



**UNIVERSITY OF GOTHENBURG**  
**SCHOOL OF BUSINESS, ECONOMICS AND LAW**

Master Degree Project in Economics

## **Competition in the Swedish Grocery Market**

An empirical study using the Boone-indicator

Emelie Erdeljac

Supervisor: Johan Stennek  
Master Degree Project No. 2014:65  
Graduate School

## Abstract

Boone (2008) proposed a new way of measuring competition based on relative profit differences. This way of measuring competition has theoretical superior properties than other common measures of competition used today. In this paper Boone's way of measuring competition has been carried out on the Swedish grocery market where separate local markets have been defined on a municipality level. The Boone-indicator has been estimated for 284 of the 290 municipalities in Sweden between 2004 and 2013. Results suggest that the average level of competition is similar in all population size municipalities where the highest level of competition was observed in municipalities with an average population between 20,124 and 48,408. The lowest competition on average was observed in municipalities with an average population size greater than 48,408. In small size municipalities with less than 20,124 citizens on average, the Boone-indicators vary more. Contradictory to our expectations, the analysis suggest that high population density is in general associated with slightly lower levels of competition where high population densities are mainly associated with greater population size municipalities. Results support that factors affecting competition may be specific to the local markets and the variation in the level of competition observed for municipalities of similar character could not be fully explained by the current analysis. Future research should incorporate analysis of the distance between stores and its' effect on competition as results may point to this as an important factor in explaining variation in competition.

## Acknowledgement

*I would like to express my gratitude to my supervisor Johan Stennek for his useful comments, remarks and engagement through the writing process of this master thesis. Furthermore I would like to thank Florin Maican for helping me with my model specification. I am thankful to my dear friend and classmate Sebastian Larsson for his encouragement and support throughout the process of writing this paper. My deepest gratitude goes out to my friends and family for their inexhaustible love and support, I am blessed to have you in my life. A special thanks goes out to my stepfather Mikael Holmström for always taking his time to listen and help guide me with my choices in life, thank you for believing in me.*

*Lastly, I would like to thank the most important person in my life, my sister. Nathalie, you are my rock when the light in the end of the tunnel is an oncoming train.*

*Thank you.*

*Emelie Erdeljac*

## Table of Contents

<b>Introduction</b> .....	6
<b>Literature review</b> .....	8
<b>Competition measures and their shortcomings</b> .....	8
<b>Overview of the grocery market industry in Sweden</b> .....	10
<b>Theoretical analysis</b> .....	13
<b>The Boone-indicator</b> .....	13
<b>Defining geographic markets</b> .....	14
<b>Empirical model estimation</b> .....	14
<b>Empirical analysis</b> .....	15
<b>Data and Variables</b> .....	15
<b>Results</b> .....	17
<b>The distribution of the Boone-indicator</b> .....	17
<b>The Boone-indicator and population size</b> .....	19
<b>The Boone-indicator and population density</b> .....	21
<b>The impact of distance on the Boone-indicator</b> .....	24
<b>The Boone-indicator and number of stores</b> .....	26
<b>Fraction of total population with access to grocery store</b> .....	28
<b>Fraction of population in urban areas with access to grocery store</b> .....	29
<b>Fraction of population outside urban areas with access to grocery store</b> .....	30
<b>Summary of results</b> .....	31
<b>Discussion and suggestions for future research</b> .....	32
<b>Conclusion</b> .....	34
<b>References</b> .....	36
<b>Appendix 1: The Boone-indicators</b> .....	37
<b>Appendix 2: Outliers</b> .....	44
<b>Positive Boone outliers</b> .....	44
<b>Negative Boone outliers</b> .....	45
<b>Municipalities with outlying negative Boone-indicator during half the sample period or more</b> .....	47
<b>Appendix 3: Municipalities with normal Boone-indicators</b> .....	48
<b>Appendix 4: The Boone-indicator and population density</b> .....	54
<b>By population density quartiles</b> .....	54
<b>Appendix 5: The Boone-indicator and the impact of distance</b> .....	55
<b>Fraction of total population with access to grocery store</b> .....	55
<b>Fraction of population in urban areas with access to grocery store</b> .....	56
<b>Fraction of population outside urban areas with access to grocery store</b> .....	57

## List of Tables

Figure 1 - Histogram of distribution of Boone-estimates .....	18
Figure 2 - Boone-indicator and population .....	20
Figure 3 - Boone-indicator and population density .....	21
Figure 4 - Boone-indicator and population density .....	22
Figure 5 - The Boone-indicator and population density weighted by population size .....	23
Figure 6 - The Boone-indicator and population density for different population sizes.....	24
Figure 7 - The Boone-indicator and number of stores .....	28
Figure 8 - The Boone-indicator and number of stores (less than 100).....	28
Figure 9 - The Boone indicator and access to grocery store .....	29
Figure 10 - The Boone-indicator and access to grocery store (urban areas) .....	30
Figure 11 - The Boone-indicator and access to grocery store (outside urban areas) .....	31

## Introduction

Researchers such as Schiersch and Schmidt-Ehmcke (2010) point out that the study of competition suffers from lack of robust measures of the competitive environment in markets due to scarcity of data and poor indicators. This problem is further acknowledged by researchers such as Amir, 2003; Bulow and Klemperer, 1999; Rosenthal, 1980; and Stiglitz, 1989, who show that one of the most widely used measures of competition, the price-cost margin (PCM), have theoretical shortcomings as competition increases. Boone, Harrison and Griffith (2005) discuss the same problem for another widely used measure of competition, the Herfindahl-index (HHI). They argue that the weakness in the traditional measures such as PCM and HHI lies in that they fail to consider the output reallocation effect of increasing competition. As an alternative measure of competition Boone (2008) proposes a method that relies on the concept of relative profit differences. The approach is based on the notion that as competition increases the profits of more efficient firms will be greater relative to less efficient firms due to the output reallocation effect that reallocates output from less efficient firms to more efficient firms as competition increases. This means that as competition increases, sales of more efficient firms will increase more relative to less efficient firms and thereby their profits. Thus, comparing the relative profits between firms that differ in efficiency will reveal information about the competitive climate within the industry studied. In this paper, Boone's way of measuring competition has been carried out on the Swedish grocery market. Unlike previous empirical studies assessing Boone's way of measuring competition, the measure in this study has been estimated for the municipalities in Sweden where each municipality is defined as a separate local market. The purpose of the study is to examine whether the level of competition in the Swedish grocery market differs across the country and if so, evaluate where and why these differences occur. The purpose will help in understanding what affects competition in the Swedish grocery industry e.g. if there are some general features that can be pinned down to as affecting the level of competition in the industry or, if the features affecting competition in the industry are particular to certain markets or certain kind of markets. Results suggest that the average level of competition is similar in all population size municipalities where the highest level of competition was observed in municipalities with an average population between 20,124 and 48,408. The lowest competition on average was observed in municipalities with an average population size greater than 48,408. In small size municipalities with less than 20,124 citizens on average, the Boone-indicators vary more. The analysis suggest that high

population density is in general associated with slightly lower levels of competition where high population densities are mainly associated with greater population size municipalities. Results support that factors affecting competition may be specific to the local markets and the variation in the level of competition observed for municipalities of similar character could not be fully explained by the current analysis. Future research should incorporate analysis of the distance between stores and its' effect on competition as results may point to this as an important factor in explaining variation in competition.

## Literature review

### Competition measures and their shortcomings

Common measures of competition include market shares, concentration indices, the Herfindahl-index (HHI), and the price-cost margin (PCM). The price cost margin is typically defined as price less marginal cost divided by the price and measures to what extent companies are able to charge a price above the marginal cost of the product. It is thus a measure of market power where the higher the PCM the higher the market power of the company. The Herfindahl-index is another measure of market power as it involves calculating the sum of squares of the market shares in the market. As have been discussed by aforementioned researchers these measures have theoretical shortcomings as competition increases.

The PCM is supposed to decrease as a result of increased competition, however, more efficient firms may have higher PCM where they skim off part of the profits originating from their efficiency lead thus the increase in their market share as competition increases may raise the industry's average PCM. The Herfindahl-index is also supposed to decrease as competition increases, yet if the output reallocation effect is assumed to hold, the HHI might increase as competition increases. The notion of the output reallocation effect is that as competition increases, output of more efficient firms increases (which had higher levels of output to start with) relative to less efficient firms. Thus, as the market share for the more efficient firms increases, HHI rises as well. Therefore, these common measures are not particularly robust from a theoretical point of view as they can incorrectly demonstrate the competitive climate in an economy.

Boone in his article in 2008 develops a new way to measure competition based on the notion of relative profit differences. The idea is that firms are punished more harshly for being inefficient as competition increases. In comparing the relative profits of companies that differ in efficiency as competition increases, one can establish a picture of the competitive climate in an economy. According to this notion, as competition increases the relative profits of the more efficient firm will increase in comparison to the less efficient firm, or, if the more efficient firm's profit fall, they will fall by less than the less efficient firm's.



Although this way of measuring competition proposed by Boone (2008) seems to have theoretical properties that are more robust than the traditional measures, there are only a few empirical studies done using the Boone-indicator. Among the first ones to assess an empirical study on the Boone-indicator is Leuvensteijn (2008) who compares the Boone-indicator and the elasticity-adjusted Lerner index (an improved measure of the PCM) in identifying regimes of price wars from non-price wars for the American sugar industry between 1890-1914. He use data for one firm namely the American Sugar Refining Company (ASRC) where he estimates the relationship between profits and marginal costs for this firm in different time periods. In his study he concludes that the Boone-indicator is better able to identify the different regimes of competition than the elasticity-adjusted Lerner index.

Boone, Griffith and Harrison (2005) perform simulations and use accounting data on UK pharmaceutical and supermarket firms on the industry level in order to investigate the relationship between the Boone-indicator and traditional measures of competition. They find that the Boone-indicator performs well in the simulations and that concentration-based measures perform worst. They also find that the PCM and the Boone-indicator are generally correlated with each other while the Herfindahl-index is generally uncorrelated with either measure except for in the supermarket industry. However, they only obtain significant results for the supermarket industry in two of the fifteen years for which they have estimated the Boone-indicator.

Another interesting study was done by Schiersch and Schmidt-Ehmcke (2010) who test the Boone-indicator's empirical validity using cartel cases and plant level data that is merged to firm level data for German manufacturing enterprises. In contrast to the mentioned studies they find that the traditional way of estimating the Boone-indicator fails to correctly indicate competition. This is due to that the model as it is initially specified does not take into consideration the firm size. They explain that under the model's assumptions the most efficient firm must become the largest one in terms of market share and consequently it must make the greatest profit. However, in reality there can be small firms that are really efficient and larger companies which are not as efficient but that make greater profits because of the larger size. Thus, they propose an augmented approach correcting for firm size, which then correctly indicates competition.

In this research paper Boone's idea will be applied to the Swedish grocery market where firm level data for individual firms will be used to estimate the Boone-indicator.

Rather than looking at the competition on the industry level, this study will look at the competition on the firm level by defining separate local markets for which the indicator will be estimated. At least for Sweden, competition in the grocery market tends to be local rather than on a national level. Estimating the Boone-indicator on a national and thereby wholesale level for different grocery chains will therefore make little sense in obtaining an overview of the competitive climate. Moreover, it may be the case that the grocery chains are involved in other businesses not directly related to the grocery industry. In this case, accounting data on the wholesale level for the chains will include figures not only related to the grocery industry but also on other industries in which it operates.

### **Overview of the grocery market industry in Sweden**

There are mainly six grocery chains present in Sweden namely ICA, Coop, Axfood, Bergendahls, Lidl and Netto. Together they account for 96 per cent of the market share of the Swedish grocery market where ICA is having the largest market share amounting to around 50 per cent (Jørgensen, 2011). According to a study made in 2011 for the Swedish Competition Authority, the market concentration on the Swedish grocery market has an average Herfindahl-index of 0,55 in the cities which is above that of the European average which is 0,32 for cities in 20 European countries (Konkurrensverket, 2009).

Thus, from a European perspective it means that the market concentration for the grocery industry in Sweden is high. Except from Lidl, none of the greater international grocery chains have established their operations in Sweden. One reason for this may be the Swedish national regulations, which makes it harder for international firms to establish their operations in Sweden thereby obstructing competition from foreign chains (Konkurrensverket, 2009). By Sweden having a small population and low population density may also be a reason for the absence of foreign chains (Jørgensen, 2011).

Another study by Konkurrensverket (2011) also concludes that the concentration of grocery chains is high in Sweden. This in turn implies that the grocery chains have high market power towards consumers. Moreover, the price level of groceries in Sweden is local which means that prices on the same product may differ from market to market and store to store even though the product is sold in stores that belong to the same chain. Due to this it is hard for consumers

to compare the price level of different products and are thus unable to get an overview of the price level for a product for the different chains. This in turn puts the consumers at a disadvantage as they are hampered to take advantage of cost differences between the grocery chains.

However, despite these characteristics, which could imply that the competition in the Swedish grocery industry may be low and that the grocery chains have high market power over consumers, Konkurrensverket (2011) conclude that the competitive situation is not worse in Sweden than in other European countries, although it could be improved. They further state that fierce local competition may lead to lower prices while if it is low, it may lead to higher prices. They also observe that the margins between costs and prices are not higher in Sweden than the rest of Europe and the same is observed for the overall price level. Thus, the competition seems to work better than what the high market concentration implies (Konkurrensverket, 2011).

Although it is recognised that the concentration is high and that competition is on a local level in the Swedish market for groceries, an overview of the competitive climate on the different local markets have not been established. Establishing such an overview makes it possible to compare if the competition differs across local markets and if so, it incites examination on why such differences are observed. It is not straightforward in what way competition may or may not differ between local markets of different sizes. On one hand, one may suspect that competition is fiercer in local markets that have a greater population size since there are simply more room for potential operators which puts pressure on firms to operate efficiently in order to gain as much as possible of the market share. On the other hand, smaller municipalities may only have room for a restricted number of operators, which puts pressure on firms to operate efficiently in order to sustain profitable. It is also possible that firms in smaller markets do not have incentives to behave as efficiently as possible due to fewer operators and less potential entrants. Thus, estimating the Boone-indicator for the local markets may give us an idea of how the competition works in that particular market.

The Boone-indicator can not only serve as a complement to other measures of competition, one can also use the indicator in order to relate certain events on the market that may have had an impact on the level of competition. For example, since the indicator shows the development of competition over time we can observe if certain market shocks such as the

financial crisis in 2008, which affected the operations of businesses in many industries around the world, had an impact on the level of competition in the Swedish grocery market.

## Theoretical analysis

### The Boone-indicator

Boone's measure relies on the output reallocation effect, which states that as competition intensifies the profits of a more efficient firm increases relative to a less efficient firm. Thus, the Boone-indicator involves comparing relative profits of firms that differ in efficiency. One way to implement the measure is therefore to estimate the relation between relative profits and marginal costs (marginal costs being a measure of the firm's efficiency level). Following Boone, Griffith and Harrison (2005) this is most easily done by a regression of the following form:

$$\Pi_i = \alpha + \beta MC_i + \varepsilon_i$$

In the above equation  $\beta$  captures the difference (or change) in profits over the difference (or change) in marginal costs. However, marginal costs are generally not observable. Instead, one can approximate a firm's efficiency by dividing variable costs by revenues in order to obtain an estimate of the average variable costs as efficiency measure in the following way:

$$\Pi_i = \alpha + \beta AVC_i + \varepsilon_i$$

Here, profits are revenues minus labour costs and intermediates,  $\Pi_i = (y_i - TVC_i)_i$ , and average variable costs are labour costs and intermediates divided by revenues,  $AVC_i = TVC_i/y_i$ , giving:

$$(y_i - TVC_i)_i = \alpha + \beta \left( \frac{TVC_i}{y_i} \right)_i + \varepsilon_i$$

As in Schiersch and Schmidt-Ehmcke's (2010) study, one may also assess firms' efficiency by estimating labour productivity defined as gross value added per employee (VA/employee), or, sales per employee (sales/employee) as efficiency index. However, the data used for this study does not contain information on temporary workers and for how long they stayed in the company and may thus be poor indicators of the true efficiency level of the firm. Therefore, average variable costs will be used for estimating efficiency in this study. The Boone-indicator is estimated by the  $\beta$  coefficient which measures to what extent less efficient firms are punished with lower relative profits. We expect the coefficient to take a negative value i.e. that increases in costs reduces profit. One interprets the coefficient the following way: a  $\beta$  of -2 means that a firm with one point higher variable costs than another more efficient firm would have 2 points lower profits than the more efficient firm. The measure as such does not

tell how intense competition is but is merely a measure of the evolution of competition when estimated for a time period i.e. when the indicator is estimated annually for the same market over a period of time, one is able to identify if the competition has increased or decreased from a year to another by comparing the  $\beta$ . However, since the main idea of the Boone-indicator is that the effect of efficiency on profitability is stronger in more competitive markets, the greater the value of  $\beta$  the more competitive is the particular market. Thus, in comparing  $\beta$  for different geographical markets in the Swedish grocery industry one can compare if the competition is stronger or weaker in the respective markets.

### **Defining geographic markets**

Municipalities will represent the relevant economic markets on which the study will be carried out. This is due to that consumers to a great extent buy their groceries in stores close to where they live which means that the competition is the greatest between the adjacent stores thus, the local situation determines how well the competition works (Jørgensen, 2011). It would be optimal to be able to define an isolated area in which consumers mainly do their grocery shopping. This is since if the municipality is located close to another municipality with similar characteristics, it is harder to restrict the competition since the stores within the municipality may not only compete with the other stores in the area, but also with stores in the close by municipality. Moreover, municipalities close to larger cities increases the possibility that people commute and do their grocery shopping in a municipality in which the consumer is not registered. There is also a possibility that the competition is more local than on a municipality level. Thus, in estimating the Boone-indicator on a municipality level may lead to that we include stores which are not in fact competing with each other and we may therefore not capture the competition accurately. This is more probable in municipalities with a greater population size or municipalities with a large land area. However, despite these potential issues when defining local markets on a municipality level, it is the best classification of local markets with the time constraint for when this study was executed. There are 290 municipalities in Sweden, which means that the Boone-indicator will be estimated for each municipality for every year over the sample period.

### **Empirical model estimation**

In this research paper a similar approach to Boone, Harrison and Griffith (2005) will be undertaken in estimating the  $\beta$  and following the discussion of Schiersch and Schmidt-Ehmcke (2010) firm size will be taken into account. One way to account for firm size is to

normalize profits by the number of employees. However, as have been discussed, this may not give a good fit as temporary workers and for how long they stayed in the company is not to be found in the datasets used for this research. Another way to account for firm size in this research is to normalize profits by the size of the grocery stores measured in square meters. However, due to time constraints when writing this paper this way of controlling for firm size will be left for future research. Instead, to control for firm size the profit margin defined as profits divided by sales ( $\Pi_i/sales$ ) will be used as dependent variable rather than profits in its numerical form. This way of controlling for firm size assumes that the size of the store is reflected by the sales which is usually a good approximation since in general, greater stores on average have greater sales. Moreover, I will use a log-log regression in estimating the  $\beta$  such that the coefficient can be interpreted as an elasticity. The final model used in this study is the following:

$$\ln\left(\frac{\Pi}{sales}\right)_i = \alpha + \beta_1 \ln(AVC) + \delta'Y * 'M * 'A + \beta_2'Y + \beta_3'M + \varepsilon_i$$

The dependent variable is the profit margin and the  $\beta_1$  coefficient captures the effect of the industry average variable costs. The  $\delta$  coefficient is an interaction term consisting of vectors of year dummies, municipalities and average variable costs. The  $\beta_2$  and  $\beta_3$  coefficients controls for year specific and municipality specific effects respectively. The Boone-indicator for each municipality and year is calculated by adding the  $\delta$  coefficient's value for each municipality and year respectively to the industry average variable costs captured by  $\beta_1$ . For example, if  $\beta_1$  is equal to -1 and the interaction term for Gothenburg municipality in 2010 is -0.05, then the Boone-indicator for Gothenburg municipality in 2010 is;  $-1+(-0.05) = -1.05$ . The Boone-indicator is interpreted as an elasticity, which shows how a one-percentage increase in average variable costs affects the profit margin. The higher the value of the Boone-indicator, the more intense is the competition. Thus, the coefficients for the different municipalities will be compared in order to assess whether the level of competition differs in the different geographic areas.

## Empirical analysis

### Data and Variables

The data for estimating the Boone-indicator is collected from the database Retriever where annual reports of grocery stores in Sweden for the last ten years are collected from Bolagsverket. After having estimated the Boone-indicators we are interested in relating

different characteristics of the municipalities to the level of competition. This is in order to investigate whether certain features can be associated with a certain level of competition e.g. if high population density is associated with high levels of competition in general or, if this is particular for certain municipalities or markets only. Therefore, data on a number of variables that may help in explaining competition has been collected and are listed in Table 1 below. Data on the variables are collected for all municipalities where data on population, population density and land area are available for all years in the sample period. Unfortunately, data on the rest of the variables are only available for two years of the sample period namely 2006 and 2011 thus limiting the analysis for these explanatory variables.

Variable	Year
Number of grocery stores	2006 &2011
Number of grocery stores per 1000 people	2006 &2011
Fraction of total population with access to grocery store within 300m/600m/1,500m/10,000m	2006 &2011
Fraction of population in urban areas with access to grocery store within 300m/600m/1,500m/10,000m	2006 &2011
Fraction of population outside urban areas with access to grocery store within 300m/600m/1,500m/10,000m	2006 &2011
Store density (number of people per store)	2006 &2011
Store density (number of stores per square kilometre of land area)	2006 &2011
Population	2004-2013
Population density	2004-2013
Land area	2004-2013

Table 1 - Explanatory variables



## Results

### The distribution of the Boone-indicator

A table with the results of the Boone-indicator for each municipality can be found in Appendix 1. When we look at the Boone-estimates we are mainly interested if there are differences in the estimates between municipalities e.g. if the Boone-indicator tend to be higher in some municipalities and lower in some. Since Boone-estimates could be generated for 284 of the 290 municipalities in Sweden it will make more sense to evaluate the estimates for municipalities of differing characteristics, such as the population size, rather than to evaluate each municipality separately (unless the analysis of the results suggest we need to do so). Thus, a first step in the analysis is to look at the overall distribution of the Boone-estimates. The descriptive statistics of the Boone-estimates in Table 2 below suggest that there is variation in the estimates and we also have some deviating results where the indicator takes extreme positive and negative values. The Boone-indicator takes a mean value of -2.53 with a minimum value of -69.39 and a maximum value of 258.33. As the Boone-indicator is interpreted as an elasticity the mean value of -2.53 and a median of -1.684 seem to make sense while the extreme values seem unreasonable. Since we expect the Boone-estimator to take a negative value (increasing costs should have a negative effect on profits) the positive Boone-estimates seem strange. Taking a closer look at the distribution of the value of the Boone-estimates we see that it is a fairly small percentage of the sample that takes the extreme values both on the positive and negative side. A histogram in Figure 1 below of the Boone-estimates excluding the extreme values show that most Boone-estimates in the sample lie between -0.2 and -3.

	<b>Percentiles</b>	<b>Smallest</b>		
<b>1%</b>	<b>-25.995</b>	<b>-69.395</b>		
<b>5%</b>	<b>-15.365</b>	<b>-46.915</b>		
<b>10%</b>	<b>-5.921</b>	<b>-45.665</b>	<b>Obs</b>	<b>2840</b>
<b>25%</b>	<b>-2.15</b>	<b>-45.465</b>	<b>Sum of Wgt.</b>	<b>2840</b>
<b>50%</b>	<b>-1.684</b>		<b>Mean</b>	<b>-2.531507</b>
		<b>Largest</b>	<b>Std. Dev.</b>	<b>9.980782</b>
<b>75%</b>	<b>-1.265</b>	<b>120.135</b>		
<b>90%</b>	<b>-.869</b>	<b>131.435</b>	<b>Variance</b>	<b>99.61601</b>
<b>95%</b>	<b>-.4535</b>	<b>179.335</b>	<b>Skewness</b>	<b>11.20461</b>
<b>99%</b>	<b>8.155</b>	<b>258.335</b>	<b>Kurtosis</b>	<b>244.054</b>

Table 2 - Distribution of Boone-estimates

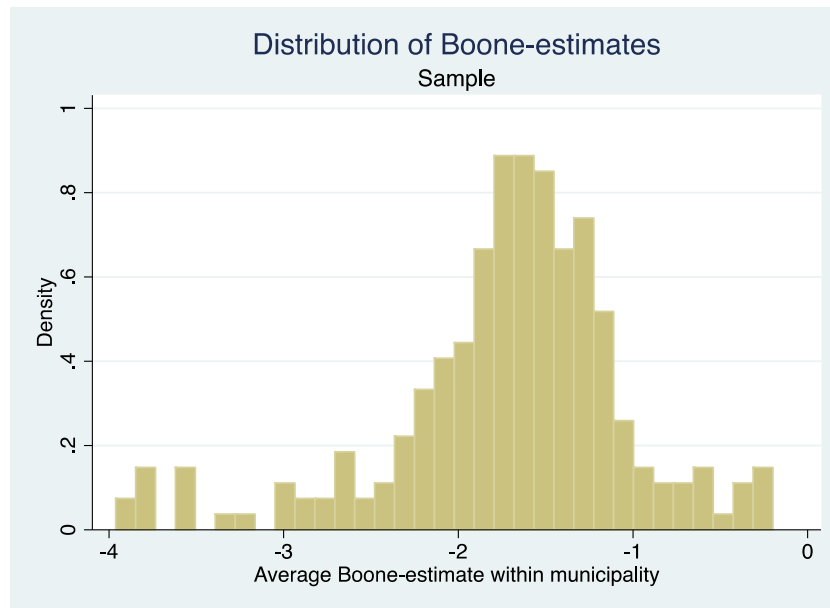


Figure 1 - Histogram of distribution of Boone-estimates

A table and population descriptives on the municipalities that have a positive Boone-estimate in any of the years of the sample period can be found in Appendix 2. From this table we see that there are in total 37 municipalities that have a positive Boone-estimate in any of the years and it is only three of these who have it for half of the sample period or more. The table with descriptives of population size show that this group of outliers have a population size around 3,000 to 41,000. These three municipalities are Grästorp, Kungsör and Skinnskatteberg and their respective population size and distribution of the Boone-indicator are found in Table 3 below. We see that all these three municipalities are small to population size with a population less than 10,000 on average.

Municipality	Population				Boone			
	Mean	Std. Dev.	Min	Max	Mean	Std. Dev	Min	Max
Grästorp	5763.4	83.42022	5639	5857	76.3443	60.02656	-1.265	179.335
Kungsör	8168.6	89.19292	8030	8303	1.9637	2.411232	-1.265	7.42
Skinnskatteberg	4587.7	165.7562	4392	4829	3.7366	6.253408	-1.265	14.575

Table 3 - Population size and Boone descriptives

A table and population descriptives on the municipalities with a more negative Boone-indicator than -4 in any of the years can be found in Appendix 2. We see from this table that there are 71 municipalities who exhibit an outlying negative value in any of the years during the sample period and 32 of them have it for half the sample period or more. These 32 municipalities and their respective population size and Boone-estimates can be found in Appendix 2 where we see that the average population size among them are around 15,000 with a minimum population size of 3,000 and maximum of 42,000.

The majority of municipalities in the sample namely 249 of the 284 municipalities have a Boone-estimate between 0 and -3 for most of the sample period. Of those, there are 179 who have a Boone-estimate between 0 and -3 for all 10 years that we have estimated the Boone-indicator. Thus, the analysis of the normally distributed Boone-estimates will focus on these 179 municipalities. A list of these municipalities can be found in Appendix 3.

Three distinctive groups have now been defined which have a consistent development in their distribution throughout the sample period. First, we have the group with normally distributed Boone-estimates throughout the sample period that consist of 179 of the municipalities. The second group is the group of municipalities that have largely deviating Boone-estimates for half the sample period or more and they consist of 32 of the municipalities. The third group consists of three of the municipalities that have a positive Boone-estimate for half of the sample period or more. Together these three groups account for 214 of the 284 municipalities in the sample thus, 70 of the municipalities are placed in a miscellaneous group. This is since their development of the Boone-estimates was not consistent enough to fit in in any of the other three groups. Thus, we have divided the 284 municipalities in our sample into four distinctive groups according to their distribution of the Boone-indicator. These are summarized in Table 4 below. The analysis in this study will focus on the first group since it is the most representative for the Swedish grocery industry. Investigation of the other groups will be left for future research however, they will be briefly discussed in a discussion section towards the end of the analysis.

Group	Boone		Total municipalities
	min	max	
Normal	-2.95	-.046	179
Negative outliers	-69.395	62.045	32
Positive outliers	-1.265	179.335	3
Miscellaneous	-29.395	258.335	70

Table 4 - Municipalities divided into groups

### The Boone-indicator and population size

When we plot the average Boone-indicators over the average population size in Figure 2 below we see that the Boone-indicator seems to vary more in municipalities with a smaller population size. Taking a closer look at the Boone-indicator according to population size quartiles in Table 5 below verifies this. Here we see that the average level of competition is similar in all population size municipalities while the standard deviation is higher in smaller

population size municipalities. The average level of competition is the highest in municipalities with an average population size between 20,124 and 48,408 and lowest in the greatest population size municipalities with an average population size greater than 48,408.

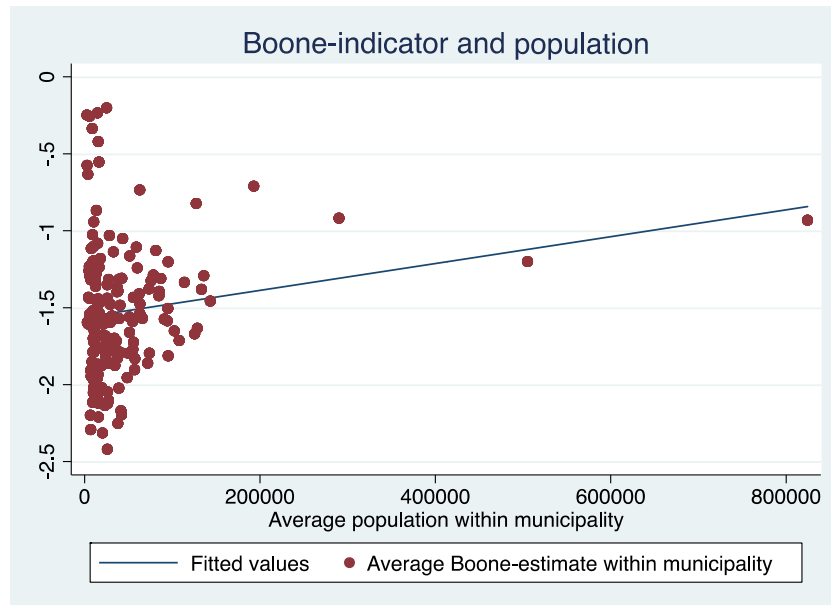


Figure 2 - Boone-indicator and population

Quartile	Average population	Obs	AVERAGE BOONE-ESTIMATE			
			Mean	Std. Dev.	Min	Max
1st	<10,733	450	-1.454414	.5038622	-2.2911	-.2448
2nd	10,733 - 20,124	450	-1.528411	.4213484	-2.2103	-.2318
3rd	20,124 - 48,408	450	-1.675698	.3986739	-2.419	-.1982
4th	48,408<	440	-1.425674	.300335	-1.9026	-.7101

Table 5 - Distribution of Boone-estimates by population quartiles

## The Boone-indicator and population density

Population density is defined as number of people per square kilometre of land area and gives information on how densely populated the municipalities are. It is interesting to look at the relationship between the level of competition and population density since we might expect that municipalities that are more densely populated have higher levels of competition. This is because the distance between the stores and where people live is probably shorter in municipalities with high population density which should trigger competition between the stores. Plotting the Boone-indicators and population density in Figure 3 below we see that there is a weak positive relationship between the Boone-indicator and population density. Thus, contradictory to our expectations, the below graph suggest that high population density is on average associated with a lower average level of competition (less negative Boone-indicator). However, we also see a fairly large spread in the level of competition for lower population densities i.e. lower population densities is associated with both higher and lower levels of competition while higher population densities is on average mainly associated with slightly lower levels of competition. We will thus investigate the matter further in order to understand why such differences in the level of competition can be observed for similar population densities.

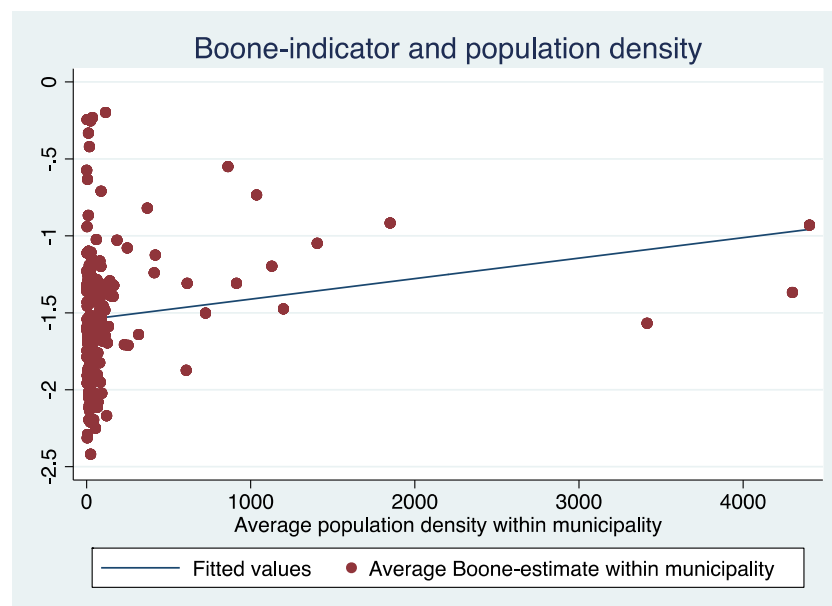


Figure 3 - Boone-indicator and population density

We investigate the relationship further by plotting the Boone-indicator and population density split on quartiles in order to get a closer look at the above graph. These graphs can be found in Appendix 4. Two of the graphs are shown below in Figure 4 which shows more clearly

that the competition for lower population density is on average associated with a slightly higher level of competition (around -1.5 and -2) while higher population density is on average associated with a lower level of competition (around -1 and -1.5).

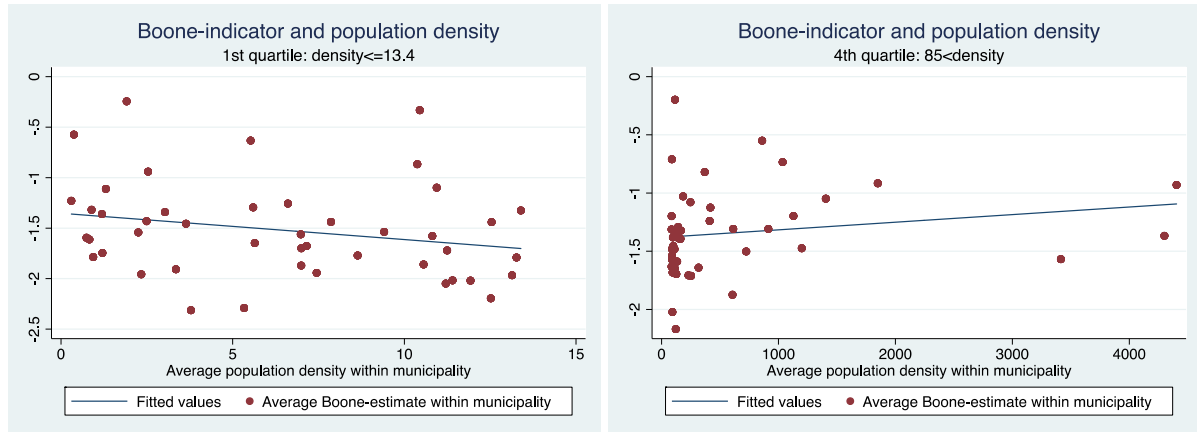


Figure 4 - Boone-indicator and population density

However, we are still interested in investigating why the spread is higher for smaller population densities. Since the population density is a ratio between population and land area, it means that municipalities of different population size can have similar population densities i.e. a small population size municipality can have the same density as a large population size municipality. If the relationship between the Boone-indicator and population density is not the same for both smaller and larger population size municipalities, it may be the reason for the observed differences in the level of competition for similar population densities. That is, it may be the case that in smaller population size municipalities, low population densities are associated with lower levels of competition while in greater population size municipalities, low population densities are associated with higher levels of competition and vice versa. In order to evaluate if this may be the case, we again plot the Boone-indicator over population density and weigh the scatter dots according to population size in Figure 5 below. The size of the scatter dots represent the size of the population in the municipality where the larger the size of the scatter dot the greater the population size. We see from this graph that smaller population size municipalities are mainly clustered in the downward corner to the left. This means that smaller population size municipalities are mainly associated with lower population densities. We also see that the greater size municipalities have on average greater population densities and lower spread in the average level of competition in comparison to lower population size municipalities.

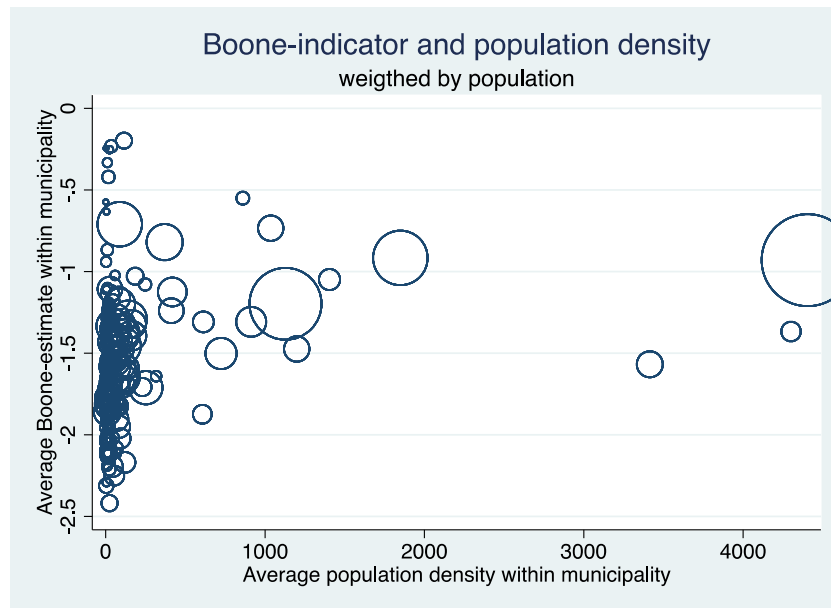
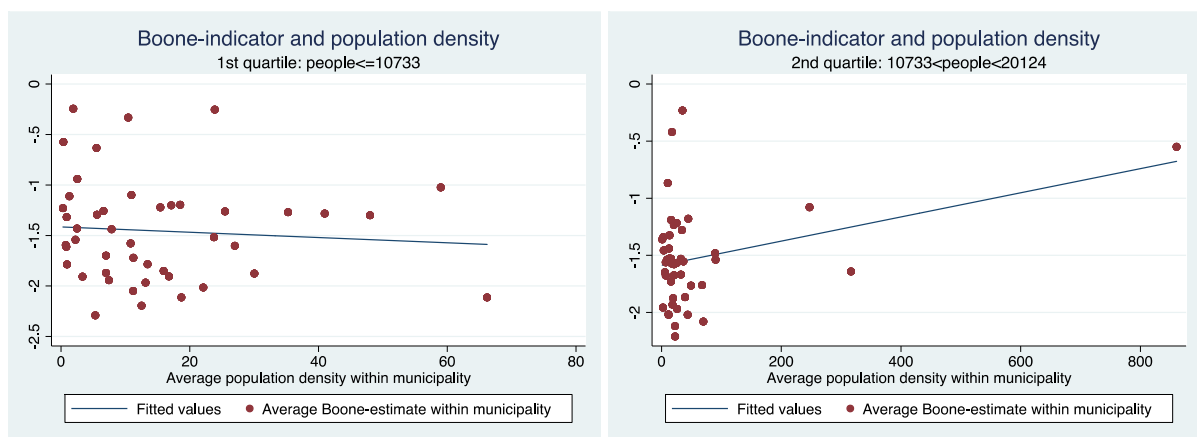
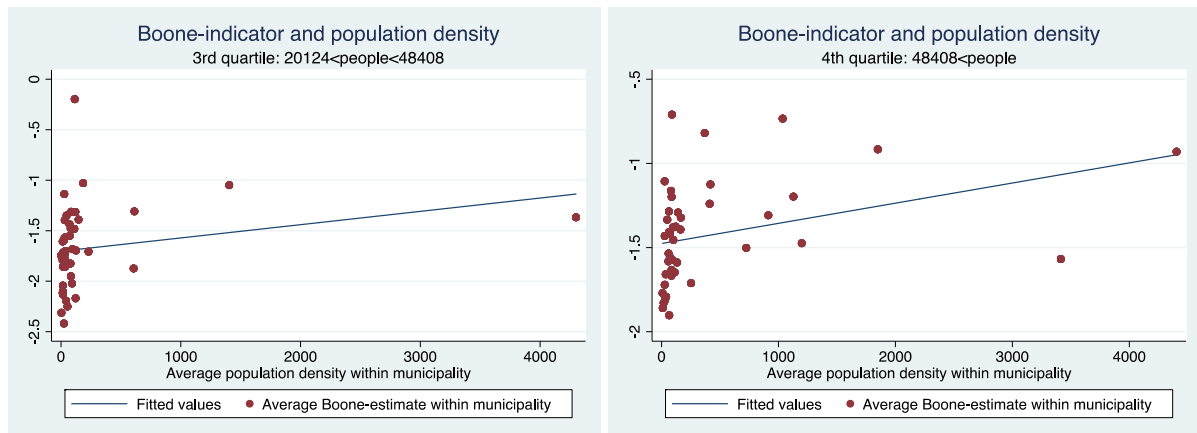


Figure 5 - The Boone-indicator and population density weighed by population size

Plotting the Boone-indicator over population density according to population quartiles in Figure 6 below makes this even more clear. Here we see indeed that smaller population size municipalities have on average lower population densities while greater population size municipalities have both high and low population densities. Moreover, we see that all municipalities except for small population size municipalities (less than 10,733 citizens) have an upward sloping relationship between the Boone-indicator and population density indicating that greater population density is on average associated with slightly lower levels of competition (less negative Boone-indicator).





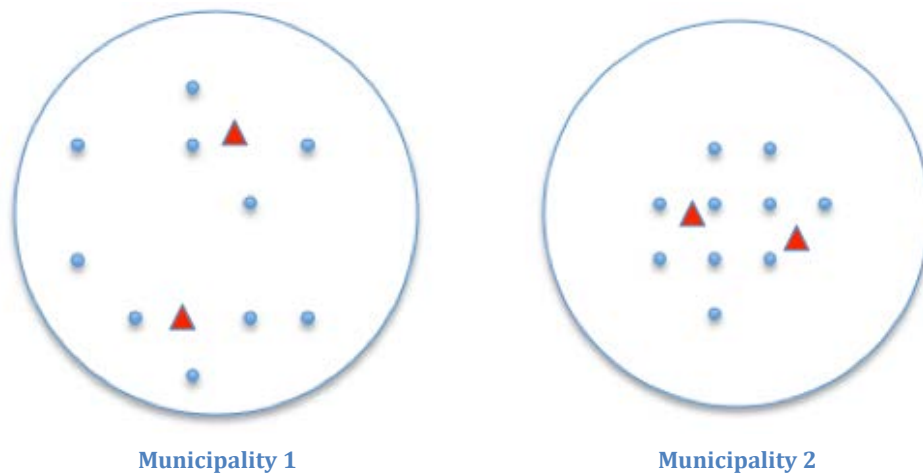
**Figure 6 - The Boone-indicator and population density for different population sizes**

In the beginning of this section we discussed that we would expect higher population density to be associated with higher levels of competition. However, our analysis to this point suggest that this relationship is the opposite namely that higher population densities is mainly associated with slightly lower levels of competition. Moreover, the analysis suggest that higher population densities are mainly represented by greater population size municipalities. However, we still observe that the level of competition varies more for lower population densities, thus, this variation is not yet fully explained. The analysis of the Boone-indicator according to population size showed that the greatest population size municipalities had on average slightly lower levels of competition thus, the analysis of the population size and population density's relation to the level of competition seem to be in line with each other.

### **The impact of distance on the Boone-indicator**

When we defined the local markets in the grocery industry in Sweden we discussed the probability of incorrectly doing so by defining it on a municipality level. The possibility is that the market is too broadly or too narrowly defined. Consider for example two municipalities with same population size, same land area and thus, the same population density. Imagine further that these two municipalities both have two grocery stores operating within the municipality. The only difference between the municipalities is the distance between where people reside within the municipality i.e. the spread of the citizens in the municipalities look like in the following figures respectively:





The blue dots in the above figures represent citizens in the municipality and the triangles are the two stores operating within the municipality. As mentioned, both municipalities have the same land area and the same amount of citizens and stores within the municipality thus, they have the same population density. However, in Municipality 1 the population is more spread out than in Municipality 2 and the distance between the stores is longer in Municipality 1 than in Municipality 2. In fact, it is likely that in Municipality 1 the two stores do not compete with each other while in Municipality 1 it is very likely that the two stores compete. Thus, the definition of the local market on the municipality level may be correctly specified for Municipality 2 while it may be incorrectly specified for Municipality 1.

The population density ratio shows the relation between the population in the municipality relative to the land area and is thus a measure of spread. However, as illustrated in the figures above the ratio does not necessarily say anything about the distance between where the people in the municipality resides. Therefore, looking at the population density and its relation to the level of competition may not tell the whole story. It is therefore of interest to look at the relationship between the distance to the closest stores and the level of competition. For that analysis which will be covered in the following sections, it is also relevant to consider the size of the land area in the municipality and number of stores present in the market.

The data on the variables to be used that have been presented earlier for that analysis are shown in Table 6 below. We see that the variables are restricted to two years namely 2006 and 2011. We will only use the variables for 2006 thus, this part of the analysis will be

restricted to only that year. We use year 2006 since we believe that this data may better reflect the general features of the Swedish grocery industry since this was before the financial crisis in 2008. This is in order to decrease the probability that our analysis is influenced by the specific event of the financial crisis. Thus, evaluation of the impact of the financial crisis on the Swedish grocery industry will be left for future research.

Variable	Year
Number of grocery stores	2006 &2011
Number of grocery stores per 1000 people	2006 &2011
Fraction of total population with access to grocery store within 300m/600m/1,500m/10,000m	2006 &2011
Fraction of population in urban areas with access to grocery store within 300m/600m/1,500m/10,000m	2006 &2011
Fraction of population outside urban areas with access to grocery store within 300m/600m/1,500m/10,000m	2006 &2011
Store density (number of people per store)	2006 &2011
Store density (number of stores per square kilometre of land area)	2006 &2011

Table 6 - Variables used for analysis of distance and store density

For ease of interpretation, as we now have several variables to analyse, we will divide the municipalities into two groups according to population size rather than four groups by quartiles as in previous sections. This means that the first and second population quartile will form one group of municipalities and the third and fourth population quartile will form the other. The two groups of municipalities will be referred to as the small population size group (1<sup>st</sup> and 2<sup>nd</sup> population quartile group) and the large population size group (3<sup>rd</sup> and 4<sup>th</sup> population quartile group). Thus, the small population size group includes the municipalities with a population less or equal to 20,124 while the large population size group includes the municipalities with a greater population size than 20,124.

### The Boone-indicator and number of stores

We start by investigating the impact that number of stores have on the level of competition within the two groups. This is shown in Figure 7 below where the size of the scatter dots represents the land area of the municipality where the greater the scatter dot the greater the land area. From these figures we see that smaller population size municipalities have between around two and 30 number of stores in total and that the municipalities with smaller land area have up to around 20 stores while municipalities with greater land area can have up to 30 stores. The larger population size municipalities have both high and low number of stores and

unlike the smaller population size municipalities, we see that it is only municipalities with a small land area that have more than 100 stores within the municipality. If we look at only the municipalities with less than 100 stores in the large population size municipalities (Figure 8) we get a clearer picture of the relationship between the Boone-indicator and number of stores. From this figure we see that there is a slightly upward sloping relationship between the number of stores and the level of competition, indicating that greater number of stores is associated with a lower level of competition while this relationship is the opposite in the small size population group. If we only consider number of stores and its relation to competition we may expect that a higher number of stores should be associated with a higher level of competition. In that case, from the below graphs the observation in the small population size municipalities is according to our expectation while the large population size municipality is contradicting. However, we also see that the land area for municipalities with a greater number of stores is in general greater too for both population groups. Moreover, we saw that the small population size group have a generally small number of stores while it is more varying in the large population group. This may say something about the store density in the municipality and similar to population density, we expect that a higher store density should be associated with a higher level of competition. Thus, in the large population group graph, if most of the municipalities that make up the upward sloping relationship that we observe have a low store density, the upward sloping relationship is in accordance with our expectations. In the same way the downward slope for the small population group can be misleading. This is because if the store density is low for the municipalities to the right in the below graph for smaller size municipalities, we would expect that competition should be lower thus exhibiting an upward sloping relationship. This may actually be the case since we see that smaller population size municipalities have fairly low number of stores regardless of land area. However, similar to the problem with population density, the store density does not tell the whole story as it does not give us information on the distance between the stores. Therefore, the following sections evaluate the relationship between distance to stores and the level of competition.



Figure 7 - The Boone-indicator and number of stores

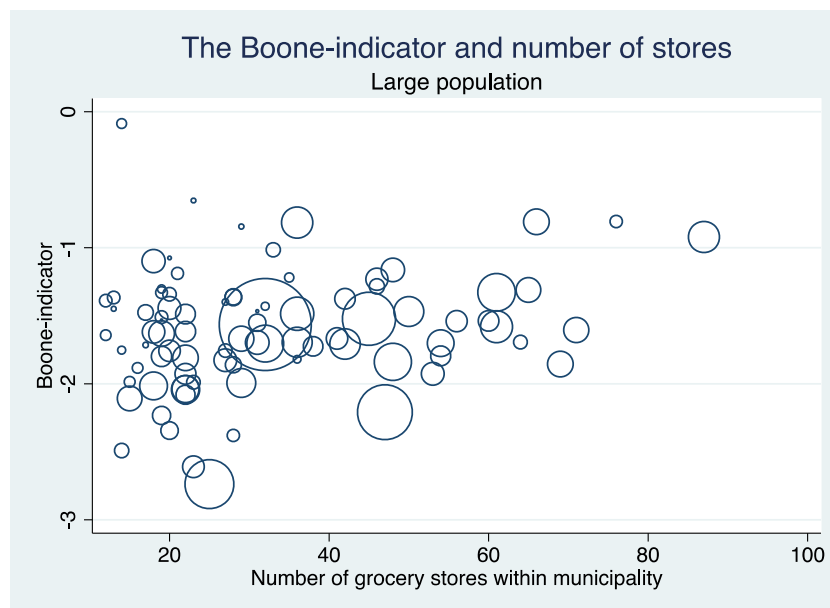


Figure 8 - The Boone-indicator and number of stores (less than 100)

### Fraction of total population with access to grocery store

In Appendix 5 plots can be found on the relationship between the Boone-indicator and access to grocery store within 300m, 600m, 1500m and 10,000m respectively for small and large size municipalities. We expect that the shorter the distance to a grocery store, the higher the level of competition therefore, this relationship should be more clearly observed for the 300m and 600m distances. Thus, we expect that a greater fraction (percentage) of the population that have access to a grocery store within smaller distances is associated with higher levels of competition. That is, we expect to see a downward sloping relationship between the Boone-indicator and access to grocery store as the fraction of the population becomes greater. The graphs for the 300m distance for the small and large population size groups are shown in Figure 9 below. Here we see that it is less common to have access to a grocery store within 300m in small population size municipalities than in large population size municipalities.

Moreover, it seems that in smaller population municipalities the relationship is downward sloping, as we expect, while in large population size municipalities it seems like the relationship slopes upward. Thus, the graphs indicate that higher fraction of the population with access to grocery store within 300m is associated with lower level of competition on average for large population size municipalities.



Figure 9 - The Boone indicator and access to grocery store

### Fraction of population in urban areas with access to grocery store

Graphs on the relationship between the Boone-indicator and access to grocery store within urban areas in the municipalities can be found in Appendix 5. Two of these plots for the 300m distance are shown in Figure 10 below. These show that it is more common in large population size municipalities to have a high fraction of the population in urban areas that have access to a grocery store within 300m. Thus, the distance between the stores in urban areas is generally shorter in greater population size municipalities. Moreover, the large population group in this figure looks similar to the figure of the large population group in the previous section thus we may assume that it is more common in general with urban areas in larger population size municipalities. For both the large and small population size group there is a tendency for an upward sloping relationship between for all distances to stores although for the small population group this relationship is ambiguous. Thus, these results are also contradicting to what we would expect.



**Figure 10 - The Boone-indicator and access to grocery store (urban areas)**

### **Fraction of population outside urban areas with access to grocery store**

Graphs on the relationship between the Boone-indicator and access to grocery store outside urban areas in the municipalities can be found in Appendix 5. Two of these plots for the 300m distance are shown in Figure 11 below. These show that it is on average more common in smaller size municipalities to have a larger fraction of the population outside urban areas with access to a grocery store within 300m. This means that it is more common in smaller size municipalities to have a shorter distance to the closest store outside urban areas. Moreover, for both population size groups it is mainly municipalities outside urban areas with a large land area that have a high fraction of the population with access to grocery store near by. We also see that the relationship of the Boone-indicator and access to grocery store is slightly upward sloping for both groups. This means that a higher fraction of the population outside urban areas with access to grocery store within 300m is associated with a lower level of competition. We also see that this relationship is stronger for smaller size municipalities than for larger size municipalities. However, we also know that the number of stores is lower in small population size municipalities which may explain why competition is lower outside urban areas in smaller size municipalities even thou the distance to the stores are closer.

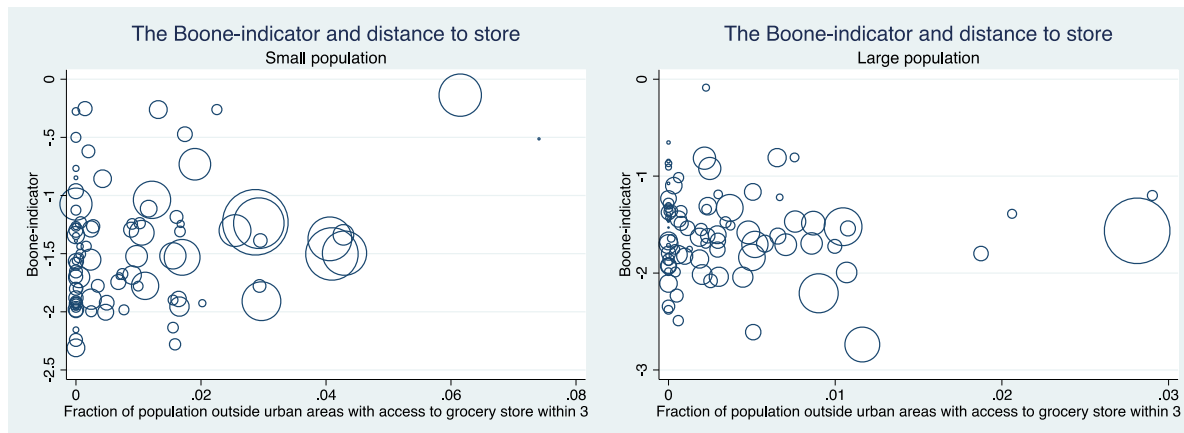


Figure 11 - The Boone-indicator and access to grocery store (outside urban areas)

### Summary of results

Our results suggests that the competition is on average the highest in municipalities with an average population between 20,124 and 48,408. We also saw that competition was on average the lowest for municipalities with an average population size greater than 48,408. We investigated the results further by looking at the relationship between the level of competition and population density. From this analysis we could conclude that high population densities were mainly associated with larger population size municipalities and unlike what we expected, high population density could be associated with lower levels of competition. Moreover, we saw that low population densities were mainly associated with lower population size municipalities although they could be associated with higher levels of competition for all population size municipalities. However, low densities could also be associated with low competition and the reason for this variation could not be fully explained.

When we looked at the relationship between the level of competition and the distance to stores we saw that it was similar in urban and non-urban areas in both smaller and larger population groups. That is, in both population groups, a higher fraction of the population that had access to a grocery store within a short distance was associated with a lower level of competition. Moreover, we saw that the relationship between number of stores and competition was the opposite for small and large population groups. This was also the true when investigating the relationship between competition and the total fraction of the population with access to a grocery store. That is, in small population municipalities the relationship was downward sloping for these two variables while in greater size municipalities these were upward sloping. We expected the relationship between the level of competition and the investigated variables to be downward sloping thus, this was only

observed for two of the variables for the small population group. When we investigated the relationship between distance to store and level of competition within smaller and larger population size municipalities we gained some insight on how the municipalities may differ in characteristics e.g. when it comes to urbanization. We have also gained insight on what affects competition in the different municipalities according to characteristics such as population size and density and concluded that these features differ for different municipalities. However, there are clearly some inconsistencies in our results indicating that there are some municipalities which deviate in their behaviour from the other municipalities of similar characteristics.

The analysis has not been able to fully explain the differences in the behaviour of the Boone-indicators for municipalities of similar character but has merely showed that differences exist. We may therefore suspect that some variable that we do not have enough information on is not considered in the analysis. One such variable that the analysis points to may be the distance between the stores. We have analysed population density, number of stores and access to closest store which all say something about the spread and the distance that people have to the closest store and its relation to competition. However, these variables do not fully capture the dynamics between the stores within the municipality and its relation to competition which may play a great role. Moreover, it is not necessarily the case that some analysis or data is missing in our study. There is still a possibility that we have incorrectly defined the market which causes the inconsistencies in our results. Or, it may be the case that we have indeed defined the market correctly but that the municipalities which deviate from the rest, which cause our results to be contradicting, indicate that the competition does not work as it should in those municipalities. For example, if firms intentionally behave in some anti-competitive way we may expect some contradictions in our expectations to what affects competition. In order to further gain understanding for the results that have been observed in this study, further investigation is needed. Discussion of such investigations and suggestions for extended research will be covered in the following section.

## **Discussion and suggestions for future research**

In this study a dataset was created with estimations on the level of competition in the Swedish grocery market within municipalities over a ten year period. This dataset offers opportunities for a wide range of analysis while this paper only covered a part. The analysis



in this study focused on looking at the overall features of the competition in the Swedish grocery market. Thus, less attention was given to investigating the development of the competition over time. Such an analysis would be interesting to undertake in order to see whether the development of competition has been similar in all markets or if this has differed between the markets. Moreover, it would be interesting to see if the level of competition on average in the Swedish grocery market has increased or decreased and also if the industry was affected by the financial crisis in 2008 and also how competition is affected by entry and exit of firms in the market. Since there has been relatively few empirical studies done using the Boone-indicator it is hard to verify its reliability. Thus, it would be interesting to compare the Boone-estimates to measures of competition that are widely used today such as the Herfindahl index or the Price-cost margin. Moreover, as have been briefly discussed in the empirical model estimation section, Boones way of measuring competition can be assessed in different ways. It would therefore be interesting as a robustness check to see whether using other variables as a proxy for efficiency suggest the same level of competition as the proxy for efficiency used in this study. A lot of discussion has been made on whether the markets for which the Boone-indicators have been estimated are correctly defined. It is hard if not impossible to perfectly define a local market although it would be interesting if a certain approach could be developed in order to evaluate the probability of that the market has been correctly defined. Moreover, it would be relevant to investigate the outliers that was observed in the data. This is because the outlying values that were generated may point to a weakness in the approach of estimating the Boone-indicator. In this paper graphical analysis was mainly used in order to detect whether certain general features could be traced down to as affecting competition. However, running another regression using the Boone-indicators as dependent variable regressed on several explanatory variables may help in evaluating if such features can be observed.

## Conclusion

This paper assessed an empirical study of the so-called Boone indicator, which has proven to have superior theoretical properties than other widely used measures of competition. The main innovation of the way of using the Boone-indicator in this paper was in the definition of markets. The Boone-indicator was applied to specific local markets unlike previous studies assessing the Boone-indicator who has done this mainly on an industry level. The measure has been applied to the Swedish grocery market where the Boone-indicator has been estimated for each municipality in Sweden where these have been defined as separate local markets. The main purpose with the study has been to obtain an overview of the competition in the Swedish grocery market in order to see whether the level of competition varies across the country for different markets and try to understand the mechanisms affecting it. The approach has been to evaluate whether there are general features that can be traced down to as affecting the overall competition in the industry or whether the competition in the different markets are driven partially or completely by characteristics specific to the particular market. The results suggest that average level of competition is similar in smaller and greater population size municipalities. The average level of competition is the highest in municipalities with an average population size between 20,124 and 48,408 and lowest on average in municipalities with a greater average population than 48,408. However, the level of competition seems to vary more for smaller size municipalities. Further investigation showed that higher population density is in general associated with slightly lower levels of competition while low population densities is associated with higher levels of competition on average for all population size municipalities although the spread is large. Moreover, higher population densities are mainly associated with greater population size municipalities. Thus, the results support that for high population size municipalities, population density is generally higher and competition is on average lower. Therefore, the results contradict our expectations of a high population density be associated with a high level of competition. Investigating the role of distance to stores and number of stores and its' relation to the level of competition was on average contradicting to our expectations as well. Results suggest that future research should analyse the effect of distance between the stores as they may point to this as an important factor in explaining competition. To conclude, results suggest that the average level of competition is similar in all population size municipalities. Differences in the level of competition for municipalities with similar characteristics could be observed and the reasons for these observations could not fully be explained by the current analysis. The results

suggest that factors affecting competition can have different effects on competition in different markets. Thus, analysis support that the factors affecting competition may be specific to the local markets. However, further investigation is needed in order to trace down the specific features affecting competition in the different markets.

## References

- Amir, R. (2003). *Market Structure, Scale Economies and Industry Performance*. CORE Discussion Paper Series 2003/65.
- Boone, J. (2008). *A new way to measure competition*. The Economic Journal 118: 1245-1261.
- Bulow, J., P. Klemperer (1999). *Prices and the winner's curse*. RAND Journal of Economics 33(1): 1-21.
- Cabral, L. M. (2000). *Introduction to industrial organization*. Cambridge, Mass.: MIT Press.
- Griffith, R., Boone, J., & Harrison, R. (2005). *Measuring competition*. London: AIM Research.
- Jørgensen, C. (2011). *Lokalisering och konkurrens i dagligvaruhandeln*. AgriFood Economics Centre.
- Konkurrensverket, (2011). *Mat och marknad – från bonde till bord*. Rapport 2011:3.
- Konkurrensverket, (2009). *Konkurrensen på dagligvarumarknaden*. Uppdragsforskningsrapport: 2009:2
- Leuvensteijn van, M. (2008). *The Boone-indicator: Identifying different regimes of competition for the American Sugar Refining Company 1890-1914*. Utrecht School of Economics Tjalling C. Koopmans Research Institute Discussion Paper Series 08-37.
- Rosenthal, R. (1980). *A model in which an increase in the number of sellers leads to a higher price*. Econometrica 48(6): 1575-1579.
- Schiersch, A., & Schmidt-Ehmcke, J. (2010). *Empiricism Meets Theory Is the Boone-Indicator Applicable?*. Berlin: Deutsches Institut für Wirtschaftsforschung.
- Scitovsky, T. (2003). *Welfare and competition*. London: Routledge.
- Stiglitz, J. (1989). *Imperfect information in the product market*. p. 769-847 in: R. Schmalensee, R. Willig (Eds.), *Handbook of Industrial Organization Vol. I*. Amsterdam.

## Appendix 1: The Boone-indicators

Municipality	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Ale	-1,265	-1,251	-1,330	-1,352	-1,376	-1,373	-1,297	-1,337	-1,230	-1,317
Alingsås	-2,511	-2,634	-2,491	-2,266	-1,559	-1,215	-1,159	-1,087	-1,299	-2,029
Alvesta	-2,009	-1,939	-1,890	-1,784	-1,847	-1,430	-1,499	-1,606	-2,240	-2,508
Aneby	-2,003	-2,072	-2,280	-2,151	-2,312	-2,342	-1,852	-2,278	-2,095	-2,566
Arboga	-20,585	-2,600	-2,672	-2,540	-2,632	-2,610	-2,739	-2,854	-2,712	-4,499
Arjeplog	-1,946	-1,265	3,354	-0,183	-3,424	-4,058	-1,238	-0,259	-1,265	-1,265
Arvidsjaur	-2,334	-3,873	-2,208	-2,268	-2,223	-2,283	-2,293	-2,491	-2,396	0,903
Arvika	-2,088	-2,031	-2,039	-2,109	-2,012	-1,921	-1,875	-2,035	-2,063	-2,262
Askersund	-13,215	-14,255	-15,265	-17,915	-16,585	-9,060	-5,584	-6,708	-16,885	-19,395
Avesta	-5,641	-3,509	-5,235	-6,265	-4,559	-3,140	-1,685	-2,035	-2,199	-3,640
Bengtstors	-1,930	-1,948	-1,922	-1,905	-1,905	-2,162	-1,988	-2,186	-2,288	-2,256
Berg	-1,161	-0,962	-1,037	-1,094	-1,018	-1,002	-0,705	-1,376	-1,314	-1,446
Bjurholm	-0,280	-0,262	-0,261	-0,258	-0,235	-0,227	-0,188	-0,234	-0,200	-0,303
Bjuv	-1,265	-1,265	-1,265	-13,735	4,695	-0,540	-2,465	-2,493	0,439	-0,263
Boden	-2,338	-2,360	-2,108	-2,191	-1,938	-1,915	-2,124	-3,207	-2,189	-2,161
Bollebygd	13,345	4,383	-1,333	8,765	-1,845	-1,755	-1,674	-1,709	-1,856	-1,265
Bollnäs	-1,894	-1,873	-2,043	-2,052	-2,048	-2,247	-2,298	-2,424	-2,350	-1,957
Borgholm	-1,182	-1,234	-1,184	-1,217	-1,192	-1,115	-1,100	-1,207	-1,205	-1,265
Borlänge	-1,726	-1,728	-1,861	-1,851	-1,884	-1,838	-1,867	-2,030	-1,987	-2,738
Borås	-1,750	-1,745	-1,795	-1,723	-1,709	-1,664	-1,647	-1,643	-0,962	-1,837
Botkyrka	-1,082	-1,295	-1,219	-1,118	-1,077	-0,919	-1,094	-1,149	-1,113	-1,184
Boxholm	18,045	14,755	-1,750	-1,737	-1,822	-1,881	-1,680	-1,735	-0,492	-1,265
Bromölla	-2,857	-3,024	-2,931	-2,923	-3,088	-2,985	-3,081	-3,292	-3,406	-1,265
Bräcke	-10,856	-10,494	-9,810	-10,349	-10,163	-9,112	-9,106	-9,902	-9,335	-11,001
Burlöv	-0,554	-0,512	-0,513	-0,505	-0,444	-0,461	-0,380	-0,452	-0,415	-1,265
Båstad	-1,675	-1,554	-1,244	-1,381	-1,482	-1,647	-1,603	-1,743	-2,329	-2,950
Dals-Ed	-1,265	-1,265	-1,265	-1,265	-1,265	-1,265	-1,265	-1,252	-1,194	-1,265
Danderyd	-1,594	-0,828	-1,086	-0,681	-1,977	-1,913	-1,902	-3,576	-3,143	-2,193
Degerfors	-1,265	-1,265	-1,265	-1,265	-1,265	-1,265	-1,265	-1,419	-1,079	-1,265
Dorotea	-3,578	-1,642	-1,771	-3,053	-1,824	-1,857	-1,668	-2,763	-2,160	-3,887
Eda	-0,318	-0,283	-0,253	-0,209	-0,206	-0,187	-0,166	-0,224	-0,214	-1,265
Ekerö	-0,107	-0,090	-0,087	-0,087	-0,082	-0,078	-0,046	-0,075	-0,065	-1,265
Eksjö	-1,296	-1,273	-1,299	-1,276	-1,227	-1,071	-1,038	-1,129	-1,324	-1,406
Emmaboda	-1,811	-1,932	-1,802	-1,818	-1,817	-1,644	-1,480	-1,702	-1,813	-2,029
Enköping	-1,419	-1,512	-1,443	-1,651	-1,753	-1,473	-1,316	-1,569	-1,567	-1,972
Eskilstuna	-1,694	-1,261	-1,231	-1,041	-1,356	-0,905	-0,925	-1,031	-0,662	-1,881
Eslöv	-1,432	-1,119	-1,342	-1,313	-1,927	-1,431	-1,306	-1,612	-1,963	-2,061
Essunga	-0,300	-0,272	-0,277	-0,275	-0,252	-0,239	-0,186	-0,234	-0,189	-0,310
Fagersta	-21,815	-21,215	-21,285	-21,165	-20,125	-19,975	-18,365	-19,945	-18,575	-21,275
Falkenberg	5,387	1,716	-1,350	-1,550	-1,398	-1,592	-1,436	-1,319	-0,449	-1,495
Falköping	-2,351	-2,015	-1,758	-1,700	-1,665	-1,513	-1,458	-1,621	-1,592	-1,660

<b>Falun</b>	-1,108	<b>-1,793</b>	-1,695	<b>-1,756</b>	<b>-1,724</b>	-1,705	-1,261	-1,611	<b>-1,928</b>	<b>-2,630</b>
<b>Filipstad</b>	-1,951	-1,946	-1,955	-1,782	-1,742	-1,743	-1,891	-1,972	-2,047	-1,675
<b>Finspång</b>	-16,135	<b>-15,345</b>	<b>-17,985</b>	<b>-16,835</b>	<b>-16,755</b>	-16,895	-15,685	<b>-16,545</b>	-16,195	<b>-2,551</b>
<b>Flen</b>	<b>-2,831</b>	<b>-2,046</b>	-1,930	<b>-2,085</b>	-1,983	-1,978	-1,884	<b>-2,200</b>	<b>-2,101</b>	-2,157
<b>Forshaga</b>	-8,645	-7,949	-6,447	-8,660	4,977	-7,800	<b>-3,467</b>	-2,074	-1,590	<b>-1,265</b>
<b>Färgelanda</b>	-3,831	-1,711	-1,679	-1,710	-1,959	-2,122	-1,936	<b>-2,445</b>	-3,800	-4,339
<b>Gagnef</b>	-1,766	-2,078	-1,992	-2,093	-2,042	-1,932	-1,610	-1,776	<b>-2,167</b>	<b>-2,211</b>
<b>Gislaved</b>	-1,636	-1,610	-1,619	-1,627	-1,549	-1,565	-1,570	-1,548	-1,709	-1,490
<b>Gnesta</b>	-2,286	-2,274	-2,136	-1,997	-1,980	-1,934	-1,845	-1,580	-2,033	-2,084
<b>Gnosjö</b>	-1,460	-1,751	-1,299	-1,576	-1,350	-1,331	-1,535	-2,187	-2,031	7,832
<b>Gotland</b>	<b>-1,854</b>	<b>-1,847</b>	<b>-1,839</b>	<b>-1,722</b>	<b>-1,811</b>	<b>-1,838</b>	-1,522	<b>-1,712</b>	-1,654	<b>-2,484</b>
<b>Grums</b>	-1,552	-1,520	-1,504	-1,421	-1,389	-1,299	-1,215	-1,546	-1,663	-2,064
<b>Grästorp</b>	<b>89,525</b>	<b>-1,265</b>	<b>96,385</b>	<b>108,935</b>	<b>179,335</b>	<b>89,725</b>	<b>83,025</b>	<b>120,135</b>	-1,092	<b>-1,265</b>
<b>Gullspång</b>	-1,635	-1,608	-1,553	-1,579	-1,644	-1,621	-1,488	4,350	15,225	7,511
<b>Gällivare</b>	<b>-29,155</b>	<b>-29,295</b>	<b>-29,525</b>	<b>-29,155</b>	<b>-30,965</b>	<b>-29,985</b>	<b>-28,565</b>	<b>-30,595</b>	<b>-24,345</b>	<b>-32,735</b>
<b>Gävle</b>	-1,700	-1,640	-1,702	-1,663	-1,695	-1,659	-1,526	-1,414	<b>-0,859</b>	<b>-1,963</b>
<b>Göteborg</b>	-1,238	-1,330	-1,200	-1,261	-1,289	-1,196	-1,051	-0,901	-1,059	-1,449
<b>Götene</b>	-1,789	-2,069	<b>-0,500</b>	-2,065	-1,337	-1,998	-1,369	-1,218	-1,445	-1,518
<b>Habo</b>	-3,492	-3,731	-1,694	-4,134	-4,382	-4,198	<b>-0,472</b>	-2,368	-0,971	-1,033
<b>Hagfors</b>	-1,748	-1,109	-1,702	-1,631	-1,648	<b>-2,170</b>	<b>-0,765</b>	-1,032	-1,895	-1,915
<b>Hallsberg</b>	<b>-4,770</b>	<b>-5,181</b>	<b>-5,976</b>	<b>-3,615</b>	<b>-3,738</b>	<b>-2,722</b>	-1,770	<b>-4,109</b>	-1,930	<b>-1,265</b>
<b>Hallstahammar</b>	-11,315	-10,740	-10,801	-10,496	-10,586	-10,444	-9,611	-10,374	<b>-2,363</b>	-11,123
<b>Halmstad</b>	-1,525	-1,551	-1,540	-1,523	-1,554	-1,624	-1,594	-1,642	-1,543	-1,617
<b>Hammarö</b>	-1,517	<b>-0,760</b>	-0,848	-0,980	-0,914	-0,866	-1,005	-1,131	-1,322	-1,447
<b>Haninge</b>	<b>-1,898</b>	<b>-1,924</b>	-1,015	-1,104	-1,137	-1,131	-1,131	-1,414	<b>-0,767</b>	-1,701
<b>Haparanda</b>	-1,206	-1,101	-0,963	-0,942	-0,943	-0,958	-0,962	-1,172	-1,230	-1,519
<b>Hedemora</b>	-1,836	-1,861	-1,881	-1,936	-1,749	-1,997	-1,955	-2,078	-1,837	-2,185
<b>Helsingborg</b>	<b>-0,799</b>	<b>-0,821</b>	<b>-0,807</b>	<b>-0,735</b>	<b>-0,736</b>	<b>-0,835</b>	<b>-0,810</b>	-0,863	-0,900	-0,893
<b>Herrljunga</b>	<b>-1,894</b>	<b>-1,937</b>	<b>-1,995</b>	<b>-1,942</b>	-1,739	<b>-2,194</b>	<b>-2,324</b>	<b>-2,447</b>	<b>-2,297</b>	<b>-2,364</b>
<b>Hjo</b>	<b>-1,265</b>	<b>-1,265</b>	<b>-1,265</b>	-17,945	-17,595	-17,205	-15,875	-17,185	-14,785	-19,255
<b>Hofors</b>	<b>-2,515</b>	<b>-2,563</b>	<b>-2,603</b>	<b>-2,642</b>	<b>-2,558</b>	<b>-2,464</b>	<b>-2,521</b>	<b>-2,398</b>	<b>-2,597</b>	-4,835
<b>Huddinge</b>	-1,624	-1,550	-1,820	-1,566	-1,493	-1,384	-1,366	-1,276	-1,269	-1,672
<b>Hudiksvall</b>	-1,580	-1,635	-1,485	-1,496	-1,419	-1,554	<b>-1,911</b>	<b>-2,133</b>	<b>-2,053</b>	<b>-2,480</b>
<b>Hultsfred</b>	-6,994	-6,516	-5,768	-6,645	-6,479	-6,532	-5,691	-1,347	-1,743	-6,622
<b>Hylte</b>	-1,603	-1,561	-1,565	-1,502	-1,583	-1,477	-1,453	-1,726	-1,691	-1,624
<b>Hällefors</b>	-1,687	11,935	-1,737	-1,251	-3,341	-2,191	-1,395	-3,225	<b>-1,265</b>	<b>-1,265</b>
<b>Härjedalen</b>	<b>-2,050</b>	<b>-2,007</b>	<b>-1,978</b>	<b>-2,109</b>	<b>-2,052</b>	<b>-2,048</b>	<b>-1,953</b>	-1,707	-1,652	<b>-1,871</b>
<b>Härnösand</b>	-1,888	-2,008	-1,503	-1,651	-1,624	-1,682	-1,707	<b>-1,878</b>	<b>-1,940</b>	<b>-1,981</b>
<b>Härryda</b>	-1,277	-1,179	-1,057	-1,174	-1,095	-0,974	<b>-0,522</b>	<b>-0,582</b>	-0,886	<b>72,265</b>
<b>Hässleholm</b>	<b>-1,756</b>	<b>-1,850</b>	<b>-1,986</b>	<b>-1,871</b>	-1,488	-1,316	-1,620	-1,775	-1,629	-1,669
<b>Håbo</b>	-1,444	-1,306	-1,697	-1,991	-2,351	-2,079	-1,995	-1,631	-2,175	<b>-1,265</b>
<b>Höganäs</b>	<b>-2,013</b>	<b>-2,092</b>	<b>-2,296</b>	<b>-2,130</b>	<b>-2,078</b>	<b>-2,115</b>	<b>-2,087</b>	<b>-2,484</b>	<b>-2,538</b>	4,262
<b>Högsby</b>	-1,713	-1,573	-1,387	-1,336	-1,328	-1,507	-1,054	-1,571	-1,649	<b>-1,265</b>
<b>Hörby</b>	<b>-0,287</b>	<b>-0,256</b>	<b>-0,261</b>	<b>-0,246</b>	<b>-0,227</b>	<b>-0,222</b>	<b>-0,168</b>	<b>-0,216</b>	<b>-0,143</b>	<b>-0,292</b>
<b>Jokkmokk</b>	-1,394	-1,286	-1,230	-1,176	-0,962	<b>-0,757</b>	-0,821	-1,328	-1,475	-1,861

Järfälla	-4,796	-2,501	-3,016	-5,217	-4,613	-2,338	-1,945	-0,952	-1,152	-1,265
Jönköping	-1,837	-1,817	-1,855	-1,898	-1,791	-1,233	-1,443	-1,522	-1,258	-2,021
Kalix	-1,307	-1,467	-1,552	-1,610	-1,565	-1,519	-1,467	-1,582	-1,582	-1,723
Kalmar	-1,620	-1,643	-1,375	-1,486	-1,396	-1,496	-1,064	-1,210	-1,166	-1,617
Karlsborg	-2,519	-2,315	-1,983	-1,976	-1,912	-1,849	-2,051	-1,261	-1,430	-1,757
Karlshamn	-1,346	-1,417	-1,512	-1,685	-1,550	-1,164	-0,675	-1,709	-2,679	-3,161
Karlskoga	-5,920	-5,881	-5,923	-6,124	-6,081	-5,949	-5,621	-4,299	-4,493	-1,265
Karlskrona	-1,819	-1,379	-1,667	-1,633	-1,659	-1,431	-1,598	-1,163	-1,257	-1,749
Karlstad	-1,738	-1,642	-1,927	-1,684	-1,693	-1,835	-0,889	-0,526	-0,484	-1,782
Katrineholm	-1,742	-1,523	-0,804	-2,053	-2,035	-1,898	-1,996	-2,261	-1,734	-4,001
Kil	-15,075	-13,315	-10,414	-1,019	-11,236	-12,995	-3,896	-2,416	-2,199	-1,265
Kinda	-1,879	-6,645	-2,157	-1,006	-7,592	-5,107	-7,085	-1,786	-2,194	-2,461
Kiruna	-2,066	-2,226	-1,564	-1,398	-1,497	-1,396	-1,632	-1,531	-1,974	-2,175
Klippan	-1,932	-1,882	-1,963	-2,023	-1,963	-2,002	-1,744	-2,000	-1,924	-2,768
Knivsta	-1,265	-1,265	-1,265	-1,265	-1,265	-1,265	-1,265	-1,265	-2,082	-29,395
Kramfors	-1,899	-1,834	-1,892	-1,926	-1,908	-1,990	-1,984	-2,271	-2,277	-2,190
Kristianstad	-1,477	-1,488	-1,163	-1,128	-1,555	-1,541	-1,258	-1,209	-1,217	-0,817
Kristinehamn	-2,280	-2,137	-2,233	-1,409	-1,731	-1,047	-2,103	-2,035	-1,788	-1,354
Krokom	-2,926	-1,954	-1,909	-1,836	-1,957	-1,919	-1,801	-2,118	-1,747	-1,405
Kumla	-16,985	-16,485	-16,965	-16,745	-15,515	-15,805	-14,545	-15,635	-14,815	-16,675
Kungsbacka	-1,364	-1,370	-1,361	-1,304	-1,316	-1,342	-1,282	-1,458	-1,414	-1,546
Kungsör	2,049	2,298	2,851	2,643	1,553	1,725	1,628	7,420	-1,265	-1,265
Kungälv	-1,451	-1,508	-1,510	-1,553	-1,469	-1,451	-1,270	-1,388	-1,250	-1,971
Kävlinge	-0,692	-0,607	-1,303	-1,303	-0,495	-1,183	-0,977	-1,293	-1,158	-1,276
Köping	-8,306	-2,077	-2,221	-2,336	-2,213	-2,358	-2,236	-2,419	-2,470	-2,423
Laholm	-1,631	-1,577	-1,488	-1,550	-1,531	-1,607	-1,510	-1,635	-1,574	-1,708
Landskrona	-2,053	-1,890	-2,008	-1,714	-1,492	-1,521	-1,566	-1,790	-1,906	-5,922
Laxå	-6,969	-3,999	-4,066	-2,561	-2,272	-2,349	-2,441	-2,943	-2,746	8,155
Lekeberg	-1,244	-1,252	-1,244	-1,292	-1,227	-1,185	-1,082	-1,158	-1,265	-1,265
Leksand	-1,330	-1,344	-1,341	-1,478	-1,509	-1,451	-1,468	-1,524	-1,334	-1,625
Lerum	-1,925	-1,832	-1,884	-1,647	-0,466	-1,614	-0,595	-0,484	-1,650	-1,804
Lessebo	-23,695	-24,295	-23,425	-23,755	-21,245	-22,075	-19,315	-19,885	-20,855	-23,275
Lidingö	-1,763	-0,675	-1,075	-0,994	-1,105	-0,954	-0,835	-0,586	-0,727	-1,772
Lidköping	-2,652	-2,364	-2,344	-2,457	-1,780	-1,690	-1,873	-2,223	-2,296	-2,823
Lilla Edet	-1,961	-1,928	-1,998	-5,447	-5,720	-6,583	-3,562	-2,201	0,698	-1,265
Lindesberg	-2,086	-2,140	-2,108	-2,164	-2,083	-2,096	-1,928	-2,241	-2,255	-2,232
Linköping	-1,291	-1,533	-1,605	-1,583	-1,514	-1,606	-1,220	-1,226	-1,308	-1,663
Ljungby	-2,059	-1,834	-2,016	-1,767	-1,667	-2,236	-2,308	-2,373	-2,278	-2,469
Ljusdal	-1,604	-1,520	-1,532	-1,394	-1,469	-1,393	-1,273	-1,325	-1,471	-1,589
Ljusnarsberg	-1,265	-1,265	-1,265	-1,265	-1,265	-1,265	-1,265	-0,512	0,824	-1,265
Lomma	-8,607	-8,504	-8,747	-8,985	-2,306	-2,163	-2,193	-2,347	-2,369	-8,646
Ludvika	-2,415	-2,263	-1,631	-1,302	-1,487	-1,743	-1,590	-1,768	-2,217	-2,149
Luleå	-1,809	-1,833	-1,708	-1,710	-1,750	-1,860	-1,758	-1,848	-1,838	-1,823
Lund	-1,651	-1,627	-1,694	-1,735	-1,790	-1,787	-1,728	-1,673	-1,571	-1,860
Lycksele	-8,346	-7,714	-7,676	-7,887	-7,116	-1,905	-1,598	-1,845	-1,709	-2,515

Lysekil	-2,073	-2,017	-1,926	-2,012	-2,058	-1,999	-2,019	<b>-2,323</b>	-2,058	<b>-2,313</b>
Malmö	-0,888	-0,960	-0,907	-0,897	-0,913	-0,892	-0,934	-1,002	-1,013	<b>-0,759</b>
Malung-Sälén	-1,045	<b>-0,743</b>	<b>-0,731</b>	<b>-0,587</b>	<b>-0,753</b>	<b>-0,743</b>	<b>-0,767</b>	-0,859	-1,324	-1,852
Malå	<b>-8,175</b>	<b>-7,907</b>	<b>-8,837</b>	<b>-8,177</b>	-14,345	-11,355	-9,865	-7,690	-6,372	<b>-1,265</b>
Mariestad	-2,026	<b>-2,052</b>	<b>-2,083</b>	<b>-2,181</b>	<b>-2,173</b>	<b>-2,118</b>	<b>-9,197</b>	<b>-10,030</b>	-9,379	1,622
Mark	-0,949	-1,364	-1,616	-1,632	-1,887	-1,862	-1,831	<b>-2,079</b>	-1,808	-1,980
Markaryd	-1,136	-1,175	-1,238	-1,250	-1,397	-1,199	<b>-0,652</b>	-1,213	-1,307	-1,394
Mellerud	<b>-2,315</b>	<b>-2,208</b>	-2,104	-2,043	-2,020	-1,988	-2,047	<b>-2,081</b>	-1,479	-8,055
Mjölby	-1,586	-1,377	-1,476	-1,522	-1,513	-1,553	-1,555	-1,348	<b>-0,801</b>	<b>-0,759</b>
Mora	-1,713	-1,783	-1,519	-1,677	-1,670	-1,651	-1,603	<b>-2,190</b>	-1,766	-1,196
Motala	<b>-1,966</b>	<b>-2,216</b>	<b>-1,927</b>	<b>-2,101</b>	<b>-2,162</b>	<b>-2,184</b>	<b>-2,307</b>	<b>-2,390</b>	<b>-2,357</b>	<b>-2,341</b>
Mullsjö	-1,343	-1,360	-1,348	-1,250	-1,422	-1,300	-1,165	-1,306	-0,934	<b>-1,265</b>
Munkedal	-2,713	-3,460	-3,718	-3,558	-1,696	-1,501	-1,817	-1,776	-1,871	-4,076
Munkfors	-2,569	-2,804	-1,958	-2,116	-1,507	-0,942	-1,137	-1,175	-0,548	<b>-1,265</b>
Mölnadal	-1,388	-1,274	-1,430	-1,276	-1,157	-0,873	-1,160	-1,318	-1,401	-1,122
Mönsterås	-21,555	-20,335	-18,095	-8,920	-5,718	-17,945	-15,875	-16,925	-17,635	-14,825
Mörbylånga	-1,788	-1,785	-1,778	-1,710	-1,754	-1,604	-1,197	-1,772	-1,653	-1,705
Nacka	-1,701	-1,652	-1,399	-1,166	-1,309	-1,125	-1,154	-1,336	-1,332	-0,911
Nora	<b>-45,665</b>	<b>-38,405</b>	<b>-37,645</b>	<b>-42,235</b>	<b>-41,545</b>	<b>-43,495</b>	<b>-38,485</b>	<b>-40,345</b>	<b>-4,861</b>	<b>-38,025</b>
Norberg	-19,595	-18,185	-18,705	-18,995	-17,515	-15,135	-15,795	-17,195	-15,415	-20,075
Nordanstig	-5,906	-8,303	-7,828	-1,612	-1,544	-1,834	-1,890	<b>-1,879</b>	<b>-2,328</b>	<b>-2,253</b>
Norrköping	<b>-1,767</b>	<b>-2,073</b>	<b>-0,809</b>	<b>-2,038</b>	<b>-1,796</b>	-1,567	<b>-1,787</b>	<b>-1,746</b>	-1,463	-1,277
Norrälje	-1,376	-1,231	-1,469	-1,477	-1,397	-1,513	-1,417	-1,441	-1,240	-1,754
Norsjö	-1,321	-1,344	-1,338	-1,297	-1,339	-1,493	-1,544	-1,553	-1,654	-1,427
Nybro	<b>-2,616</b>	<b>-1,978</b>	-1,689	-1,647	-1,697	-1,794	-1,735	-1,864	<b>-2,264</b>	-3,455
Nykvarn	<b>-0,469</b>	-0,732	-0,767	-1,157	-1,130	-1,188	-0,986	-1,280	<b>-1,265</b>	<b>-1,265</b>
Nyköping	-1,746	-1,643	-1,669	-1,697	-1,700	<b>-1,817</b>	-1,663	<b>-1,767</b>	-1,375	-1,514
Nynäshamn	-1,513	-1,434	-1,366	-1,583	-1,351	-1,395	-1,540	-1,130	-1,792	<b>-1,265</b>
Nässjö	-1,845	-1,764	-1,799	-1,800	-1,733	-1,731	-1,712	-1,835	-1,744	-1,782
Ockelbo	-1,347	-1,316	-1,288	-1,379	-1,308	-1,263	-1,199	-1,313	<b>-1,265</b>	<b>-1,265</b>
Olofström	-7,997	<b>-4,622</b>	<b>-3,712</b>	<b>-3,509</b>	<b>-3,308</b>	-3,387	<b>-2,693</b>	<b>-2,409</b>	-1,974	<b>-2,225</b>
Orsa	-25,995	-23,445	-25,295	-25,805	-20,735	-16,885	-20,705	62,045	<b>-1,265</b>	<b>-1,265</b>
Orust	-1,782	-1,814	-1,780	-1,837	-1,757	<b>-1,864</b>	-1,804	<b>-1,919</b>	<b>-1,942</b>	-2,165
Osby	<b>-2,542</b>	<b>-2,473</b>	<b>-2,356</b>	<b>-2,445</b>	<b>-2,390</b>	<b>-2,265</b>	<b>-2,256</b>	<b>-2,352</b>	<b>-2,478</b>	<b>-5,497</b>
Oskarshamn	-0,975	-3,050	-0,759	1,287	-4,180	-3,612	-0,955	-1,308	-1,234	3,788
Ovanåker	-1,670	-4,738	-6,805	-6,117	-5,458	-1,785	<b>-0,821</b>	-1,169	-1,853	<b>-2,759</b>
Oxelösund	-1,542	-1,424	-1,391	-1,485	-1,455	-1,471	<b>-2,103</b>	-1,793	-1,818	<b>-1,930</b>
Pajala	-0,946	-1,203	-1,373	-1,502	-1,497	-1,330	-1,761	<b>-1,908</b>	<b>-2,277</b>	<b>-2,326</b>
Partille	-2,007	-1,853	-1,449	-1,940	-1,848	-1,830	-1,814	-2,049	-1,488	<b>-2,462</b>
Perstorp	-6,673	-6,946	-5,481	-3,857	-5,448	-4,646	-1,741	<b>-0,527</b>	-1,818	<b>-1,265</b>
Piteå	<b>-1,871</b>	<b>-1,994</b>	-1,705	-1,762	-1,707	-1,673	-1,582	-1,618	-1,589	-2,405
Ragunda	-1,850	-1,306	-1,321	-1,265	-1,704	-1,986	-1,870	-1,897	-1,194	-1,032
Robertsfors	<b>-2,513</b>	<b>-2,539</b>	<b>-2,310</b>	<b>-2,328</b>	<b>-2,342</b>	<b>-2,314</b>	<b>-2,293</b>	-1,880	<b>-2,048</b>	<b>-2,344</b>
Ronneby	<b>-2,187</b>	<b>-2,123</b>	<b>-2,081</b>	<b>-2,183</b>	<b>-2,020</b>	-1,741	-1,598	-1,344	-0,986	<b>-2,311</b>
Rättvik	-1,711	-1,636	-1,523	-1,543	-1,384	-1,472	-1,447	-1,690	-1,745	-2,331



Sala	-15,085	-15,755	-16,045	-15,695	-15,365	-15,115	-14,135	-15,005	-13,965	-15,615
Salem	-1,265	-1,265	-1,265	-1,265	-1,265	-2,001	69,465	5,810	-1,265	-1,265
Sandviken	-1,017	-0,859	-1,827	-1,816	-1,857	-0,991	-1,097	-1,445	-1,704	-1,341
Sigtuna	-1,465	-1,517	-1,188	-1,084	-0,815	-1,224	-1,362	-1,371	-1,242	-1,867
Simrishamn	-1,868	-1,814	-1,798	-1,809	-1,642	-1,616	-1,612	-1,835	-1,724	-1,933
Sjöbo	-1,746	-1,554	-1,675	-1,563	-1,159	-1,086	-1,186	-1,800	-1,788	-1,978
Skara	-6,547	-5,849	-6,583	-0,597	-1,593	-2,019	-4,464	-3,097	-3,087	-5,302
Skellefteå	-2,188	-2,128	-2,209	-1,379	-1,410	-1,867	-2,062	-1,576	-1,497	-2,282
Skinnskatteberg	-1,265	-1,265	-1,265	-1,265	12,765	14,575	3,746	9,015	3,590	-1,265
Skurup	-2,044	-0,948	-1,187	-1,202	-1,086	-1,269	-1,159	-1,058	-0,943	-3,058
Skövde	-1,511	-1,529	-1,551	-1,577	-1,616	-1,613	-1,788	-1,536	-1,376	-1,496
Smedjebacken	-1,152	-1,308	-5,916	-1,127	-1,148	-2,384	-2,295	-2,780	-2,684	-1,265
Sollefteå	-2,471	-2,666	-2,738	-2,682	-2,386	-2,161	-2,124	-2,043	-1,897	-1,960
Sollentuna	-1,896	-2,146	-0,653	-0,762	-0,626	-1,888	-2,174	-1,262	-1,520	-1,817
Solna	-2,306	-1,499	-1,466	-1,595	-1,293	-1,699	-1,462	-1,376	-1,221	-1,768
Sorsele	-1,265	-1,265	-0,137	-0,334	-0,336	-0,300	-0,264	-0,304	-0,269	-1,265
Sotenäs	-2,948	-2,584	-2,155	-2,100	-2,071	-1,888	-1,889	-1,911	-1,720	-1,869
Staffanstorp	131,435	-0,881	-0,879	-0,956	-0,927	-0,942	-0,903	-0,977	-0,894	-1,046
Stenungsund	-1,574	-1,553	-1,643	-1,697	-1,691	-1,618	-1,578	-1,723	-1,690	-2,061
Stockholm	-1,035	-0,815	-0,868	-0,907	-0,841	-0,998	-0,891	-1,036	-0,886	-1,027
Storuman	-0,981	0,264	-1,374	-1,379	-1,187	-0,617	-0,551	-0,621	-0,994	-1,305
Strängnäs	-1,977	-2,143	-1,996	-1,969	-2,143	-2,027	-2,123	-2,264	-2,131	-3,804
Strömstad	-1,245	-1,234	-1,309	-1,356	-1,290	-1,253	-0,747	-1,250	-1,210	-1,271
Strömsund	-1,342	-1,358	-1,238	-1,334	-1,352	-1,405	-1,185	-1,222	-1,507	-1,661
Sundbyberg	-1,613	-1,534	-1,531	-1,517	-1,469	-1,182	-1,193	-1,248	-1,209	-1,179
Sundsvall	-2,041	-1,541	-1,328	-1,893	-1,747	-1,595	-1,642	-1,964	-2,031	-2,337
Sunne	-0,897	-0,893	-0,856	-0,870	-0,850	-0,846	-0,771	-0,878	-0,794	-1,015
Surahammar	-18,225	-17,255	-18,145	-18,225	-17,745	-17,465	-15,745	-17,465	-16,515	-18,855
Svalöv	-0,809	-0,690	-1,535	-1,171	-1,437	-1,414	-1,373	-1,438	-1,452	-1,467
Svedala	-46,915	-40,465	-43,875	-38,565	-45,465	-39,655	-36,935	-35,545	-69,395	-1,265
Svenljunga	-1,800	-1,772	-1,744	-1,826	-1,761	-1,597	-1,377	-1,701	-1,743	-1,888
Säffle	-2,645	-2,481	-3,257	-3,075	-3,290	-2,909	-4,012	-11,415	-9,491	258,335
Säter	15,455	0,383	-2,497	-1,174	-2,542	-1,967	-1,022	-0,667	-0,590	8,587
Sävsjö	-1,544	-1,548	-1,587	-1,499	-1,498	-1,485	-1,472	-1,464	-1,532	-1,675
Söderhamn	-2,223	-2,281	-2,610	-2,612	-2,505	-2,396	-2,089	-2,143	-2,410	-2,921
Söderköping	-1,650	-1,498	-1,777	-1,781	-1,520	-1,690	-1,388	-1,411	-1,199	-1,871
Södertälje	-1,312	-1,322	-1,284	-1,300	-1,387	-1,333	-1,452	-1,459	-1,286	-1,798
Sölvesborg	-1,708	-1,810	-1,693	-1,569	-1,560	-1,530	-1,388	-0,826	-1,694	-1,603
Tanum	-1,412	-1,356	-1,294	-1,321	-1,212	-1,323	-1,170	-1,363	-1,465	-1,333
Tibro	-1,003	-1,108	-1,563	-1,691	-1,304	-1,372	-1,144	-1,297	-1,250	-1,265
Tidaholm	-3,717	-1,582	-1,606	-1,797	-1,518	-1,461	-1,430	-1,388	-1,384	-1,265
Tierp	-15,365	-15,815	-15,405	-15,715	-15,095	-14,385	-13,225	-14,955	-13,705	-16,575
Timrå	-6,498	-1,151	-1,164	-1,182	-1,120	-1,150	-1,946	-2,065	-2,409	-2,259
Tingsryd	-1,982	-2,023	-2,004	-1,987	-2,243	-2,178	-2,045	-2,021	-1,542	-2,174
Tjörn	-1,430	-1,348	-1,438	-1,485	-1,474	-1,635	-1,054	-1,451	-1,695	-1,807

Tomelilla	-1,859	-1,937	-1,899	-1,923	-1,885	-1,795	-1,725	-1,514	-0,882	<b>-1,265</b>
Torsby	-1,215	-1,268	-1,302	-1,298	-1,330	-1,367	-1,320	-1,413	-1,358	-1,538
Torsås	-14,395	-13,655	<b>-13,815</b>	-12,235	-12,795	-12,055	<b>-11,385</b>	-12,055	<b>-2,437</b>	<b>-2,109</b>
Tranemo	-1,701	-1,701	-1,698	-1,733	-1,680	-1,623	-1,640	-1,736	-1,749	-2,037
Tranås	-1,071	-1,126	-1,126	-1,138	-1,338	-1,284	-1,248	-1,159	-1,198	-1,108
Trelleborg	<b>-2,536</b>	<b>-2,506</b>	<b>-2,380</b>	<b>-2,237</b>	<b>-2,181</b>	<b>-2,165</b>	<b>-2,040</b>	<b>-2,132</b>	<b>-2,251</b>	<b>-1,265</b>
Trollhättan	-1,743	-1,716	-1,756	-1,730	-1,812	-1,833	-1,724	-1,683	-1,659	-0,232
Trosa	<b>-1,265</b>	<b>-1,265</b>	<b>-1,265</b>	<b>-1,265</b>	<b>-1,265</b>	<b>-1,265</b>	-13,675	-14,245	<b>-1,265</b>	<b>-1,265</b>
Tyresö	<b>-0,570</b>	<b>-0,547</b>	-1,715	-1,351	-1,577	-1,569	-0,535	-1,599	-1,583	-2,040
Täby	<b>-0,540</b>	<b>-0,634</b>	-0,844	<b>-0,549</b>	<b>-0,475</b>	<b>-0,750</b>	<b>-0,502</b>	<b>-0,451</b>	-1,165	-1,432
Töreboda	-1,101	-1,154	-1,231	-1,185	-1,208	-1,060	-0,968	-1,096	-0,858	-2,151
Uddevalla	-1,035	-0,999	-1,365	-1,267	-1,316	-1,379	-1,359	<b>-0,659</b>	-1,232	-1,019
Ulricehamn	-2,026	-2,065	-2,059	-2,009	-2,069	-2,123	-2,037	1,192	0,526	-1,982
Umeå	-1,538	-1,480	-1,581	-1,621	-1,404	<b>-0,836</b>	<b>-0,829</b>	-0,883	-1,448	-1,727
Upplands-Bro	-16,485	-14,795	-15,865	-14,755	-14,905	-14,435	-13,745	-14,865	-13,375	<b>-1,265</b>
Upplands Väsby	-3,095	-4,052	-3,572	-2,833	-3,504	-3,265	-3,101	-3,381	-1,887	-1,782
Uppsala	<b>-0,714</b>	<b>-0,542</b>	-0,921	<b>-0,837</b>	<b>-0,524</b>	<b>-0,695</b>	<b>-0,552</b>	<b>-0,580</b>	<b>-0,643</b>	-1,093
Uppvidinge	-1,677	<b>-4,241</b>	-1,410	-1,969	<b>-4,455</b>	<b>-4,091</b>	<b>-3,328</b>	<b>-3,932</b>	<b>-2,153</b>	<b>-2,240</b>
Vadstena	<b>-1,265</b>	<b>-1,265</b>	<b>-1,265</b>	<b>-1,265</b>	<b>-1,265</b>	<b>-1,265</b>	-1,441	<b>-1,265</b>	<b>-1,265</b>	<b>-1,265</b>
Vaggeryd	-22,175	-20,895	-21,195	-23,225	-20,775	-21,035	-19,405	-21,055	-20,905	<b>-1,265</b>
Valdemarsvik	-5,371	-4,965	-1,695	-1,853	-1,574	-1,655	-1,573	-1,692	-1,823	-1,577
Vallentuna	-1,566	-1,472	-1,389	-1,405	-1,419	-1,693	-1,667	-1,315	-1,257	-1,599
Vansbro	-2,466	5,578	-1,867	-1,564	-1,699	-1,570	-1,406	-1,377	-1,448	2,784
Vara	<b>-2,179</b>	<b>-2,181</b>	<b>-2,242</b>	<b>-2,271</b>	<b>-2,247</b>	<b>-2,054</b>	<b>-2,076</b>	<b>-2,180</b>	<b>-2,283</b>	<b>-2,390</b>
Varberg	<b>-1,872</b>	<b>-1,784</b>	<b>-1,725</b>	<b>-1,729</b>	<b>-1,965</b>	<b>-1,915</b>	<b>-1,917</b>	<b>-1,997</b>	<b>-1,992</b>	<b>-2,130</b>
Vaxholm	<b>-16,505</b>	-20,505	-20,325	<b>-18,845</b>	-18,655	-17,835	-17,285	<b>-18,555</b>	-17,575	<b>-18,645</b>
Vellinge	<b>-1,872</b>	-1,803	-1,753	-1,778	<b>-1,874</b>	-1,737	-1,186	-1,756	<b>-2,049</b>	<b>-1,265</b>
Vetlanda	-8,624	-8,263	-8,521	-7,849	-1,983	-2,060	<b>-2,081</b>	<b>-2,331</b>	<b>-2,498</b>	<b>-2,711</b>
Vilhelmina	-1,219	-1,535	-1,496	-1,270	-1,354	-1,277	-1,248	-1,357	-1,503	-0,925
Vimmerby	-1,631	-1,268	-1,113	-1,521	-1,465	-1,519	-1,495	-1,646	-1,706	-1,903
Vindeln	4,530	4,839	-0,948	-1,029	-0,837	-0,760	-0,757	<b>-0,698</b>	<b>-0,670</b>	-1,337
Vingåker	-6,613	-5,689	-7,574	-9,159	-7,437	-5,562	-4,643	-3,198	1,837	<b>-1,265</b>
Vänersborg	-1,307	-1,444	-1,437	-1,406	-1,425	-1,472	-1,435	<b>-1,858</b>	<b>-1,907</b>	<b>-1,971</b>
Vännäs	<b>-1,265</b>	<b>-1,265</b>	29,395	-3,473	-3,445	-3,947	-2,808	-3,524	<b>-1,265</b>	<b>-1,265</b>
Värmdö	<b>-2,120</b>	<b>-2,068</b>	<b>-1,912</b>	<b>-2,027</b>	<b>-1,900</b>	<b>-1,967</b>	<b>-1,889</b>	<b>-1,954</b>	<b>-0,807</b>	<b>-1,865</b>
Värnamo	<b>-12,755</b>	<b>-12,325</b>	<b>-12,295</b>	-11,675	<b>-11,855</b>	<b>-11,785</b>	<b>-10,496</b>	<b>-11,485</b>	-9,246	<b>-2,725</b>
Västervik	-1,191	-1,078	-1,098	-1,139	-1,210	-1,086	-1,055	-1,219	-1,137	-1,155
Västerås	<b>-2,060</b>	<b>-2,040</b>	<b>-1,994</b>	<b>-1,828</b>	<b>-1,898</b>	-1,720	-1,256	-1,223	-1,465	-1,667
Växjö	-1,497	-1,446	-1,538	-1,501	-1,341	-1,014	-1,131	-1,209	-1,459	<b>-0,785</b>
Vårgårda	-1,217	-1,257	-1,213	-1,246	-1,219	-1,216	-1,254	-1,471	-1,521	-4,479
Ydre	-0,651	-0,585	-0,620	-0,614	-0,572	-0,534	-0,463	-0,547	-0,479	<b>-1,265</b>
Ystad	<b>-4,778</b>	<b>-3,841</b>	-1,822	-2,187	-1,839	-1,982	-1,759	-4,386	-3,470	-0,470
Älmhult	<b>-2,017</b>	<b>-1,985</b>	<b>-1,925</b>	-1,765	-1,857	-1,828	<b>-1,921</b>	<b>-2,069</b>	<b>-2,140</b>	<b>-2,183</b>
Älvdalen	-1,841	-1,709	-1,777	-1,692	<b>-2,051</b>	<b>-2,035</b>	-1,811	<b>-1,977</b>	<b>-1,863</b>	<b>-2,318</b>
Älvsbyn	14,085	-1,837	-1,870	-1,938	-1,701	-1,616	-1,621	-1,908	-1,899	6,510

Ängelholm	-1,863	-1,839	-1,684	-1,718	-1,835	-1,680	-1,728	-1,687	-1,070	-1,889
Åmål	-1,611	-1,551	-1,074	-1,151	-1,379	-1,702	-1,663	-1,751	-1,667	-2,401
Ånge	-1,265	-1,265	-1,265	-1,265	-1,265	-3,536	-3,375	-2,574	-2,374	-5,103
Åre	-1,676	-1,605	-1,653	-1,588	-1,485	-1,622	-1,479	-1,547	-1,476	-1,587
Årjäng	-0,507	-0,462	-0,473	-0,455	-0,338	-0,388	-0,347	-0,392	-0,365	-0,478
Åsele	-1,265	-4,155	-5,647	-5,592	-0,397	5,034	-1,265	-1,265	-1,662	-6,820
Åstorp	-3,252	9,035	-2,586	-2,643	-2,250	-2,312	-2,277	-2,483	-2,394	-24,385
Åtvidaberg	-2,050	-2,058	-1,989	-1,997	-1,860	-1,824	-1,880	-2,069	-2,167	-2,334
Öckerö	-2,111	-2,133	-2,075	-2,187	-2,105	-2,033	-1,979	-2,120	-2,346	-5,888
Ödeshög	-1,265	-3,814	-2,560	8,370	-1,590	-1,998	-2,848	-3,210	-1,265	-1,265
Örebro	-1,593	-1,408	-1,310	-1,332	-1,518	-1,160	-1,197	-1,376	-1,368	-1,546
Örkelljunga	-1,966	-2,018	-1,928	-1,978	-1,905	-1,888	-1,801	-2,028	-1,991	-1,265
Örnsköldsvik	-1,498	-1,499	-1,522	-1,557	-1,456	-1,765	-1,974	-2,085	-2,242	-2,111
Östersund	-0,717	-0,736	-0,815	-0,795	-0,800	-0,730	-1,469	-1,578	-1,615	-1,811
Österåker	-1,879	-1,822	-1,749	-0,908	-0,822	-0,894	-0,761	-1,598	-1,733	-3,297
Östhammar	-1,875	-1,860	-1,810	-1,838	-1,264	-1,146	-1,830	-1,917	-0,645	-1,884
Östra Göinge	-18,845	-4,734	-18,205	-1,446	-1,492	-2,515	-2,217	13,065	3,594	0,417
Övertorneå	1,421	-3,243	-1,498	-1,494	-1,527	-1,333	-1,416	-1,640	-1,602	-1,724 <sup>1</sup>

---

<sup>1</sup> Estimates marked in pink are significant

## Appendix 2: Outliers

### Positive Boone outliers

Municipality	Total positive Boone-estimates over the years
Arjeplog	1
Arvidsjaur	1
Bjuv	2
Bollebygd	3
Boxholm	2
Falkenberg	2
Forshaga	1
Gnosjö	1
Grästorp	7
Gullspång	3
Härnösand	1
Håbo	1
Höganäs	1
Kungsör	8
Laxå	1
Lilla Edet	1
Ljusnarsberg	1
Mariestad	1
Orsa	1
Oskarshamn	2
Salem	2
Skinnskatteberg	5
Staffanstorps	1
Storuman	1
Säffle	1
Säter	3
Ulricehamn	2
Vansbro	2
Vindeln	2
Vingåker	1
Vänersborg	1
Älvdalen	1
Älvsbyn	1
Åre	2
Ödeshög	1
Östra Göinge	3
Övertorneå	1

Variable	Obs	Mean	Std. Dev.	Min	Max
Population	71	11365.95	8444.13	3122.1	40591.8

## Negative Boone outliers

<b>Municipality</b>	<b>Total negative outlying Boone-indicators over the years</b>
Arboga	2
Arjeplog	1
Askersund	10
Avesta	4
Bjuv	1
Bräcke	10
Fagersta	10
Finspång	9
Forshaga	5
Färgelanda	1
Gällivare	10
Habo	3
Hallsberg	4
Hallstahammar	9
Hjo	7
Hofors	1
Hultsfred	8
Järfälla	3
Karlskoga	9
Katrineholm	1
Kil	5
Kinda	4
Knivsta	1
Kumla	10
Köping	1
Landskrona	1
Laxå	2
Lessebo	10
Lilla Edet	3
Lomma	5
Lycksele	5
Malå	9
Mariestad	3
Mellerud	1
Munkedal	1
Mönsterås	10
Nora	10
Norberg	10
Nordanstig	3
Olofström	2
Orsa	7

<b>Osby</b>	1
<b>Oskarshamn</b>	1
<b>Ovanåker</b>	4
<b>Perstorp</b>	5
<b>Sala</b>	10
<b>Skara</b>	5
<b>Smedjebacken</b>	1
<b>Surahammar</b>	10
<b>Svedala</b>	9
<b>Säffle</b>	3
<b>Tierp</b>	10
<b>Timrå</b>	1
<b>Torsås</b>	8
<b>Trosa</b>	2
<b>Upplands Väsby</b>	9
<b>Upplands-Bro</b>	1
<b>Uppvidinge</b>	3
<b>Vaggeryd</b>	9
<b>Valdemarsvik</b>	2
<b>Vaxholm</b>	10
<b>Vetlanda</b>	4
<b>Vingåker</b>	7
<b>Värmdö</b>	9
<b>Växjö</b>	1
<b>Ystad</b>	2
<b>Älvdalen</b>	4
<b>Älvsbyn</b>	1
<b>Åstorp</b>	1
<b>Öckerö</b>	1
<b>Östra Göinge</b>	3

<b>Variable</b>	<b>Obs</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Min</b>	<b>Max</b>
<b>Population</b>	348	15579.83	10053.1	3143	85822

## Municipalities with outlying negative Boone-indicator during half the sample period or more

### Municipality

Askersund  
Bräcke  
Fagersta  
Finspång  
Forshaga  
Gällivare  
Hallstahammar  
Hjo  
Hultsfred  
Karlskoga  
Kil  
Kumla  
Lessebo  
Mönsterås  
Nora  
Norberg  
Orsa  
Perstorp  
Sala  
Skara  
Surahammar  
Svedala  
Tierp  
Torsås  
Upplands  
Väsby  
Vaggeryd  
Vaxholm  
Vingåker  
Värmdö  
Lomma  
Lycksele  
Malå

Variable	Obs	Mean	Std. Dev.	Min	Max
Population	320	14826.13	8361.531	3155	41449

### Appendix 3: Municipalities with normal Boone-indicators

<b>Municipality</b>	<b>Total normal Boone-indicators over the years</b>
<b>Ale</b>	10
<b>Alingsås</b>	10
<b>Alvesta</b>	10
<b>Aneby</b>	10
<b>Arboga</b>	8
<b>Arjeplog</b>	8
<b>Arvidsjaur</b>	9
<b>Arvika</b>	10
<b>Avesta</b>	6
<b>Bengtsfors</b>	10
<b>Berg</b>	10
<b>Bjurholm</b>	10
<b>Bjuv</b>	7
<b>Boden</b>	10
<b>Bollebygd</b>	7
<b>Bollnäs</b>	10
<b>Borgholm</b>	10
<b>Borlänge</b>	10
<b>Borås</b>	10
<b>Botkyrka</b>	10
<b>Boxholm</b>	8
<b>Bromölla</b>	10
<b>Burlöv</b>	10
<b>Båstad</b>	10
<b>Dals-Ed</b>	10
<b>Danderyd</b>	10
<b>Degerfors</b>	10
<b>Dorotea</b>	10
<b>Eda</b>	10
<b>Ekerö</b>	10
<b>Eksjö</b>	10
<b>Emmaboda</b>	10
<b>Enköping</b>	10
<b>Eskilstuna</b>	10
<b>Eslöv</b>	10
<b>Essunga</b>	10
<b>Falkenberg</b>	8
<b>Falköping</b>	10
<b>Falun</b>	10
<b>Filipstad</b>	10
<b>Flen</b>	10
<b>Färgelanda</b>	9



<b>Gagnef</b>	10
<b>Gislaved</b>	10
<b>Gnesta</b>	10
<b>Gnosjö</b>	9
<b>Gotland</b>	10
<b>Grums</b>	10
<b>Gullspång</b>	7
<b>Gävle</b>	10
<b>Göteborg</b>	10
<b>Götene</b>	10
<b>Habo</b>	7
<b>Hagfors</b>	10
<b>Hallsberg</b>	6
<b>Halmstad</b>	10
<b>Hammarö</b>	10
<b>Haninge</b>	10
<b>Haparanda</b>	10
<b>Hedemora</b>	10
<b>Helsingborg</b>	10
<b>Herrljunga</b>	10
<b>Hofors</b>	9
<b>Huddinge</b>	10
<b>Hudiksvall</b>	10
<b>Hylte</b>	10
<b>Hällefors</b>	10
<b>Härjedalen</b>	10
<b>Härnösand</b>	9
<b>Härryda</b>	10
<b>Hässleholm</b>	10
<b>Håbo</b>	9
<b>Höganäs</b>	9
<b>Högsby</b>	10
<b>Hörby</b>	10
<b>Jokkmokk</b>	10
<b>Järfälla</b>	7
<b>Jönköping</b>	10
<b>Kalix</b>	10
<b>Kalmar</b>	10
<b>Karlsborg</b>	10
<b>Karlshamn</b>	10
<b>Karlskrona</b>	10
<b>Karlstad</b>	10
<b>Katrineholm</b>	9
<b>Kinda</b>	6
<b>Kiruna</b>	10
<b>Klippan</b>	10

<b>Knivsta</b>	9
<b>Kramfors</b>	10
<b>Kristianstad</b>	10
<b>Kristinehamn</b>	10
<b>Krokom</b>	10
<b>Kungsbacka</b>	10
<b>Kungälv</b>	10
<b>Kävlinge</b>	10
<b>Köping</b>	9
<b>Laholm</b>	10
<b>Landskrona</b>	9
<b>Laxå</b>	7
<b>Lekeberg</b>	10
<b>Leksand</b>	10
<b>Lerum</b>	10
<b>Lidingö</b>	10
<b>Lidköping</b>	10
<b>Lilla Edet</b>	6
<b>Lindesberg</b>	10
<b>Linköping</b>	10
<b>Ljungby</b>	10
<b>Ljusdal</b>	10
<b>Ljusnarsberg</b>	9
<b>Ludvika</b>	10
<b>Luleå</b>	10
<b>Lund</b>	10
<b>Lysekil</b>	10
<b>Malmö</b>	10
<b>Malung-Sälen</b>	10
<b>Mariestad</b>	6
<b>Mark</b>	10
<b>Markaryd</b>	10
<b>Mellerud</b>	9
<b>Mjölby</b>	10
<b>Mora</b>	10
<b>Motala</b>	10
<b>Mullsjö</b>	10
<b>Munkedal</b>	9
<b>Munkfors</b>	10
<b>Möln dal</b>	10
<b>Mörbylånga</b>	10
<b>Nacka</b>	10
<b>Nordanstig</b>	7
<b>Norrköping</b>	10
<b>Norrtälje</b>	10
<b>Norsjö</b>	10

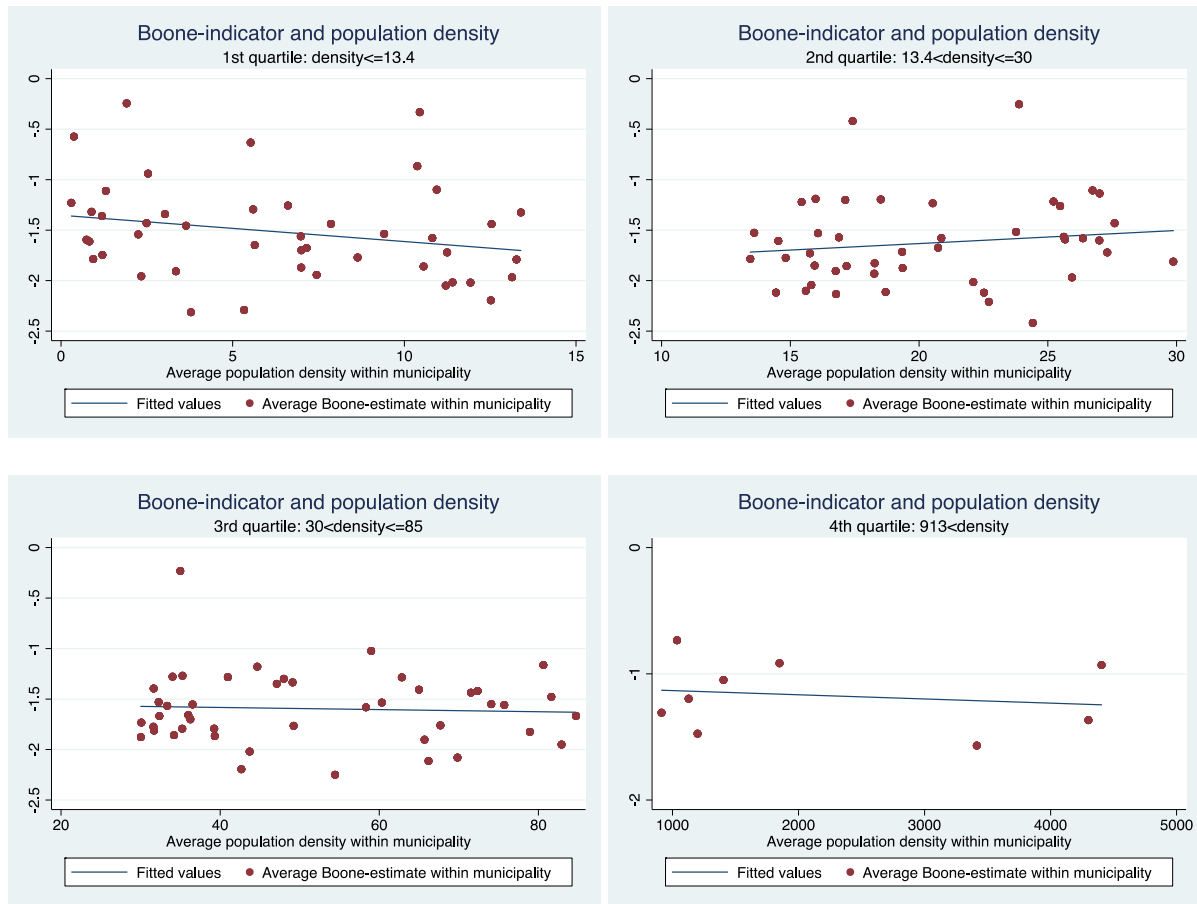
<b>Nybro</b>	10
<b>Nykvarn</b>	10
<b>Nyköping</b>	10
<b>Nynäshamn</b>	10
<b>Nässjö</b>	10
<b>Ockelbo</b>	10
<b>Olofström</b>	8
<b>Orust</b>	10
<b>Osby</b>	9
<b>Oskarshamn</b>	7
<b>Ovanåker</b>	6
<b>Oxelösund</b>	10
<b>Pajala</b>	10
<b>Partille</b>	10
<b>Piteå</b>	10
<b>Ragunda</b>	10
<b>Robertsfors</b>	10
<b>Ronneby</b>	10
<b>Rättvik</b>	10
<b>Salem</b>	8
<b>Sandviken</b>	10
<b>Sigtuna</b>	10
<b>Simrishamn</b>	10
<b>Sjöbo</b>	10
<b>Skellefteå</b>	10
<b>Skurup</b>	10
<b>Skövde</b>	10
<b>Smedjebacken</b>	9
<b>Sollefteå</b>	10
<b>Sollentuna</b>	10
<b>Solna</b>	10
<b>Sorsele</b>	10
<b>Sotenäs</b>	10
<b>Staffanstorps</b>	9
<b>Stenungsund</b>	10
<b>Stockholm</b>	10
<b>Storuman</b>	9
<b>Strängnäs</b>	10
<b>Strömstad</b>	10
<b>Strömsund</b>	10
<b>Sundbyberg</b>	10
<b>Sundsvall</b>	10
<b>Sunne</b>	10
<b>Svalöv</b>	10
<b>Svenljunga</b>	10
<b>Säffle</b>	6

<b>Säter</b>	7
<b>Sävsjö</b>	10
<b>Söderhamn</b>	10
<b>Söderköping</b>	10
<b>Södertälje</b>	10
<b>Sölvesborg</b>	10
<b>Tanum</b>	10
<b>Tibro</b>	10
<b>Tidaholm</b>	10
<b>Timrå</b>	9
<b>Tingsryd</b>	10
<b>Tjörn</b>	10
<b>Tomelilla</b>	10
<b>Torsby</b>	10
<b>Tranemo</b>	10
<b>Tranås</b>	10
<b>Trelleborg</b>	10
<b>Trollhättan</b>	10
<b>Trosa</b>	8
<b>Tyresö</b>	10
<b>Täby</b>	10
<b>Töreboda</b>	10
<b>Uddevalla</b>	10
<b>Ulricehamn</b>	8
<b>Umeå</b>	10
<b>Upplands-Bro</b>	9
<b>Uppsala</b>	10
<b>Uppvidinge</b>	7
<b>Vadstena</b>	10
<b>Valdemarsvik</b>	8
<b>Vallentuna</b>	10
<b>Vansbro</b>	8
<b>Vara</b>	10
<b>Varberg</b>	10
<b>Vellinge</b>	10
<b>Vetlanda</b>	6
<b>Vilhelmina</b>	10
<b>Vimmerby</b>	10
<b>Vindeln</b>	8
<b>Vänernborg</b>	9
<b>Vännäs</b>	10
<b>Värnamo</b>	10
<b>Västervik</b>	10
<b>Västerås</b>	10
<b>Växjö</b>	9
<b>Vårgårda</b>	10

<b>Ydre</b>	10
<b>Ystad</b>	8
<b>Älmhult</b>	10
<b>Älvdalen</b>	5
<b>Älvsbyn</b>	8
<b>Ängelholm</b>	10
<b>Åmål</b>	10
<b>Ånge</b>	10
<b>Åre</b>	8
<b>Årjäng</b>	10
<b>Åsele</b>	10
<b>Åstorp</b>	9
<b>Åtvidaberg</b>	10
<b>Öckerö</b>	9
<b>Ödeshög</b>	9
<b>Örebro</b>	10
<b>Örkelljunga</b>	10
<b>Örnsköldsvik</b>	10
<b>Östersund</b>	10
<b>Österåker</b>	10
<b>Östhammar</b>	10
<b>Östra Göinge</b>	4
<b>Övertorneå</b>	9

## Appendix 4: The Boone-indicator and population density

### By population density quartiles

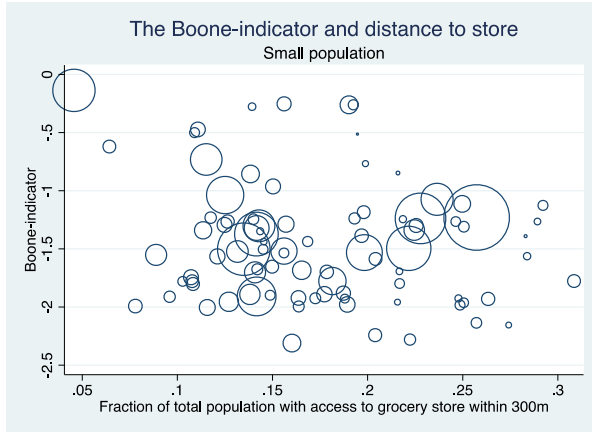


*The above graphs shows the relationship between the Boone-indicator and population density split by population density quartiles. Lower population densities as in the first three quartiles seem to be associated with higher level of competition on average while higher population densities as in the fourth quartile seem to be associated with slightly lower levels of competition on average although the spread is high.*

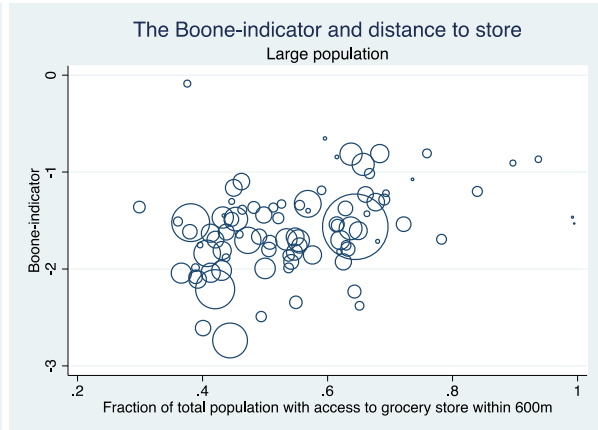
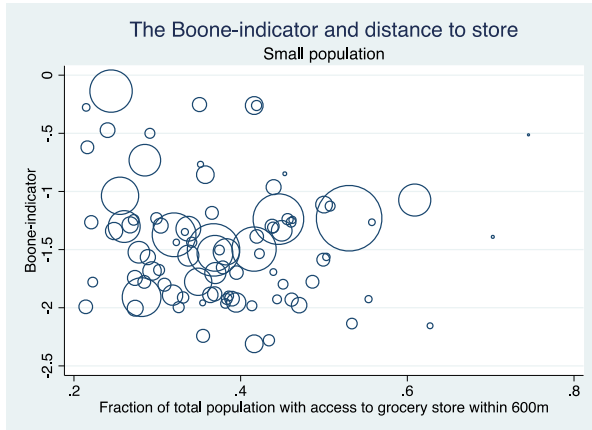
# Appendix 5: The Boone-indicator and the impact of distance

## Fraction of total population with access to grocery store

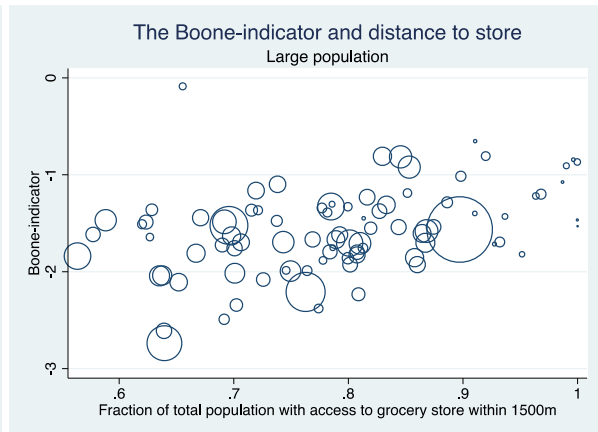
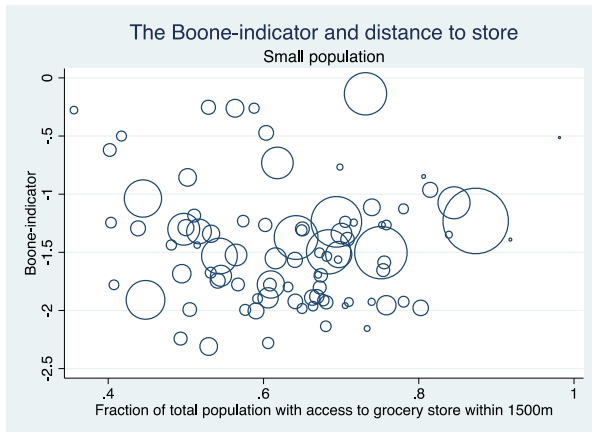
### Within 300m



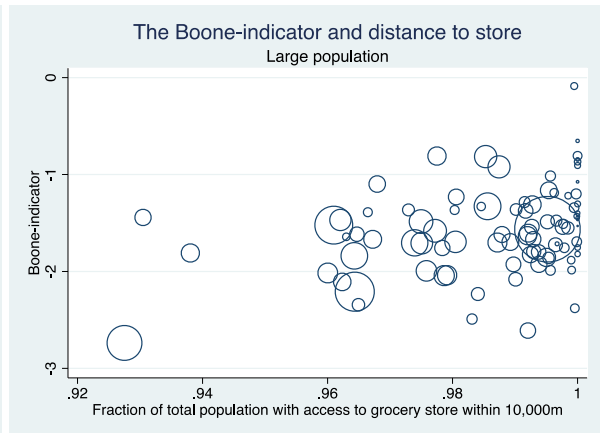
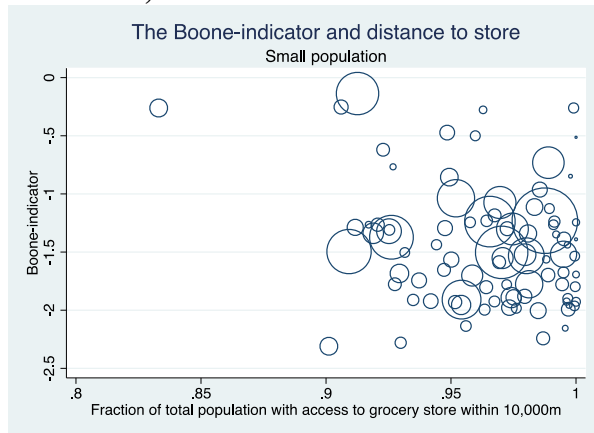
### Within 600m



### Within 1500m

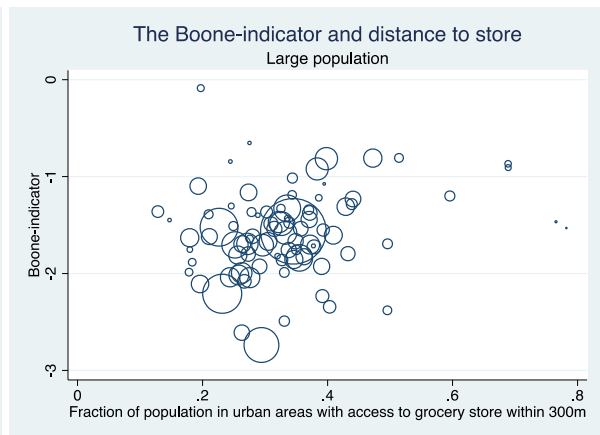
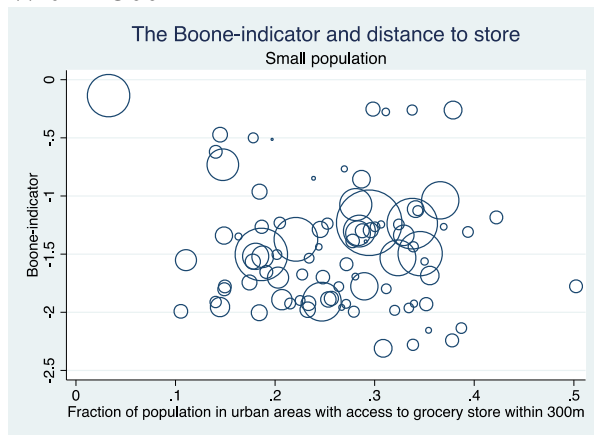


## Within 10,000m

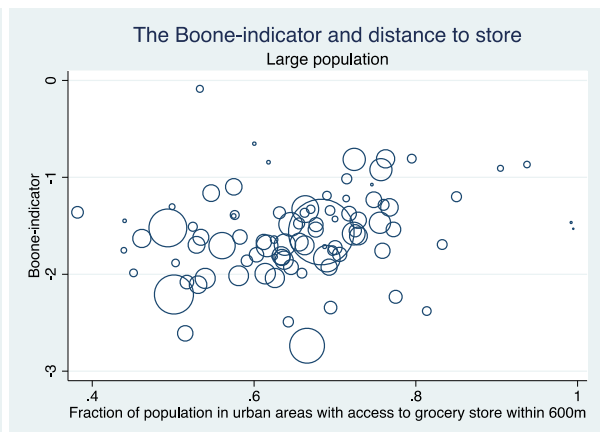
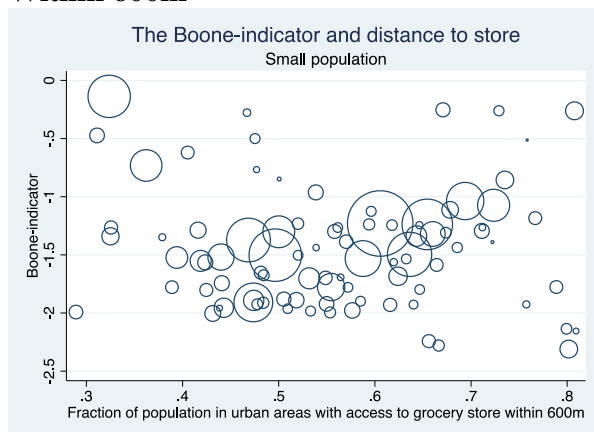


## Fraction of population in urban areas with access to grocery store

### Within 300m

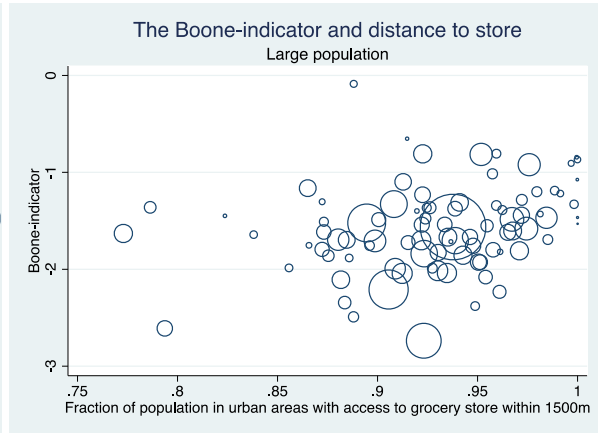
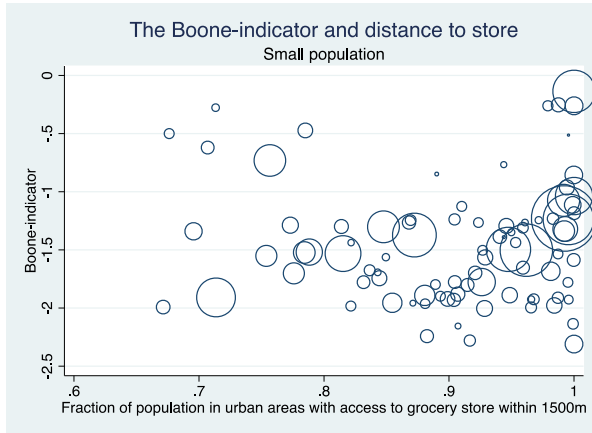


### Within 600m

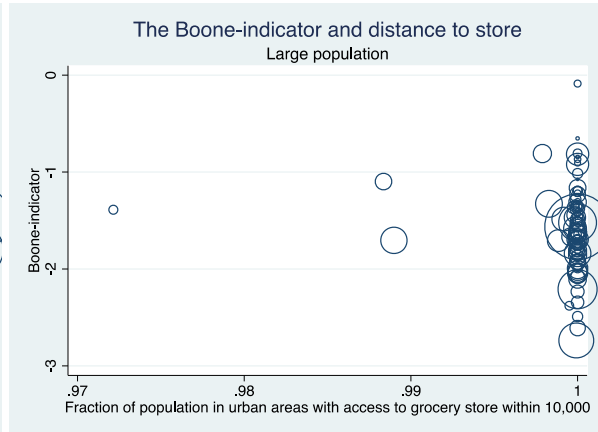
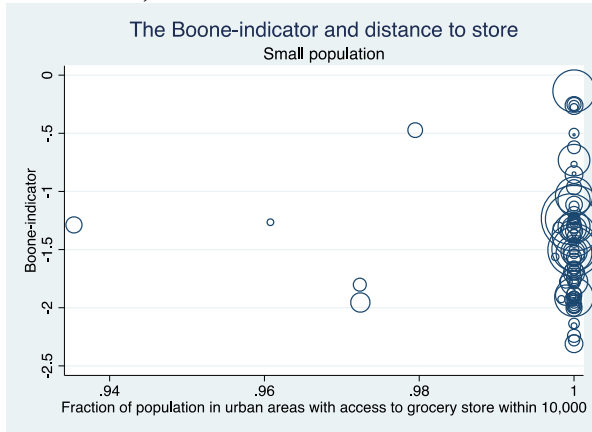




## Within 1500m

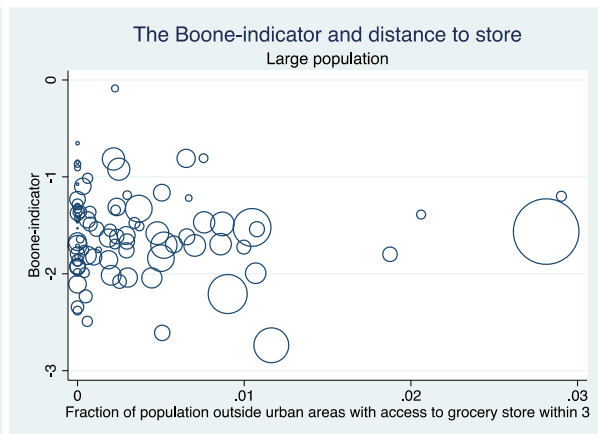
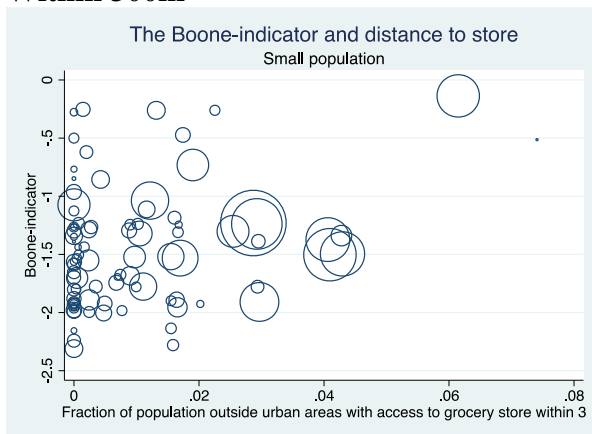


## Within 10,000m

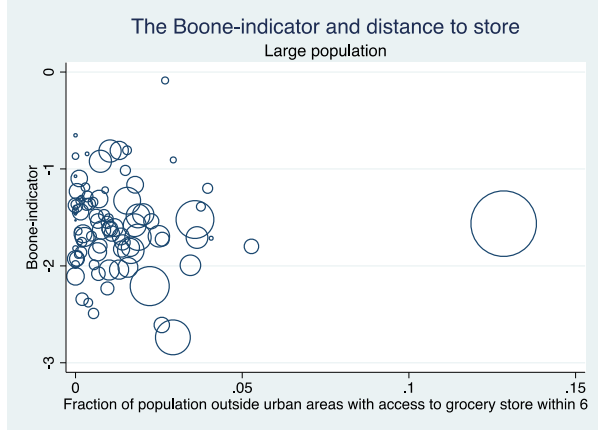
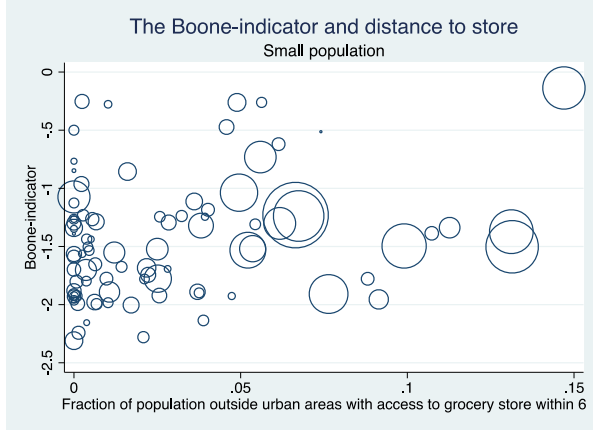


## Fraction of population outside urban areas with access to grocery store

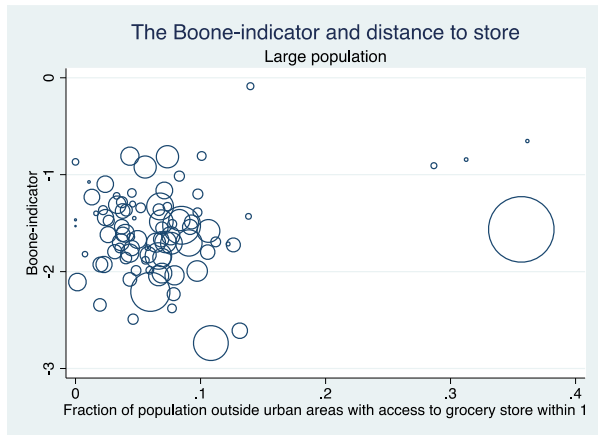
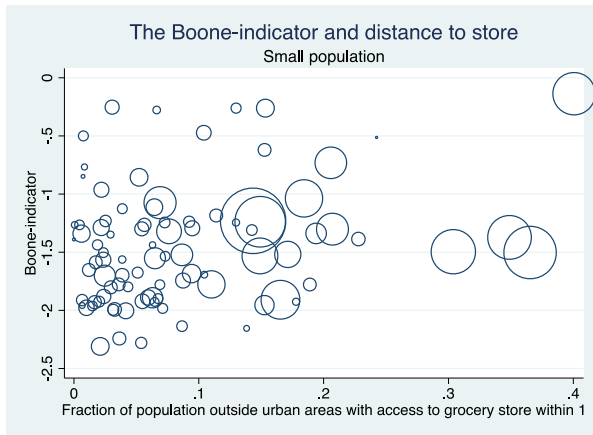
### Within 300m



### Within 600m



### Within 1500m



### Within 10,000m

