	0.065	0.091	0.143**	0.135*	0.045	-0.148*	-0.030	0.026	-0.089	-.204**	0.082	0.094	0.471**	1		
Ikea	-0.014	0.013	-0.006	0.049	-0.006	0.002	0.277**	0.139**	0.180**	-0.051	0.127*	0.116*	-0.055	-0.038	-0.058	1	
Systembolaget	0.397**	0.143**	0.199**	0.000	0.245**	-0.060	0.195**	-0.024	-0.069	-0.444**	0.110*	0.467**	0.146**	0.198**	0.019	0.114*	1

**. Correlation is significant at the 0.01 level (2-tailed). *. Correlation is significant at the 0.05 level (2-tailed).

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