



JÖNKÖPING UNIVERSITY  
*International Business School*

# Related and Unrelated Variety in Retailing

A Study on the Scale and Diversity of Local Retail Markets in  
Sweden

**MASTER Thesis**

**THESIS WITHIN:** *Economics*

**NUMBER OF CREDITS:** *30 Credits*

**PROGRAMME OF STUDY:** *Economic, Trade and Policy*

**AUTHOR:** *Faryar Farakesh*

**TUTOR:** *Özge Öner*

**JÖNKÖPING** May 2016

## **Master Thesis in Economics-Trade and Policy**

**Title:** Related and Unrelated Variety in Retailing  
A Study on the Scale and Diversity of Local Retail Markets in Sweden

**Authors:** Faryar Farakesh, 891127

**Tutor:** Özge Öner

**Date:** May 2016

**Subject Terms:** Retail variety, Related vs. Unrelated Variety, Retail Agglomeration, Performance of Retail Markets

---

### **Abstract**

This thesis aims to investigate how variety in a local retail market is related to the performance of such retail market in terms of its scale and specialization. The empirical study employs data from Swedish municipalities for the years 2002-2012 to perform fixed effects regressions in order to look into the changes in scale and specialization of the local retail market over time with an observed variety. Variety in the retail market is calculated both in terms of related and unrelated variety that tackles how related the different retailers are with respect to each other in the same local market. The results indicate that there is a positive and significant relation between the scale as well as the specialization of the retail sector and the variety in the local market. Related variety appears to have more influence on the specialization of the retail sector compared to unrelated variety.

### **Acknowledgement**

I would like to express my deepest gratitude to my supervisor, Özge Öner who has willingly provided me with useful comments, suggestions and support. Without her persistent guidance and supervision, this thesis would not have been possible. I am extremely thankful to Tina Wallin and Orsa Kekezi for their help with empirical part of my thesis. Finally, I take this opportunity to thank my parents, my sister and my friends for putting their faith in me.

## Table of Contents

|          |   |           |
|----------|---|-----------|
| <b>1</b> | <b>Introduction.....</b>  | <b>1</b>  |
| <b>2</b> | <b>Literature Review.....</b>   | <b>4</b>  |
| 2.1      | Retail Agglomeration .....  | 4         |
| 2.2      | Retail Diversity .....  | 6         |
| <b>3</b> | <b>Theoretical Background.....</b>  | <b>8</b>  |
| 3.1      | Related and Unrelated Variety .....   | 8         |
| 3.2      | Accessible Market Potential .....   | 10        |
| 3.3      | Economic Base Analysis .....  | 12        |
| 3.4      | Hypotheses .....  | 13        |
| <b>4</b> | <b>Empirical Study.....</b>   | <b>14</b> |
| 4.1      | Data and Variables .....  | 14        |
| 4.1.1    | Dependent Variables.....  | 14        |
| 4.1.2    | Explanatory Variables .....   | 15        |
| 4.1.3    | Variety Variables: .....  | 16        |
| 4.2      | Empirical Strategy .....  | 16        |
| 4.3      | Models.....   | 17        |
| <b>5</b> | <b>Results.....</b>   | <b>18</b> |
| 5.1      | Correlation Analysis.....   | 18        |
| 5.2      | Regression Results .....  | 20        |
| <b>6</b> | <b>Conclusion .....</b>   | <b>23</b> |
| <b>7</b> | <b>References .....</b>   | <b>24</b> |
|          | Appendix.....   | <b>26</b> |
|          | SIC codes.....  | 26        |
|          | Descriptive Statistics .....  | 29        |
|          | Relationship between variety and retail scale and specialization, OLS<br>regression, 2002-2012 .....                      | 29        |
|          | Relationship between related and unrelated variety and retail scale and<br>specialization, OLS regression, 2002-2012..... | 30        |

## **Tables**

|  |    |
|--|----|
| Table 1 Testable Hypothesis .....  | 13 |
| Table 2 Correlation Analysis .....   | 19 |
| Table 3 Relationship between variety and retail scale and specialization, fixed effects, 2002-2012 .....                         | 21 |
| Table 4 Relationship between related and unrelated variety and retail's scale and specialization, fixed effects, 2002-2012 ..... | 22 |

# 1 Introduction

The role of retailing in the economy is noteworthy in the today's world, where the gravity of consumption is undeniable. Most of the countries have experienced a remarkable shift in their consumption patterns due to changes in valuing the products, the concept of shopping, as well as increased digitalisation. Such changes have direct implications for consumers' behaviour. The shift in consumption patterns manifests itself in the spatial organization of retail. Today, individuals and households prefer to live in places with diverse consumption possibilities (Klaesson, Mellander, & Öner, 2012; Andersson & Klaesson, 2005; Öner, 2014; Clark & Lloyd, 2003). Glaeser et al. (2001) suggest that contemporary cities are consumption hubs, contrary to their historical importance for production. The argument is that the future of cities is dependent not only on the productivity of individuals, but also the quality of life that relates to consumer amenities (Glaeser, Kolko, & Saiz, 2001; Öner, 2015).

Clark & Lloyd (2003) interpret contemporary cities as an entertainment machine that provides a platform for attracting expert labour by enhancing their quality of life, especially with the help of diverse consumption possibilities. The retail sector is arguably one of the most important entity that can provides such consumption possibilities to inhabitants in a city and increase its attractiveness (Öner, 2015).

The specific attributes of the retailing sector bold the importance of space for these kinds of economic activities. The mutual dependency between consumers and sellers identifies the significant role of location for these economic activities. Retailing is also important for the local economy through job opportunities it provides (Öner, 2014). Despite the growing trend of on-line shopping in Sweden, the majority of the consumption still takes place in physical stores, which emphasize on the importance of location for these kinds of economic activities<sup>1</sup> (HUI Research, 2014).

The development of retail location indicates that retail stores prefer to be located in a specific location where they are close to demand and other retailers. The clustering of retail stores is observed mostly due to the increasing returns to scale, which results in cost reduction as well as the exploitation of other available externalities. The consumers' choice for shopping destinations is not limited to spatial attributes of a local retail market. It also depends on the variety of retail services that are offered by a retail cluster. Therefore, shoppers do not always patronize the closest or largest shopping centre, since they consider other factors like variety into their decisions (Golledge, Rushton, & Clark, 1966).

The accessibility to diversified products and services is also a striking factor that consumers consider in their shopping itinerary. The consumers' demand for variety is influenced by the accessibility to the local, intra-regional and extra-regional market (Johansson & Klaesson, 2011). Hence, a large body of literature in this thesis contributes to the accessible market potential in order to capture the total demand for retail services.

---

<sup>1</sup> <http://www.hui.se/en/news/e-commerce-going-strong>

Variety, however, can be related or unrelated (Boschma & Iammarino, 2009). Such division for the retail sector means that the variety offered by shops may or may not be related to each other. For example, a shoe shop is more related to a women's clothing shop than it is to a shop selling electronic goods. The relatedness and unrelatedness in measuring variety would then imply the level at which retailers operate in diverse segments of industry, as well as the interactions between different sectoral levels among these entities (Frenken K., Van Oort, Verburg, & Boschma, 2005; Wixe & Andersson, 2016).

This thesis uses the concept of related vs. unrelated variety to investigate whether related and unrelated variety have an influence on the scale and specialization of local retail market.

Diversification in retail has been one of the strategies for rebuilding retail infrastructure in some European countries, including Germany, Netherlands and France (Kacker, 1986). In the period of 1975 to 1985, European countries promoted diversification in retailing in order to benefit from market opportunities from the greater demand and to spread risks by investing on the formats which are more desirable by consumers (Trodjman, 1994). Moreover, the variety of retail and consumer services is also argued to be crucial due to the promotion of consumer's welfare (Hottman, 2016; Glaeser, Kolko, & Saiz, 2001).

A rather large body of literature on retail geography argues that consumers have a preference for multipurpose shopping trips, which enables them to reduce the search cost by purchasing different goods in a single trip (Ghosh & McLafferty, 1984; McLafferty & Gosh, 1986; Oppewal & Holoyoake, 2004). Multipurpose shopping is a prevailing shopping behaviour which is chosen by consumers with the aim of economization of transport costs by shopping for a bundle of product and services in a single trip. The other benefit of multipurpose shopping lies in the availability of diverse consumption possibilities. In such argument, multipurpose shopping is the reason why retailers of the different kind cluster in space.

Despite the fact that the significant role of variety for the formation and success of retail cluster is recognized, there is a lack of empirical studies on the matter. The link between retail agglomeration and variety requires further studying. The contribution of this thesis, therefore, is to identify the relationship between diversification in the retailing sector and its performance in terms of a local retail market's scale and specialization.

The empirical investigation employs data for 290 Swedish municipalities during 2002-2012. A series of Ordinary Least Squares (OLS) are implemented prior to a municipality-year fixed-effects analysis. The local retail market performance indicators considered in this study are the number of people employed in the retail sector, number of retail shops, as well as retail specialization. Variety of retail services is captured through two perspectives. First, following a more traditional entropy approach, the study employs Herfindahl-Hirschman index to measure overall diversification. Later, the study employs related vs. unrelated approach based on a similar entropy idea, which uses different industrial categorization aggregations to capture the relatedness among the sub-sectors of a sector (Frenken, Van Oort, & Verburg, 2007; Nilsson, 2016; Wixe & Andersson, 2016). The hypothesis is that both related and unrelated variety have influence on

the scale and specialization of a local retail cluster, but related variety should matter more. The motivation for the hypothesis is further discussed in the thesis.

The paper continues as follows. Section two gives an overview of the previous research. Section three presents the theoretical framework used in the analysis. Section four discusses the data, as well as empirical strategy and the results and discussion of the results, are presented in section five. Finally, section six concludes the thesis with some remarks.

## 2 Literature Review

*In this section, the overview of previous studies in regards to retail agglomeration and the role of diversification in retail sector are presented to motivate the study at hand.*

### 2.1 Retail Agglomeration

Agglomeration is a phenomenon that applies to almost all economic activities. Firms locate close to each other to get benefits from knowledge diffusion, increasing the return to scale and accessibility to the greater market (Krugman, 1979; Frenken K., Van Oort, Verburg, & Boschma, 2005). Agglomeration of economic activities happens as a consequence of some externalities which confutes a firm to locate close to the others. Agglomeration can be defined in two strands. Localization economies or Marshallian externalities, is the clustering of firms within the same or highly related industries in local areas while urbanization economies which refers to Jacob's externalities, define the agglomeration of different firms regardless of the industry they operate in (Fujita & Thisse, 1996). The Jacob's hypothesis is that the regional development will be achieved through the availability of a great diversity of economic activity, which applies to consumer goods and services likewise (Jacob, 1969). The greater the number of variety, the greater the innate capacity of the economy for the production of more goods and services (Beaudry & Schiffauerova, 2009)

The idea of retail agglomeration first presented by Hotelling (1929), which states that retailers selling similar products prefer to locate within a close proximity to each other in order to exploit the scale of the market. Hotelling builds his theory based on the principle of minimum differentiation for retailers selling identical or almost identical products or services. Therefore, consumers' behaviour is only influenced by the cost per unit as well as the transport cost due to the inelastic demand. There are various arguments against Hotelling's model due to the limitation that exists in propositions (Eaton & Lipsey, 1975; Devletoglou, 1965; McLafferty & Gosh, 1986). For example, McLafferty & Avijit (1986) notice that the principle of minimum differentiation which was considered as a basis of Hotelling's Model doesn't hold when the multipurpose shopping idea is taken into consideration. It is expressed that if the propensity for multipurpose shopping is high, the retail stores with similar commodities have the desire to disperse from each other in order to capture the greater market share and market power.

The new economic geography (NEG) literature, initiated by Krugman (1980) among others, provides a platform for the identification of agglomeration forces for economic activities, and sheds some light on the role of market size for the distribution of firms. In order to specify why centripetal forces are stronger in some locations, Krugman applied the monopolistic competition approach. He states that increasing returns to scale make markets imperfectly competitive. The economies of scale, product differentiation and imperfect competition were a base for this new framework. It was the first step in combining the international trade and geographical economies (Ottaviano, 2011). Krugman's model is based on monopolistic competition which goes back to Dixit-Stiglitz model. The model integrates increasing returns to scale and imperfect competition,

meaning that each individual firm produces a differentiated variety to weaken the competition while gaining from the scale of the market by a reduction in cost. New economic geography predicts that a larger market serves consumers with more diversity, which results in greater welfare because the price index is lower as a result of agglomerative forces. Agglomeration of firms has various benefits both for individuals and firms. First, it provides pooled market for individuals in a specific location and it supports the specialization in non-tradeable goods. Moreover, it improves production as a result of knowledge spill over (Krugman, 1979).

The concept of “love of variety” introduced by NEG framework, explains how gains from trade will increase by the increased preference of consumers for variety in the market. This argument is based on the fact that consumers desire to spread their consumption over a large number of varieties (Combes, Mayer, & Thisse, 2008). Venables (1996) states that under increasing returns and imperfect competition, cost and demand are forces, which stimulate firms to cluster in a specific location in order to enlarge the market and get benefits from economies of scale.

Another concept that can offer reason for the agglomeration of retail services is the concept of “multipurpose shopping”. The literature on retail geography argues that consumers have a preference for multipurpose shopping trips, which enables them to get benefits from a reduction in time and transport costs by purchasing different goods in a single trip (Ghosh & McLafferty, 1984; McLafferty & Gosh, 1986; Oppewal & Holoyoake, 2004). Kim et al. (2002) propose that in order to explain the simultaneous demand for varieties, each variety should be considered as an imperfect substitute for the other varieties.

Arentze et al. (2005) elucidate that the size and location of retail stores influence the consumers’ behaviour which explains this fact that retail agglomeration satisfies consumers’ demand for multipurpose shopping. The demand for multipurpose shopping is dependent on the location of consumers due to the transport cost (Ghosh & McLafferty, 1984). Agglomeration of retail services of different kind leads in the minimization of transport costs for consumers and provides them with more diversified products and services to choose from. Moreover, the geographical proximity facilitates the coordination and reduce uncertainty among firms due to the stimulation of interactive innovation (Boschma, 2005).

Moreover, the agglomeration of retail entities benefits firms through increasing returns to scale resulting from cost reduction as production is expanded. Retail stores with diversified commodities compete with each other in diversification and qualities while the retail stores with similar products compete in price.

## 2.2 Retail Diversity

Presumably, the integration of the distribution chain into the retail sector and acquisition activities in the 80s induced the increasing appreciation for diversification (Keep, Hollander, & Calantone, 1996). During 1975 to 1985, European countries started to promote diversification strategies in their retail sectors in order to capture benefits from a potentially greater demand. During that period, the diversification strategy mainly followed in food retailing (Trojman, 1994). In general terms, the diversification strategy would be followed by firms in order to maximize the profit and to promote efficiency in usages of resources (Montgomery, 1994).

The concept of diversification in the retailing industry is embedded in two strategies. The first strategy is market diversification which implies the expansion of retail's activities in the other geographical market for the attainment of the greater demand. The second strategy which is the main focus of this study is product diversification. Product diversification refers to the number and nature of product categories which are offered by retailers (Etgar & Rachman-moore, 2010). Product diversification became one of the main growth strategies for firms to pursue profitability (A.Hitt & E.Hoskisson, 1994). Retail diversity is also found to help retailers to lower the probability of failure (Nilsson, 2016).

Baumol & Ide (1956) argue that it is false to assume that the consumers' purchasing function is independent of variety, which is offered by shoppers. They also state that a larger variety will likely end in more sales since consumers will probably be faced with an irresistible situation for purchasing.

Etgar & Rachman-Moore (2010) draw advantages of diversity in retail services through economies of scale (due to the cost reduction as a consequence of increased production) and economies of scope (due to the usage of same services like information technology systems or marketing and logistic systems). The other benefits listed by the literature for diversification are resource flexibility as well as strategic flexibility. Furthermore, activities in diversified environments arguably stimulate accumulation of knowledge and experience, which may help retailers to become more specialised over time.

Diversification in the retail sector is vital for promoting consumers' welfare (Hottman, 2016; Glaeser, Kolko, & Saiz, 2001). The concept of "love of variety" in the NEG literature, explains in a similar way how the diversity can influence consumer's behaviour, since the utility would be influenced by the number of variety which is offered by retail sector. Kim et al. (2002) argue that large losses are incurred when consumers are confronted with decreased variety. The reduction in consumers' utility as a consequence of decreased variety is driven by the heterogeneity in preferences among them. Moreover, consumers have a desire for multipurpose shopping in order to not only reduce the transport cost but also to be provided by a large number of varieties which results in an increase in their utility. Quiegly (1998) argues that the variety encourages the concentration of economic activities which gives rise to economies of scale and promotion in consumers' utility.

It is also fruitful to set forth that there is a difference between the concept of shopping and purchasing. Shopping can be explained as a process, which can provide consumers with the information about the bundle of products whereas purchasing is the final step of this process. The size and variety of retail centres can influence the ability of consumers to enjoy this process (Öner, 2014). Arentze et al. (2005) state that the diversity of stores make shopping environment more pleasant which attracts more consumers.

## 3 Theoretical Background

### 3.1 Related and Unrelated Variety

One way that variety in the retail market can be offered is from shops that are selling related products, and that share competence and cognitive proximity at the organizational level. The effect of related and unrelated variety differs substantially (Frenken, Van Oort, & Verburg, 2007&2005; Wixe & Andersson, 2016; Nilsson, 2016). The concept of related and unrelated variety determines the level at which retailers operate in diverse segments of the same retailing industry, as well as the interactions between different level among these entities meaning that variety can be within industry or between different sectors.

Related vs. unrelated variety approach has different level of influence on industries' performance, and that should hold particularly for the retail sector. The related diversification could benefit firms in regards to economies of scope which is a rather short-term benefit. If the firms exploit this relatedness in order to create new commodities, they can capture the long-term effect as well (Markides & Williamson, 1994). Moreover, related variety enables firms to use their existing resources in new areas (Farjoun, 1994). Montgomery (1994) states that the profitability of diversification is greater in firms, which follow the diversity around their resources other than firms that diversify more broadly. Whilst, the unrelated variety can prevent a region from sector-specific shocks, because diversification spreads the risk between industries within a region (Frenken, Van Oort, & Verburg, 2007).

My empirical analysis on the role of variety in the retail market, starts with using the Herfindahl-Hirschman index. HHI-index considers the market share of the firm in relation to the industry it belongs. This concentration ratio used as a proxy of competition among firms which gives more weight to larger firms. It is calculated as sum of the squares of the market share of firms within the industry. The HHI-index vary between zero and one. When the market is divided between countless firms with relatively equal shares, the HHI- index is close to zero, whilst when there is one main firm with a large share in a market or industry that represents the monopoly alike condition, the HHI-index is close to one. The larger HHI index represents higher market power due to the decrease in diversification. In the formula (1), N denotes the total number of firms and  $S_i$  presents the market share of firm (i).

$$H = \sum_{i=1}^N S_i^2 \quad (1)$$

The traditional approach for measuring the diversity among businesses is heavily depended on the SIC definition of product class which determines the industry and specific segment at which firms or businesses operate in.

Jacquemin & Berry (1979) express that HHI-index fails in explaining how the diversification at detailed level of classification (e.g. 5-digit) can be the consequence of diversification in broader segments (e.g. 3-digit). The utilisation of entropy approach enables us to overcome this shortcoming and to obtain the correlation between different level of variety both within and across sectors. Therefore, this study considers that it is more suitable to distinguish between related and unrelated diversification with the help of entropy approach. The level of variety efficiency heavily depends on the degree of relatedness of industries and diversification strategies firms chose to follow (Boschma & Iammarino, 2009; Frenken, Van Oort, & Verburg, 2007). For instance, the proximity of a carpet shop (SIC 47531) and a furniture shop (SIC 47592) that offer relatively related products has a different influence on the overall performance of the retail cluster they are in compared to a carpet shop and a pet shop (SIC47762) which are operating in unrelated segments.

The entropy measure of diversification is more sensitive to very small firms while in Herfindahl index, the influence of small firms has been neglected (Jacquemin & Berry, 1979). Another benefit of utilisation of related and unrelated measures, is that it takes both the number of segments and the degree of variety into account (Park & Jang, 2013).

Following the traditional approach, the product diversity or in other words the degree of relatedness is maintained by the utilisation of entropy approach by using the Standard Industrial Classification (SIC) definition of the product class or economic activity. SIC codes contain 5 digit where the first 3 digit refers to an industry code and the rest 2 digit defines the different segment in a specific industry. If the first three digit of two industries are equal, they are considered as a related industry, otherwise, they are unrelated. By utilisation of entropy measurement, the related diversity can be obtained by the distribution of employment within subsectors at the lowest 5-digit SIC code level that share 3-digit class. The related diversity relates to Jacob's externalities. The unrelated diversity can be captured by the distribution of employment between 3-digit classes, which then relates more to a Marshallian externalities (Nilsson, 2016). Related diversity can be referred as a variety within the industry while unrelated diversity presents the variety between industries (Wixe & Andersson, 2016). The formulas are presented in following.

$$UV_s = - \sum_{g=1}^G P_g \ln(P_g) \quad (2)$$

$$RV_s = \sum_{g=1}^G P_g H_g \quad (3)$$

$$H_g = - \sum_{i \in S_g} \frac{P_i}{P_g} \ln \left( \frac{P_i}{P_g} \right) \quad (4)$$

In formulas above,  $G$  denotes the number of employment categories at higher level (3 digit).  $P_g$  represents the share of employment working in the same 3 digits in municipality (s). while,  $P_i$  refers to the number of employment categories at 5 digit level,  $H_g$  denotes the share of employment at 5 digit level within 3 digit level.

### 3.2 Accessible Market Potential

Accessibility to diversified products and services has been considered as the amenity and attractiveness of places which results in a greater demand (Andersson & Klaesson, 2005). The formula below comes from the study of Johansson & Klaesson (2011) and it represents the standard model of monopolistic competition in NEG framework. This formula identifies that increase in market accessibility as well as a number of variety results in a greater demand (Johansson & Klaesson, 2011).

$$X_{ir} = \delta_i G_i(A_r) P_i^{-\theta} \quad (5)$$

$X_{ir}$  represents the firm's demand for product variety where  $r$  is the supply region and  $G_i(A_r)$  defines the function of accessibility to the market.  $P_i^{-\theta}$  denotes the price with elasticity of  $\theta$ .

Lakshmanan & Hansen (1965) express that retail sector is consumer-oriented meaning that, the number of shops and establishments depends on the consumer's demand in subject to their purchasing power as well as their preferences for mobility. The preference for commuting depends heavily on the time sensitivity of commodities. The most products and services which are offered by the retail sector are highly time sensitive due to the face to face interaction in demand (Johansson & Klaesson, 2011). It means that increasing distance may result in reduction in demand for these products and services. Therefore, the geographical distance and market potential are important factors for the interaction between firms and their consumers (Nilsson, 2016). Besides the size, it is important how centrally a shop is located, since consumers have inexorable desire for nearest retails stores due to the transport cost. The proximity to the great demand is essential for the retail vitality since retailer desire to reach to thresholds of demand to

cover their costs which depend on the accessibility and size of the retail market (Johansson & Klaesson, 2011).

The location-decision of business services including retail entities are influenced by the accessibility to the local, intra-regional and extra-regional market demand (Johansson & Klaesson, 2011). The decomposition of different market sizes prevents the overlapping of market potential due to the possibility of consumers' out-flow between different markets and municipalities (Andersson & Klaesson, 2005). The size of a municipality makes a difference on the influence of each market's accessibility, for instance, a small municipality with the large intra-regional market would expect the consumers' out-flow. Since consumers have a desire to be provided with a larger range of products and services' varieties (Andersson & Klaesson, 2005). Accessibility measurements indicate the availability of shops in the local market and regions in order to capture consumption possibilities in the specific municipality as well as municipality in vicinity. Accessibility to the market potential is a useful measurement for capturing the scale of the market both within and between regions (Öner, 2014).

The empirical investigation in this paper uses an accessibility approach that measures the market potential in terms of access to population, to be used as a proxy for the total demand for retail services.

Following the study by Johansson, Klaesson & Olsson (2002) ,the total market accessibility is obtained from the formula below, where S denotes the size of market and  $S_i^M$ ,  $S_i^R$  And  $S_i^E$  represent intra-municipal market size, intra-regional market size and extra-regional market size for the specific municipality (i) respectively. Intra- regional market refers to the market accessibility to the other municipality with the same local labour market or idiomatically Functional Economic Region (FER).

$$S_i^{tot} = S_i^M + S_i^R + S_i^E \quad (6)$$

Summation of different market size accessibility cannot give appropriate measure due to the overlapping between markets which is driven as a result of competition between different municipalities in attracting consumers. Therefore, the model was modified by Johansson & Klaesson (2011) in order to allow each market to have specific and detached effects to capture the whole scale of the market accessibility. In this model, the time distance from the supply location to demand's concentration is captured.

$$S_i^{tot} = P_i e^{\{-\lambda_M t_{ii}\}} + \sum_{R-i} P_R e^{\{-\lambda_R t_{iR}\}} + \sum_{N-R} P_N e^{\{-\lambda_E t_{iE}\}} \quad (7)$$

In the modified formula, R denotes the whole FER s which exist in an economy. P denotes the population in a given municipality and t denotes the travel time between two municipalities.

$\lambda$  refers to the time distance sensitivity between two different geographic locations which varies between different market's accessibilities. The values of  $\lambda$  are based on the studies of Johansson et al. (2002) considering the commuting time between zones for Swedish municipalities.<sup>2</sup>

### 3.3 Economic Base Analysis

The economic base analysis refers to the identification of activities in a location. Economic base means that a particular sector exports goods and services outside of the economic confines of a given region or the market that provide goods and services for individuals from outside of economic boundaries (Andrews, 1953). The base industries can be considered to be wage earners of the region from a trade-flow stand point (Andrews, 1953). Location quotient (LQ) has been considered as a shortcut procedure for identifying basic activities in a given region (Leigh, 1970). LQ is used frequently by researchers in regional development and economic geography. This concept provides a tool to observe how well a specific industry is represented in a target region. If the value of LQ is less than unity, it indicates that the industry is underrepresented in the region, meaning the industry is non-specialized local activity. Otherwise, the region has more than its fair share of that specific industry. Therefore, based on the context of economic base studies, the industry is considered as a basic economic activity in that region. The concentration proxy holds the importance of specialization in the retail sector by comparing the employment in a specific municipality to national norms. For example, in Jönköping municipality, the retail's employment has 1.8% of total employment and the share of retail's employment in Sweden is 1.4% of total employment. Therefore, LQ for Jönköping municipality is greater than one (1.26), meaning that Jönköping is specialised in retail sector and has external demand. It is fruitful to mention that the LQ cannot indicate reasons behind the questions "why one specific industry is underrepresented" or "if there is any potential for improving the industry" (Miller, Gibson, & Wright, 1991).

The computation of LQ is obtained from formula (8):

$$\frac{e_i/e}{E_i/E} = \frac{\text{local employment in industry } i / \text{Total local employment}}{\text{reference area employment in industry } i / \text{Total reference area employment}} \quad (8)$$

---

<sup>2</sup>  $\lambda_M = 0.02$ ,  $\lambda_R = 0.1$ ,  $\lambda_E = 0.05$

### 3.4 Hypotheses

In order to capture the role of diversity on the retail's scale and specialization six hypothesis are investigated in this study which are in line with the previous studies and theoretical framework:

*Table 1 Testable Hypothesis*

|    |  |
|----|--|
| H1 | Variety in retailing is positively associated with the number of people employed in a local retail market  |
| H2 | Variety in retailing has positive influence on the number of shops in a local retail market  |
| H3 | Variety in retailing is positively associated with specialization (concentration) of retail sector   |
| H4 | Related and unrelated variety has a positive relationship with the number of people employed in retail sector, but the related variety has a higher influence than the unrelated variety |
| H5 | Related and unrelated variety has a positive relationship with the number of retail's shops, but the related variety has a higher influence than the unrelated variety                   |
| H6 | Related and unrelated variety are positively associated with the degree of specialization in retailing sector, where related variety matters more than unrelated variety                 |

## 4 Empirical Study

### 4.1 Data and Variables

In the empirical part of the study secondary data has been used by combining two main databases, SCB (Statistics Sweden) and rAps. rAps (denominated in the system of regional analysis and prognosis) provides a comprehensive set of information including statistics in the fields of employment, population, industry and regional economy which is provided by Regional Growth Agency (Tillväxtverket). rAps database provides a platform for analysis and forecasts for regional researchers, policymakers and the other regional actors. rAps consists of two part which are rAps-RIS that provides regional information and model system.

Three dependent variables are considered for measuring the retail's performance, which are the number of people employed in the retail sector, the number of retail shops and the retail specialization (LQ). I control for several characteristic of municipalities that may affect the retail's scale and specialization including the share of unemployment and immigrants, municipal tax, average housing price and total accessible market potential.

For the first set of regressions Herfindahl-Hirschman index has been used to measure the importance of diversity. For the second set of regressions, related and unrelated diversity measures are used. The number of observation for conducting the regressions is satisfactory (3190 observations). The regressions are extracted for eleven years from 2002-2012. Since the variety proxies and control variables are calculated as shares or in natural logarithm form, all other scale variables are log transformed in order to prevent skewness problems. The descriptive statistics table can be found in the appendix for describing the characteristics of dependent and independent variables which provides an overview of minimum and maximum values, mean values and standard deviation. The overview of SIC codes which are used in this paper is available in the appendix. The main interest of this thesis is capturing the coefficient of variety indices.

#### 4.1.1 Dependent Variables

##### Retail Employment ( $\ln Remp_{it}$ )

The number of people employed in the retail sector is extracted from the statistic of day-time population employed in the retail sector from the age of 16. The variable is converted to log and aggregate for each specific municipality.

##### Retail Shops ( $\ln RShops_{it}$ )

The number of retail shops is captured from the statistic of retail activities for every specific municipality. This variable is also converted to log and aggregate for each particular municipality. This variable and retail employment have been considered as the scale of the retail market.

### Retail Specialization ( $LQ_{it}$ )

The Retail specialization is captured by the help of location quotient. In order to obtain the location quotient for every specific municipality, the employment data in the retail sector and total employment for every municipality has been employed into formula (8) that was presented in section 3.

### 4.1.2 Explanatory Variables

#### Total Accessible Market Potential ( $ACC_{it}$ )

Total accessible market potential has been used to capture the scale of the market in a spatial continuum. This variable is adapted from Johansson et al. (2002) and Johansson and Klaesson (2011). In order to compute the total accessibility, the population data has been employed from Statistics of Sweden into the formula which was presented in section 3. After summation of all different market size including intra-municipal, intra-regional as well as extra-regional, the total accessibility measurement is transformed to its natural logarithm.

#### Share of Unemployment ( $Unemp_{it}$ )

The share of unemployment has been calculated by using the data from day-time population as well as the employment population from the age of 16. This variable can be interpreted as a proxy of labour market condition.

$$Share\ of\ Unemployment_{it} = (Population_{it} - Employment_{it}) / population_{it} \quad (9)$$

#### Share of Immigrants ( $Imm_{it}$ )

The share of immigrants has been employed with the help of statistic data of immigrant population as well as total population. The share of immigrant is obtained from dividing the immigrant population by the total population in each particular municipality.

$$Share\ of\ Immigrants_{it} = immigrants\ population_{it} / population_{it} \quad (10)$$

#### Average Housing Price ( $House\ P_{it}$ ):

The average Housing price is based on the price of dwelling building in every specific municipality which indicates the purchasing power of the people located in every particular municipality as well as the cost of establishment in every specific municipality. This variable is log transformed.

#### Municipal Tax ( $Tax_{it}$ )

The municipal tax is extracted from the Swedish statistic database which presents the local tax rate for each municipality.

### Central-Dummy:

The central-dummy variable gives the value of one to municipalities which contain the local labour market and value of zero to the other municipalities<sup>3</sup>. In the fixed effect regression, the central-dummy has been excluded as this variable reflects time-invariant municipality characteristic.

### 4.1.3 Variety Variables:

#### HHI-Index:

The HHI-index is considered as a variety proxy which has been employed based on the formula (1) by the statistics data of the number of retail shops in every particular municipality.

#### Related Variety:

Related variety defines the variety within an industry. In order to compute the related variety, the number of employees in the retail market under 5 digit and 3 digit SIC code, has been used. The formula (3) is used for capturing the related variety's value for every specific municipality.

#### Unrelated Variety:

Unrelated variety which is the variety offered by unrelated retail's entities is obtained with the help of statistics of the number of employees in the retail sector under 3 digit SIC code. The formula (2) is conducted for capturing the unrelated variety's value for every particular municipality.

## 4.2 Empirical Strategy

The panel used in empirical study consists of 290 municipalities in Sweden during 2002-2012. In order to investigate how retail's scale and specialization can change with an observed variety, two models of regressions have been used. The base regression is pooled Ordinary Least Square (OLS) regression in order to observe the relationship between retail's scale and specialization with an observed variety. Due to the shortcoming of OLS regressions in controlling for unobserved heterogeneity, in other words, to eliminate time and space invariant characteristic of municipalities, the fixed effect regression has been used in the next step which looks into the

---

<sup>3</sup> Sweden consists of 81 municipalities which contain local labour market that indicates the other 209 municipalities would be in the other category.

changes in scale and specialization over time by considering the mean value of the variables. Hence, estimated coefficients cannot be biased due to the omission of time and space invariant characteristics. In both categories of regressions, year-dummies have been used which enable us to control for shocks over time that are common for all municipalities (for example shocks due to the recessions, changes in governmental policies or business cycle effects). Likewise, I add time-specific effects into the model by adding T-1 year dummies variables (one year should be dropped in order to avoid perfect collinearity. In this paper year 2002 is dropped). Municipality-Year fixed effect regression has the advantage of controlling for all the variables that are constant over time or location but specific to each observation. This makes the estimation more trustworthy even though by adding year-dummies we decrease the degree of freedom and lower our observation but we have precise estimation in return. The fixed effect regression excludes central-dummy as this reflects time-invariant municipality characteristic.

### 4.3 Models

Hypothesis 1:

$$\ln Remp_{it} = \beta_1 + \beta_2 \ln Acc_{it} + \beta_3 Unem_{it} + \beta_4 Immi_{it} + \beta_5 Tax_{it} + \beta_6 \ln House P_{it} + \beta_7 HHI_{it} + \sum_{t=1}^T \lambda_j D_j + U_{it}$$

Hypothesis 2:

$$\ln RShops_{it} = \beta_1 + \beta_2 \ln Acc_{it} + \beta_3 Unem_{it} + \beta_4 Immi_{it} + \beta_5 Tax_{it} + \beta_6 \ln House P_{it} + \beta_7 HHI_{it} + \sum_{t=1}^T \lambda_j D_j + U_{it}$$

Hypothesis 3:

$$LQ_{it} = \beta_1 + \beta_2 \ln Acc_{it} + \beta_3 Unem_{it} + \beta_4 Immi_{it} + \beta_5 Tax_{it} + \beta_6 \ln House P_{it} + \beta_7 HHI_{it} + \sum_{t=1}^T \lambda_j D_j + U_{it}$$

Hypothesis 4:

$$\ln Remp_{it} = \beta_1 + \beta_2 \ln Acc_{it} + \beta_3 Unem_{it} + \beta_4 Immi_{it} + \beta_5 Tax_{it} + \beta_6 \ln House P_{it} + \beta_7 UV_{it} + \beta_8 RV_{it} + \sum_{t=1}^T \lambda_j D_j + U_{it}$$

Hypothesis 5:

$$\ln RShops_{it} = \beta_1 + \beta_2 \ln Acc_{it} + \beta_3 Unem_{it} + \beta_4 Immi_{it} + \beta_5 Tax_{it} + \beta_6 \ln House P_{it} + \beta_7 UV_{it} + \beta_8 RV_{it} + \sum_{t=1}^T \lambda_j D_j + U_{it}$$

Hypothesis 6:

$$LQ_{it} = \beta_1 + \beta_2 \ln Acc_{it} + \beta_3 Unem_{it} + \beta_4 Immi_{it} + \beta_5 Tax_{it} + \beta_6 \ln House P_{it} + \beta_7 UV_{it} + \beta_8 RV_{it} + \sum_{t=1}^T \lambda_j D_j + U_{it}$$

The error term consists of two components ( $U_{it} = \mu_i + v_{it}$ ). Where  $\mu_i$  denotes the cross-section specific component and  $v_{it}$  is remainder effects. It is assumed that explanatory variables are independent of the error term  $v_{it}$  (Baltagi, 2008).

In all regressions (i) represents the specific municipality and (t) represents the time period.

## **5 Results**

### **5.1 Correlation Analysis**

The bivariate correlations are presented to see whether there is any linear relation between dependent and independent variables which later used in regressions. Table 2 provides a summary of the correlations between variables. There is a high correlation (0, 96) between two dependent variables which are the number of employees in the retail sector and the number of retail shops at a 0.01 significance level. These two variables are representing the retail's performance in terms of scale, in another word, they are measuring the same things by two approaches. The high correlation (0.89, 0.85) exists between related variety and two dependent variables which are retail employment and retail shops at 0.01 significance level. There is no high correlation between explanatory variables that would jeopardize the regression set up, other than Average housing Price and total market access.

Table 2 Correlation Analysis

|                     | Retail<br>Employment | Retail<br>Shops | LQ              | Total<br>Accessibility | SH-<br>Unemployment | SH-<br>Immigrants | Tax             | Housing-Price   | Central-Dum     | HHI<br>Index    | UV             | RV       |
|---------------------|----------------------|-----------------|-----------------|------------------------|---------------------|-------------------|-----------------|-----------------|-----------------|-----------------|----------------|----------|
| Retail Employment   | <b>1</b>             |                 |                 |                        |                     |                   |                 |                 |                 |                 |                |          |
| Retail Shops        | <b>0.96***</b>       | <b>1</b>        |                 |                        |                     |                   |                 |                 |                 |                 |                |          |
| LQ                  | <b>0.65***</b>       | <b>0.53***</b>  | <b>1</b>        |                        |                     |                   |                 |                 |                 |                 |                |          |
| Total Accessibility | <b>0.52***</b>       | <b>0.55***</b>  | <b>0.14***</b>  | <b>1</b>               |                     |                   |                 |                 |                 |                 |                |          |
| Sh- Unemployment    | <b>-0.46***</b>      | <b>-0.41***</b> | <b>-0.29***</b> | <b>0.03</b>            | <b>1</b>            |                   |                 |                 |                 |                 |                |          |
| Sh- Immigrants      | <b>0.15***</b>       | <b>0.11***</b>  | <b>0.25***</b>  | <b>0.01</b>            | <b>-0.25***</b>     | <b>1</b>          |                 |                 |                 |                 |                |          |
| Tax                 | <b>-0.24***</b>      | <b>-0.26***</b> | <b>-0.11***</b> | <b>-0.50***</b>        | <b>0</b>            | <b>0.01***</b>    | <b>1</b>        |                 |                 |                 |                |          |
| Housing-Price       | <b>0.62***</b>       | <b>0.62***</b>  | <b>0.33***</b>  | <b>0.80***</b>         | <b>-0.05***</b>     | <b>0.09***</b>    | <b>-0.39***</b> | <b>1</b>        |                 |                 |                |          |
| Central-Dum         | <b>0.4***</b>        | <b>0.39***</b>  | <b>0.28***</b>  | <b>-0.26***</b>        | <b>-0.40***</b>     | <b>0.06***</b>    | <b>0.09***</b>  | <b>-0.05***</b> | <b>1</b>        |                 |                |          |
| HHI-index           | <b>-0.48***</b>      | <b>-0.49***</b> | <b>-0.25***</b> | <b>0.41***</b>         | <b>0.16***</b>      | <b>0</b>          | <b>0.24***</b>  | <b>-0.42***</b> | <b>-0.10***</b> | <b>1</b>        |                |          |
| UV                  | <b>0.67***</b>       | <b>0.60***</b>  | <b>0.42***</b>  | <b>0.36***</b>         | <b>-0.27***</b>     | <b>0.14***</b>    | <b>-0.03</b>    | <b>0.55***</b>  | <b>0.23***</b>  | <b>-0.42***</b> | <b>1</b>       |          |
| RV                  | <b>0.89***</b>       | <b>0.85***</b>  | <b>0.58***</b>  | <b>0.43***</b>         | <b>-0.42***</b>     | <b>0.12***</b>    | <b>-0.18***</b> | <b>0.52***</b>  | <b>0.39***</b>  | <b>-0.46***</b> | <b>0.61***</b> | <b>1</b> |

All scale variables are in the log form in order to avoid the skewness problem. \*\*\*  $p < 0.01$

## 5.2 Regression Results

In the base model with the Herfindahl-Hirschman index, a positive and significant relation between the number of people employed in the retail sector and variety is found at a 0,05 level of significance, which implies that variety has a positive influence on the employment's growth. Therefore, the first hypothesis which expresses on the existence of a positive and significant relation between retail's employment and diversity cannot be rejected. No relation has been found for the number of shops and variety. The specialization of retail sector also has a significant and positive relation with retail variety at the 0,01 level of significance. The result indicates that the variety gives rise to specialization in local retail markets. Quiegly (1998) states that variety stimulates the concentration of economic activities and enhances utility of consumers and firm's profitability. Therefore, the third hypothesis cannot be rejected. Total accessibility measurement is positively associated with employment as well as the number of shops in the retail industry with 0,01 level of significance. Studies by Johansson & Klaesson (2011) identify that the accessibility to the market is linked to the local demand. Therefore, based on the result, it can be concluded that demands for production inputs (employees) and production's infrastructure (shops), increase with growth in accessibilities which gives rise to the demand for consumer services. The share of unemployment has a negative effect on the retail's employment and the average housing value is positively associated with all retail's performance indicators. The results of fixed effect estimation are presenting in Table 3. The OLS regressions results can be found in the appendix.

Table 3 Relationship between variety and retail scale and specialization, fixed effects, 2002-2012

| VARIABLES              | Retail Employment<br>(Ln) | Retail<br>Shops(Ln)       | Retail<br>Specialization(Ln) |
|------------------------|---------------------------|---------------------------|------------------------------|
| HHI-Index              | <b>0.472**</b><br>(2.384) | <b>-0.349</b><br>(-0.753) | <b>0.368***</b><br>(4.025)   |
| TotalAccessibility(Ln) | 0.981***<br>(3.498)       | 1.103***<br>(6.397)       | -0.0494<br>(-0.172)          |
| Share of Unemployed    | -1.205***<br>(-2.941)     | -0.436*<br>(-1.833)       | -0.489<br>(-1.036)           |
| Share of Immigrants    | -6.572**<br>(-2.146)      | -1.029<br>(-0.916)        | -6.513**<br>(-2.113)         |
| Municipal tax          | -0.00251<br>(-0.664)      | 0.0951***<br>(4.136)      | -0.000293<br>(-0.0962)       |
| Housing Value( ln)     | 0.205***<br>(3.352)       | 0.0811***<br>(2.664)      | 0.166***<br>(2.883)          |
| Constant               | -6.171**<br>(-2.108)      | -10.83***<br>(-4.699)     | 0.489<br>(0.158)             |
| Observation            | 3190                      | 3190                      | 3190                         |
| Number of Municipality | 290                       | 290                       | 290                          |
| Year-Dummies           | Yes                       | Yes                       | Yes                          |
| R-squared              | 0.420                     | 0.434                     | 0.085                        |

Note: The variety proxy is HHI-index, T-statistics in parentheses, \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Due to the shortcoming of HHI-index in interpreting the relatedness in the retail sector, the second set of regressions employ entropy measures for related and unrelated variety. The advantage of utilization entropy measure is that we can distinguish between their impacts on the retail's scale and specialization since they may have a various level of influence. The result of regressions indicates both of these variables have a statistically significant relationship with the number of employees and specialization in the retail market.

In the first regression, related variety is associated positively and significantly with employment in the retail sector at the 0, 01 level of significance. Moreover, the result of regression detects that there is a significant relationship between unrelated variety and employment. In fact, the effect of related and unrelated variety is about the same for the scale of retailing in terms of employment, meaning both related and unrelated variety contributes to the employment growth in the local retail market. Whereas, the effect of related variety is insignificant for the scale in terms of the number of shops. A significant and positive relationship between the number of shops and unrelated variety has been found at the 0, 05 level of significance.

In the last regression where LQ as a proxy of retail specialization is dependent variable, the related and unrelated variety are positively and significantly associated with retail specialization. The coefficient of related variety is dedicated larger value to itself which illustrate that the related variety has a larger influence on the specialization of retail market.

Montgomery (1994) elucidates that the related diversity would be more desirable for firms due to utilisation of existing resources including knowledge for production of diversified goods, which results in specialization.

In comparison to the former group of regressions, The R-squared is higher in estimations with related and unrelated variety rather than estimations with HHI-index as a diversity proxy. The higher value of R-Squared illustrates that related and unrelated approach explains the variation in dependent variables better.

*Table 4 Relationship between related and unrelated variety and retail's scale and specialization, fixed effects, 2002-2012*

| VARIABLES               | Retail Employment (Ln)     | Retail Shops(Ln)           | Retail Specialization(Ln)  |
|-------------------------|----------------------------|----------------------------|----------------------------|
| Unrelated Variety       | <b>0.350***</b><br>(11.77) | <b>0.0335**</b><br>(2.439) | <b>0.209***</b><br>(6.742) |
| Related Variety         | <b>0.335***</b><br>(10.33) | <b>0.0168</b><br>(1.164)   | <b>0.280***</b><br>(8.351) |
| Total Accessibility(Ln) | 0.868***<br>(3.724)        | 1.097***<br>(6.401)        | -0.0890<br>(-0.347)        |
| Share of Unemployed     | -1.148***<br>(-3.180)      | -0.437*<br>(-1.813)        | -0.471<br>(-1.037)         |
| Share of Immigrants     | -4.657*<br>(-1.724)        | -1.044<br>(-0.941)         | -5.183*<br>(-1.880)        |
| Municipal tax           | 0.00136<br>(0.413)         | 0.0951***<br>(4.199)       | 0.00219<br>(0.882)         |
| Housing Value( ln)      | 0.130***<br>(2.756)        | 0.0748**<br>(2.450)        | 0.111**<br>(2.271)         |
| Constant                | -4.850**<br>(-1.973)       | -10.76***<br>(-4.717)      | 1.003<br>(0.360)           |
| Observation             | 3190                       | 3190                       | 3190                       |
| Number of code          | 290                        | 290                        | 290                        |
| Year-Dummies            | Yes                        | Yes                        | Yes                        |
| R-squared               | 0.541                      | 0.434                      | 0.260                      |

Note: T-statistics in parentheses, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

## 6 Conclusion

The importance of diversification in a retail market is addressed in the previous literature, but there is a lack of empirical studies that illustrates the relation between variety and the performance of the retail sector in a local market in terms of its scale and specialization. The aim of this study was to cover the shortcoming of previous literature by investigating the relation between diversity and the scale and specialization in a local retail market.

In particular, the paper examines how the scale and the degree of specialization in retail firms influenced by the types of firms in vicinity. Measures that indicate similarities between retail's entities are captured from SIC codes in 3-digit and 5-digit level based on the number of employees working in different segments. In fact, the novelty of this paper is the distinction between related variety and unrelated variety due to their different level of efficiency on the retail's performance. Scale is measured in terms of the number of people employed in this sector, as well as in terms of the number of retail shops. To capture retail specialization, LQs are used based on economic base analysis. Municipality-year fixed effects regressions are used in order to control for the inherent characteristics of municipalities that may be constant over time, which makes the result more trustworthy compared to a cross-sectional analysis. In the first step, the HHI-index has been considered as a variety indicator. The results of regressions detected a significant and positive relation between the employment and number of shops with HHI-index. The result of regressions with utilisation of related and unrelated variety approach indicates that the employment and specialization of the retail sector are positively and significantly associated with variety but the level of related variety influence is greater than unrelated variety for specialization.

In the light of previous research, findings illustrate that the influence of related diversity is greater than unrelated diversity on the retail's specialization.

In conclusion, it is axiomatic that diversification promotes retail's performance but it also plausible that relatedness among firms influences the level of this promotion. In this paper, the relatedness among retail's entities examined in regards to the similarities in their industrial classifications. Therefore, a broader conclusion can be captured by examining the other dimensions of relatedness.

## 7 References

- A.Hitt, M., & E.Hoskisson, R. (1994). A Mid-Range Theory of the Interactive Effects of International and Product Diversification on Innovation and Performance. *Journal of Management*.
- Andersson, M., & Klaesson, J. (2005). Regional Interaction and Economic Diversity-exploring the role of geographically overlapping markets for.
- Andrews, R. B. (1953). Mechanics of the Urban Economic Base: Historical Development of the Base Concept. *Land Economics*.
- Arentze, T. A., Oppewal, H., & Timmermans, H. J. (2005). A multipurpose Shopping Trip Model to Assess Retail Agglomeration Effects. *Journal of Marketing Research*.
- Baltagi, B. H. (2008). *Econometrics*.
- Baumol, W., & Ide, E. (1956). Variety in Retailing. *Management Science*.
- Beaudry, C., & Schiffauerova, A. (2009). Who's Right? Marshall or Jacob? The Localization Versus Urbanization Debate. *Research Policy*.
- Bettis, R. A. (1981). Performance Differences in Related and Unrelated Firms. *Strategic Management Journal*.
- Borenstein, M., Hedges, L. V., Higgins, J. P., & Rothstein, H. R. (2010). A basic introduction to fixed-effect and random-effects models for meta-analysis. *Research Synthesis Methods*.
- Boschma. (2005). Proximity and Innovation: A Critical Assessment. *Regional Studies*.
- Boschma, R., & Iammarino, S. (2009). Related Variety, Trade Linkage and Regional Growth in Italy. *Economic Geography*.
- Clark, T. N., & Lloyd, R. (2003). The city as an Entertainment Machine. *Research in Urban Policy*.
- Colledge, R., Ruston, G., & Clark. (1966). multipurpose shopping.
- Combes, P.-P., Mayer, T., & Thisse, J.-F. (2008). Monopolistic Competition. In P.-P. Combes, T. Mayer, & J.-F. Thisse, *Economic Geography, The Integration of Regions and Nations* (pp. 53-80).
- Devletoglou, N. E. (1965). A Dissenting View of Duopoly and Spatial Competition. *Economica*.
- Dixit, A. K., & Stiglitz, J. E. (1977). Monopolistic Competition and Optimum Product Diversity. *American Economic Association*.
- Eaton, C., & Lipsey, R. G. (1975). The Principle of Minimum Differentiation Reconsidered: Some New Developments in the Theory of Spatial Competition. *The Review of Economic Studies*.
- Einarsson, A. (2008). The Retail Sector in the Nordic Countries: A Description of the Differences, Similarities and Uniqueness in the Global Market. *Journal of Retailing and Consumer Services*.
- Etgar, M., & Rachman-moore, D. (2010). Market and Product Diversification: The Evidence from Retailing. *Journal of Marketing Channel*.
- Farjoun, M. (1994). Beyond Industry Boundaries: Human Expertise, Diversification and Resource-Related Industry Groups. *Organization Science*.
- Frenken, K., Van Oort, F. G., Verburg, T., & Boschma, R. A. (2005). Variety and Regional Economic Growth in the Netherlands. *Ministry of Economic Affairs*.
- Frenken, K., Van Oort, F., & Verburg, T. (2007). Related Variety, Unrelated Variety and Regional Economic Growth. *Regional Studies*.
- Fujita, M., & Thisse, J.-f. (1996). Economics of Agglomeration. *Journal of the Japanese and International Economies*.
- Ghosh, A., & McLafferty, S. (1984). A Model of Consumer Propensity for Multipurpose Shopping. *Geographical Analysis*.
- Glaeser, E. L., Kolko, J., & Saiz, A. (2001). Consumer City. *Journal of Economic Geography*.
- Golledge, R., Rushton, G., & Clark, W. (1966). Some Spatial Characteristics of Iowa's Dispersed Farm Population and Their Implications for the Grouping of Central Place Functions. *Economic Geography*.
- Hotelling, H. (1929). Stability in Competition. *The Economic Journal*.
- Jacob, J. (1969). *The economy of cities*. Random House.
- Jacquemin, A. P., & Berry, C. H. (1979). Entropy Measure of Diversification and Corporate Growth. *The Journal of Industrial Economics*.
- Johansson, B., & Klaesson, J. (2011). Agglomeration dynamics of business services. *The Annals of Regional Science*.

- Johansson, B., Klaesson, J., & Olsson, M. (2002). Time distances and labor market integration. *Regional Science*.
- Johansson, B., Klaesson, J., & Olsson, M. (2003). Commuters' non-linear response to time distances. *Journal of Geographical Systems*.
- Kacker, M. P. (1986). The Metamorphosis of European Retailing. *European Journal of Marketing*.
- Keep, W. W., Hollander, S. C., & Calantone, R. J. (1996). Retail Diversification in the USA, Are There Performance Benefits? *Journal of Retailing and Consumer Services*.
- Kim, J., Allenby, G. M., & Rossi, P. E. (2002). Modelling Consumer Demand for Variety. *Marketing Science*.
- Klaesson, J., Mellander, C., & Öner, Ö. (2012). In search of services in the market place. A probability of presence approach for retail services in Sweden. *Innovative Marketing*.
- Krugman, P. (1979). Increasing Returns, Monopolistic Competition and International Trade. *Journal of International Economics*.
- Krugman, P. (1980). Scale Economies, Product Differentiation and the Pattern of Trade.
- Krugman, P. (1991). Increasing Returns and Economic Geography. *Journal of Political Economy*.
- Lakshmanan, J., & Hansen, W. J. (1965). A Retail Market Potential. *Journal of the American Institute of Planners*.
- Leigh, R. (1970). The use of Location Quotient in urban economic base studies. *Land economics*.
- Markides, C. C., & Williamson, P. J. (1994). Related Diversification, Core Competence and Corporate Performance. *Strategic Management Journal*.
- McLafferty, S., & Gosh, A. (1986). Multipurpose Shopping and Location of Retail Firms. *Geographical Analysis*.
- Miller, M. M., Gibson, L. J., & Wright, N. G. (1991). Location Quotient: A Basic Tool for Economic Development Analysis. *Economic Development Review*.
- Montgomery, C. A. (1994). Corporate Diversification. *The Journal of Economic Perspectives*.
- Nilsson, P. (2016). The influence of related and unrelated industry diversity on retail firm failure. *Journal of Retailing and Consumer Services*.
- Öner, Ö. (2014). *Retail Location*.
- Öner, Ö. (2015). Retail City: The Relationship between Place Attractiveness and Accessibility to Shops. *IFN working paper*.
- Öner, Ö., & Larsson, J. P. (2013). Which retail services are co-located? *International Journal of Retail and Distribution Management*.
- Oppewal, H., & Holyoake, B. (2004). Bundling and retail agglomeration effects on shopping behavior. *Journal of Retailing and Consumer Services*.
- Ottaviano, G. I. (2011). 'New' new economic geography: firm heterogeneity. *Journal of Economic Geography*.
- Park, K., & Jang, S. (2013). Effects of Within Industry Diversification and Related Diversification Strategies on Firm Performance. *International Journal of Hospitality Management*.
- Quigley, J. M. (1998). Urban Diversity and Economic Growth. *The Journal of Economic Perspectives*.
- Research, H. (n.d.). Stockholm.
- Sjölander, S., & Oskarsson, C. (1995). Diversification: Exploiting the flow of technology, A Swedish Comparison. *International Journal of Technology Management*.
- Trodjman, A. (1994). European Retailing. *International Journal of Retail & Distribution Management*.
- Venables, A. J. (1996). Equilibrium Locations of Vertically Linked Industries. *International Economic Review*.
- Wixe, S., & Andersson, M. (2016). Which Types of Relatedness Matter in Regional Growth? Industry, Occupation and Education. *Regional Studies*.

# Appendix

## SIC codes

| SNI 2002 | Description  |
|----------|--|
| 52.111   | Retail sale in department stores and the like with food, beverages and tobacco predominating |
| 52.112   | Retail sale in other non-specialized stores with food, beverages and tobacco predominating   |
| 52.121   | Other retail sale in department stores and the like  |
| 52.129   | Retail sale in non-specialized stores n.e.c.   |
| 52.210   | Retail sale of fruit and vegetables  |
| 52.220   | Retail sale of meat and meat products  |
| 52.230   | Retail sale of fish, crustaceans and molluscs  |
| 52.241   | Retail sale of bread, cakes and flour confectionery  |
| 52.242   | Retail sale of sugar confectionery   |
| 52.250   | Retail sale of alcoholic and other beverages   |
| 52.260   | Retail sale of tobacco products  |
| 52.271   | Retail sale of health foods  |
| 52.279   | Retail sale of food in specialized stores n.e.c.   |
| 52.279   | Retail sale of food in specialized stores n.e.c.   |
| 52.310   | Dispensing chemists  |
| 52.320   | Retail sale of medical and orthopaedic goods   |
| 52.330   | Retail sale of cosmetic and toilet articles  |
| 52.410   | Retail sale of textiles  |
| 52.421   | Retail sale of men's, women's and children's clothing, mixed                                 |
| 52.422   | Retail sale of men's clothing  |
| 52.423   | Retail sale of women's clothing  |
| 52.424   | Retail sale of children's clothing   |
| 52.425   | Retail sale of furs  |
| 52.431   | Retail sale of footwear  |
| 52.432   | Retail sale of leather goods   |
| 52.441   | Retail sale of furniture   |
| 52.442   | Retail sale of home furnishing textiles  |
| 52.443   | Retail sale of glassware, china and kitchenware  |
| 52.444   | Retail sale of lighting equipment  |
| 52.451   | Retail sale of electrical household appliances   |
| 52.452   | Retail sale of radio and television sets   |
| 52.453   | Retail sale of gramophone records, tapes, CDs, DVDs and video tapes                          |
| 52.454   | Retail sale of musical instruments and music scores  |
| 52.461   | Retail sale of hardware, plumbing and building materials                                     |
| 52.461   | Retail sale of hardware, plumbing and building materials                                     |
| 52.462   | Retail sale of paint   |
| 52.471   | Retail sale of books and stationery  |
| 52.471   | Retail sale of books and stationery  |
| 52.471   | Retail sale of books and stationery  |
| 52.472   | Retail sale of newspapers and magazines  |
| 52.481   | Retail sale of spectacles and other optical goods  |

|        |  |
|--------|--|
| 52.482 | Retail sale of photographic equipment, and related services        |
| 52.483 | Retail sale of watches and clocks                                  |
| 52.484 | Retail sale of jewellery, gold wares and silverware                |
| 52.485 | Retail sale of sports and leisure goods                            |
| 52.485 | Retail sale of sports and leisure goods                            |
| 52.486 | Retail sale of games and toys                                      |
| 52.486 | Retail sale of games and toys                                      |
| 52.487 | Retail sale of flowers and other plants                            |
| 52.488 | Retail sale of pet animals   |
| 52.491 | Retail sale of art; art gallery activities                         |
| 52.492 | Retail sale of coins and stamps                                    |
| 52.493 | Retail sale of computers, office machinery and computer programmes |
| 52.494 | Retail sale of telecommunication equipment                         |
| 52.495 | Retail sale of wallpaper, carpets, rugs and floor coverings        |
| 52.496 | Retail sale of boats and boating accessories                       |
| 52.497 | Retail sale of office furniture                                    |
| 52.499 | Retail sale in specialized stores n.e.c.                           |
| 52.501 | Retail sale of antiques and second-hand books                      |
| 52.509 | Retail sale of other second-hand goods in stores                   |

| SNI20<br>07 | Description   |
|-------------|---|
| 47.111      | Retail sale in department stores and the like with food, beverages or tobacco predominating |
| 47.112      | Retail sale in other non-specialised stores with food, beverages or tobacco predominating   |
| 47.191      | Other retail sale in department stores and the like   |
| 47.199      | Other retail sale in non-specialised stores n.e.c.  |
| 47.210      | Retail sale of fruit and vegetables in specialised stores                                   |
| 47.220      | Retail sale of meat and meat products in specialised stores                                 |
| 47.230      | Retail sale of fish, crustaceans and molluscs in specialised stores                         |
| 47.241      | Retail sale of bread, cakes and flour confectionery in specialised stores                   |
| 47.242      | Retail sale of sugar confectionery in specialised stores                                    |
| 47.250      | Retail sale of beverages in specialised stores  |
| 47.260      | Retail sale of tobacco products in specialised stores                                       |
| 47.291      | Retail sale of health foods in specialised stores   |
| 47.210      | Retail sale of fruit and vegetables in specialised stores                                   |
| 47.299      | Other retail sale of food in specialised stores n.e.c.                                      |
| 47.730      | Dispensing chemist  |
| 47.740      | Retail sale of medical and orthopaedic goods in specialised stores                          |
| 47.750      | Retail sale of cosmetic and toilet articles in specialised stores                           |
| 47.510      | Retail sale of textiles in specialised stores   |
| 47.711      | Retail sale of men's, women's and children's clothing in specialised stores                 |
| 47.712      | Retail sale of men's clothing in specialised stores   |
| 47.713      | Retail sale of women's clothing in specialised stores                                       |
| 47.714      | Retail sale of children's clothing in specialised stores                                    |
| 47.715      | Retail sale of furs in specialised stores   |
| 47.721      | Retail sale of footwear in specialised stores   |
| 47.722      | Retail sale of leather goods in specialised stores  |

|        |   |
|--------|---|
| 47.591 | Retail sale of home furniture in specialised stores   |
| 47.532 | Retail sale of home furnishing textiles in specialised stores   |
| 47.593 | Retail sale of glassware, china and kitchenware in specialised stores                                 |
| 47.594 | Retail sale of electrical fittings in specialised stores  |
| 47.540 | Retail sale of electrical household appliances in specialised stores                                  |
| 47.430 | Retail sale of audio and video equipment in specialised stores  |
| 47.630 | Retail sale of music and video recordings in specialised stores                                       |
| 47.595 | Retail sale of musical instruments and music scores in specialised stores                             |
| 47.521 | Retail sale of wood and other building materials in specialised stores                                |
| 47.522 | Retail sale of plumbing and heating equipment in specialised stores                                   |
| 47.523 | Retail sale of paints in specialised stores   |
| 47.610 | Retail sale of books in specialised stores  |
| 47.622 | Retail sale of stationery in specialised stores   |
| 47.789 | Other retail sale in specialised stores n.e.c.  |
| 47.621 | Retail sale of newspapers in specialised stores   |
| 47.781 | Retail sale of spectacles and other optical goods except photographic equipment in specialised stores |
| 47.782 | Retail sale of photographic equipment in specialised stores   |
| 47.771 | Retail sale of watches and clocks in specialised stores   |
| 47.772 | Retail sale of jewellery in specialised stores  |
| 47.641 | Retail sale of sporting equipment except bicycles in specialised stores                               |
| 47.642 | Retail sale of bicycles in specialised stores   |
| 47.410 | Retail sale of computers, peripheral units and software in specialised stores                         |
| 47.650 | Retail sale of games and toys in specialised stores   |
| 47.761 | Retail sale of flowers, plants, seeds and fertilisers in specialised stores                           |
| 47.762 | Retail sale of pet animals and pet food in specialised stores   |
| 47.783 | Retail sale of art in specialised stores; art gallery activities                                      |
| 47.784 | Retail sale of coins and stamps in specialised stores   |
| 47.410 | Retail sale of computers, peripheral units and software in specialised stores                         |
| 47.420 | Retail sale of telecommunications equipment in specialised stores                                     |
| 47.531 | Retail sale of carpets, rugs, wall and floor coverings in specialised stores                          |
| 47.643 | Retail sale of boats and boating accessories in specialised stores                                    |
| 47.592 | Retail sale of office furniture in specialised stores   |
| 47.789 | Other retail sale in specialised stores n.e.c.  |
| 47.791 | Retail sale of antiques and second-hand books in stores   |
| 47.792 | Retail sale of other second-hand goods in stores  |

## Descriptive Statistics

| <i>Variable</i>              | <i>Obs.</i> | <i>Mean</i> | <i>Std.Deviation</i> | <i>Min</i> | <i>Max</i> |
|------------------------------|-------------|-------------|----------------------|------------|------------|
| <i>Retail Employment</i>     | 3190        | 749,03      | 2123,85              | 0,00       | 33472,00   |
| <i>Retail Shops</i>          | 3190        | 190,45      | 429,85               | 0,00       | 6309,00    |
| <i>Retail Concentration</i>  | 3190        | 0,76        | 0,42                 | 0,00       | 4,99       |
| <i>Total Accessibility</i>   | 3190        | 125505,90   | 153104,00            | 3237,56    | 947300,80  |
| <i>Share of unemployment</i> | 3190        | 0,59        | 0,09                 | -0,12      | 0,82       |
| <i>Share of immigrants</i>   | 3190        | 0,01        | 0,42                 | 0,00       | 0,04       |
| <i>Municipal Tax</i>         | 3190        | 31,91       | 1,20                 | 0,00       | 34,32      |
| <i>Housing Price</i>         | 3190        | 1230,82     | 954,64               | 216,00     | 7061,00    |
| <i>HHI-index</i>             | 3190        | 0,06        | 0,03                 | 0,00       | 0,62       |
| <i>Unrelated Variety</i>     | 3190        | 0,86        | 0,40                 | 0,00       | 1,67       |
| <i>Related Variety</i>       | 3190        | 0,72        | 0,63                 | 0,00       | 2,21       |

## Relationship between variety and retail scale and specialization, OLS regression, 2002-2012

| VARIABLES               | Retail Employment(Ln)        | Retail Shops(Ln)             | Retail Specialization(Ln)    |
|-------------------------|------------------------------|------------------------------|------------------------------|
| HHI-Index               | <b>-6.524***</b><br>(-13.22) | <b>-5.151***</b><br>(-14.37) | <b>-1.850***</b><br>(-7.241) |
| Total Accessibility(Ln) | 0.403***<br>(17.40)          | 0.327***<br>(19.46)          | -0.136***<br>(-11.33)        |
| Share of Unemployed     | -3.723***<br>(-25.05)        | -2.226***<br>(-20.63)        | -0.620***<br>(-8.055)        |
| Share of Immigrants     | 14.04***<br>(5.094)          | 7.326***<br>(3.662)          | 18.73***<br>(13.13)          |
| Municipal tax           | 0.0906***<br>(7.313)         | 0.0892***<br>(9.915)         | -0.00116<br>(-0.181)         |
| Housing Value( ln)      | 0.712***<br>(19.86)          | 0.503***<br>(19.34)          | 0.368***<br>(19.86)          |
| Central Dummy           | 1.081***<br>(33.28)          | 0.815***<br>(34.55)          | 0.129***<br>(7.664)          |
| Constant                | -4.414***<br>(-8.725)        | -3.649***<br>(-9.938)        | 0.187<br>(0.715)             |
| Observations            | 3190                         | 3190                         | 3190                         |
| Year-Dummies            | Yes                          | Yes                          | Yes                          |
| R-squared               | 0.725                        | 0.721                        | 0.302                        |

Note: T-statistics in parentheses, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

## Relationship between related and unrelated variety and retail scale and specialization, OLS regression, 2002-2012

| VARIABLES               | Retail Employment (Ln)     | Retail Shops(Ln)           | Retail Specialization(Ln)  |
|-------------------------|----------------------------|----------------------------|----------------------------|
| Unrelated Variety       | <b>0.715***</b><br>(23.09) | <b>0.476***</b><br>(18.18) | <b>0.172***</b><br>(7.412) |
| Related Variety         | <b>1.156***</b><br>(57.90) | <b>0.758***</b><br>(44.86) | <b>0.374***</b><br>(24.93) |
| Total Accessibility(Ln) | 0.156***<br>(10.83)        | 0.172***<br>(14.13)        | -0.214***<br>(-19.77)      |
| Share of Unemployed     | -1.584***<br>(-16.70)      | -0.848***<br>(-10.57)      | 0.0408<br>(0.573)          |
| Share of Immigrants     | 11.67***<br>(6.980)        | 5.456***<br>(3.855)        | 17.92***<br>(14.27)        |
| Municipal tax           | 0.0318***<br>(4.208)       | 0.0493***<br>(7.725)       | -0.0187***<br>(-3.301)     |
| Housing Value( ln)      | 0.324***<br>(14.40)        | 0.252***<br>(13.24)        | 0.253***<br>(14.94)        |
| Central Dummy           | 0.347***<br>(15.64)        | 0.340***<br>(18.12)        | -0.0993***<br>(-5.967)     |
| Constant                | 0.446<br>(1.422)           | -0.566**<br>(-2.132)       | 1.683***<br>(7.144)        |
| Observations            | 3190                       | 3190                       | 3190                       |
| Year-Dummies            | Yes                        | Yes                        | Yes                        |
| R-squared               | 0.899                      | 0.860                      | 0.458                      |

Note: T-statistics in parentheses, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1