Geographical living-patterns of the economically active in Stockholm county

By Marie Haldorson

Statistics Sweden, S-701 89 Örebro

Abstract

This study shows the geographical patterns of where the economically active population in Stockholm county live 1990 compared to 2000. Register data on a grid frame level show that different categories of the economically active population have different geographical living-patterns. The study presents a way of analysing register data, where the grid frames are used to form zones around the heart of Stockholm. The characteristics of the economically active population who live in different zones are analysed.

Other results are that the whole increase of economically active in the county of Stockholm between 1990 and 2000 is due to an increase in commuting from the Mälar region. The economic growth of the region together with shortage of dwellings, makes people commute. The study gives details on which categories of the economically active that commute.

The results are presented in graphs and maps, which shows the different geographical living-patterns for males and females and for people of different origin and educational background.
Introduction

The Stockholm region is described in a number of reports as a functional region growing and including more and more municipalities outside the administrative borders of Stockholm county. The supply of job opportunities makes Stockholm county an attractive region to work in, while the shortage of dwellings makes it difficult for those who work in the county to find somewhere to live within the county.

Regional enlargement is a way to get a larger employment-base when a region grows economically. The purpose of this report is to shed some light on if and how such an enlargement really is the case. Two years – 1990 and 2000 – was chosen for the analysis. The study also focus on if the employed working in Stockholm county have different geographical living-patterns depending on sex, origin or educational background in the year of 2000.

The basis for this study is register-data on where the economically active population, or the day-time population, of Stockholm county lives in 1990 and 2000, distributed by grid frames of the size 1 x 1 kilometre. The use of grid-frames makes it possible to analyse the geographical pattern of where people live in great detail. In the report the data have been analysed and aggregated with GIS-software, both for zones/rings surrounding Stockholm city and for counties.

Statistics Sweden has made this report on behalf of the Office of Regional Planning and Urban Transportation (RTK) in two versions; a full version in Swedish and this limited version in English. The report was written by Marie Haldorson, the data was produced by Johnny Sehlin who also have assisted with GIS-expertise. Gunnar Hedin has examined the results and is also expert on the Labour Statistics Based on Administrative Sources.

Ulla Moberg at the Office of Regional Planning and Urban Transportation (RTK) has been Head of project.
Summary

The aim of this study has been to show if people of different sex, origin and educational background have different geographical living patterns and to what extent there has been any regional enlargement of the Stockholm region between 1990 and 2000.

To study the question of different geographical living-patterns for different categories of the day-time population a centre-point was used, placed in the middle of Stockholm city at the Sergel square. The data for 2000 was aggregated to zones and rings surrounding this centre-point and analysed to show differences in where the day-time population of Stockholm county choose to live.

In the centre, defined as a zone with 10 kilometre radius from Sergel square, lives the high educated of the day-time population in the county and there are an equal amount of men and women. Half of the day-time population in the county living in this zone has post-secondary education, to be compared with only a little more than 25 percent in the ring between 20 and 50 kilometres from the city - where the share of high educated is the lowest.

Those who work in the county and are born abroad live to a large extent in the ring between 20 and 50 kilometres from the city. The rings which covers municipalities outside the county at a distance 100 – 200 kilometres from the city have the lowest share of people born abroad, which shows that the ingoing commuters often are people born in Sweden. The day-time population of Stockholm county as a whole is dominated by those born in Sweden – more than eight out of ten are born in Sweden.

An analysis of the zones around Stockholm city shows that it is possible to indicate different geographical living-patterns for the day-time population depending on sex, origin and educational background. Men born in Sweden is the category with the largest geographical living-region, educational background doesn’t matter. Female university graduates, regardless of origin, and male university graduates born abroad have the smallest geographical living-regions. 90 percent of these categories of the day-time population of Stockholm county live within 30-40 kilometres from the city of Stockholm.

From the official statistics we know that the economically active population (the day-time population) of Stockholm county has grown with almost 9,000 people between
1990 and 2000 to a total of 960,500 people, while the ingoing commuting has grown with 17,000 people during the same period to a total of almost 81,000 people.

A comparison between the situation in 1990 and the situation in 2000 makes two things quite clear; in the first place the whole increase of the day-time population in Stockholm county between these two years is due to an increase in ingoing commuting to the county. The increase in day-time population is a net-figure where the people who both live and work in the county has decreased, at the same time as the ingoing commuting has increased. Secondly the decrease of people both living and working in the county is also a net-figure, as there has been a considerable increase of people who work in the county and live within 10 kilometres from the city combined with a decrease concentrated to the ring between 10 and 20 kilometres from the city.

The growing number of in-commuters might be a consequence of the fact that people who used to both live and work in Stockholm county choose to move out from the county and start to commute instead. You still work in the county, but the shortage of dwellings make you choose to live in some of the municipalities close to the county.

It is more difficult to find an easy answer to why the number of economically active living in the ring between 10 and 20 kilometres from the city has decreased. Maybe the day-time population living in this ring has moved to the city zone or to a municipality in another county.

Regional enlargement is not easy to measure, but from the data used in this study it is possible to state that the day-time population of Stockholm county in 2000 comes from a larger geographical environs than in 1990. Measured by the number of grid frames outside Stockholm county, inhabited by someone working in Stockholm county, there is an increase by 2,500 grid frames.
Table of contents

Abstract ........................................................................................................................................1
Introduction ..................................................................................................................................2
Summary .......................................................................................................................................3
Geographical living-patterns 2000 ..............................................................................................6
    Zones and rings ......................................................................................................................6
    A comparison between the rings ............................................................................................8
    Different geographical living-patterns? ................................................................................10
A comparison between 1990 and 2000 ....................................................................................12
    The day-time population in Stockholm County has grown through increasing ingoing
    commuting ...........................................................................................................................12
    Four out of ten lives in the ten kilometre-zone ....................................................................13
    The women works closer to their home than the men .........................................................14
    Why is there a decrease of employed living in the ring between 10 and 20 kilometres
    from the city? ......................................................................................................................15
About the statistic source: Labour Statistics Based on Administrative Sources ...............16
Literature .......................................................................................................................................18
Geographical living-patterns 2000

Zones and rings

Map 1: The map show the rings surrounding the centre of Stockholm. The municipality-borders and names of larger localities are also shown.
Analysing statistics on grid frames gives you a possibility to let go of the administrative divisions of the country in counties or municipalities. Instead you may use GIS-software to create different geographical zones based on a certain distance from a chosen centre-point. In this study the geographical pattern for the day-time population of Stockholm county is described by zones and rings. The centre-point for the zones/rings is Sergel square in the middle of Stockholm city. The zones/rings have been made with 10 kilometres intervals from 10 to 100 kilometres, then an outer zone has been made between 100 and 200 kilometres.

The difference between a zone and a ring is that while the zone covers the whole area from the centre-point and out to the limit at a certain radius, the ring only covers the area surrounding the previous zone.

In the analysis the rings surrounding the City of Stockholm has been divided into the following groups:

- The ten kilometre-zone include parts of the locality of Stockholm. The locality of Stockholm comprises a lot of municipalities and in this zone you find the whole of Solna, Sundbyberg and Lidingö included together with a large part of Stockholm and Danderyd municipalities and the western part of Nacka municipality. The day-time population of the county of Stockholm living in this zone is 390,000 people year 2000.

- The ring between 10 and 20 kilometres from the city consists of parts of the locality of Stockholm and other large localities as Täby, Lidingö and Boo. A bit over 30 percent of the day-time population of the county of Stockholm are living in this ring, which gives 295,000 people year 2000.

- The ring between 20 and 50 kilometres from the city is delimited in the south by Nynäshamn, in the west by Mariefred and in the north by Knivsta and Rimbo localities. The largest localities in this ring are Södertälje, Upplands-Väsby, Tumba, Åkersberga, Vallentuna and Märsta. Barely one fifth of the day-time population of the county of Stockholm are living in this ring, which gives 185,000 people year 2000.

- The ring between 50 and 100 kilometres from the city comprises the municipalities Oxelösund, Trosa, Gnesta, Flen, Strängnäs, Enköping, Uppsala
and Norrtälje. It also include large parts of Nyköping, Eskilstuna, Västerås, Heby and Östhammar municipality. Five percent of the day-time population of the county of Stockholm is living in this ring, or about 50,000 people year 2000.

- The ring between 100 and 200 kilometres from the city comprises no longer any municipalities of Stockholm county, there are about 50 municipalities in the neighbouring counties in this ring. The ring is delimited in the south by Västervik, in the west by Karlskoga and in the north by Gävle locality. One percent of the day-time population of the county of Stockholm is living in this ring, or about 11,000 people year 2000.

A comparison between the rings

The day-time population of Stockholm county has been divided into 20 different categories, which are a combination of the variables sex, origin and educational background. The variables have the following values:

- sex: male, female
- origin: born in Sweden, born abroad
- educational background: compulsory school, upper secondary education, post-secondary education less than three years, post-secondary education three years or more, unknown educational level

Are there any differences between which category of the day-time population of Stockholm county that lives in the different rings surrounding the city? If you study the educational background of the day-time population living in the rings, the answer is that there definitely are differences in this respect.
The ten kilometre-zone is the only zone/ring where the high educated are most common among the day-time population living in the zone. The ring between 20 and 50 kilometres has the highest share of low educated, but all the rings – except for the centre zone – are dominated by those with upper secondary education.

If you study the distribution of people born in Sweden and people born abroad, the dominating group – naturally – are people born in Sweden in all the rings. The average
percentage of people born abroad of the day-time population of Stockholm county is 16 percent, with a higher share in the ring between 10 and 20 kilometres and a lower share in the rings between 50 and 200 kilometres.

Map 2: Illustration of the share of day-time population born abroad who are living in the centre of Stockholm county. Names of municipalities.

Different geographical living-patterns?

Is it possible to measure if different categories of the day-time population have different geographical living-patterns? A way of doing that is by using data for the zones and comparing zones of varying size to find out if some category of the day-time population live in a smaller or larger zone than some other category.

In the table on the next page an arithmetic example is made with two levels: one level where 90 percent of the day-time population in the county live within the zone and one level where 97 percent live within the zone. The categories with the largest geographical living-regions are not surprisingly categories with men born in Sweden. What maybe was a bit surprising was that the educational background didn’t matter, but a man with
compulsory school education has as large geographical living-region as a man with post-secondary education.

None of the categories with men born in Sweden has a share of 97 percent within the 200-kilometre zone, why it is possible that the men with higher education reaches that share within a larger zone than the men with lower education – but there are no figures on that in this study.

The women with high education, regardless of origin, and the men with high education born abroad has the smallest geographic living-regions. 90 percent of these categories lives in a zone of 30-40 kilometre from the city. If you look at the higher level at 97 percent almost all categories with women born abroad, regardless of educational background, live within a zone of 60 kilometres from the city.

Table A: The categories of the day-time population of Stockholm county 2000 distributed by the zone where they live

<table>
<thead>
<tr>
<th>Category</th>
<th>Zone</th>
<th>Total</th>
<th>30 km</th>
<th>40 km</th>
<th>50 km</th>
<th>60 km</th>
<th>70 km</th>
<th>80 km</th>
<th>90 km</th>
<th>100 km</th>
<th>200 km</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td></td>
<td>960 405</td>
<td>83</td>
<td>88</td>
<td>90</td>
<td>92</td>
<td>94</td>
<td>94</td>
<td>95</td>
<td>96</td>
<td>97</td>
</tr>
<tr>
<td>Women, Sw, comp</td>
<td></td>
<td>44 619</td>
<td>81</td>
<td>88</td>
<td>92</td>
<td>94</td>
<td>96</td>
<td>96</td>
<td>97</td>
<td>97</td>
<td>98</td>
</tr>
<tr>
<td>Women, Sw, upper sec</td>
<td></td>
<td>179 624</td>
<td>82</td>
<td>88</td>
<td>91</td>
<td>93</td>
<td>95</td>
<td>95</td>
<td>96</td>
<td>96</td>
<td>97</td>
</tr>
<tr>
<td>Women, Sw, post-sec2</td>
<td></td>
<td>68 279</td>
<td>87</td>
<td>90</td>
<td>93</td>
<td>94</td>
<td>95</td>
<td>96</td>
<td>96</td>
<td>96</td>
<td>97</td>
</tr>
<tr>
<td>Women, Sw, post-sec3</td>
<td></td>
<td>92 777</td>
<td>89</td>
<td>92</td>
<td>93</td>
<td>94</td>
<td>96</td>
<td>96</td>
<td>97</td>
<td>97</td>
<td>97</td>
</tr>
<tr>
<td>Men, Sw, comp</td>
<td></td>
<td>61 840</td>
<td>75</td>
<td>82</td>
<td>87</td>
<td>90</td>
<td>92</td>
<td>93</td>
<td>94</td>
<td>95</td>
<td>96</td>
</tr>
<tr>
<td>Men, Sw, upper sec</td>
<td></td>
<td>193 854</td>
<td>77</td>
<td>83</td>
<td>87</td>
<td>89</td>
<td>91</td>
<td>92</td>
<td>93</td>
<td>94</td>
<td>96</td>
</tr>
<tr>
<td>Men, Sw, post-sec2</td>
<td></td>
<td>65 781</td>
<td>81</td>
<td>85</td>
<td>87</td>
<td>89</td>
<td>91</td>
<td>91</td>
<td>92</td>
<td>93</td>
<td>94</td>
</tr>
<tr>
<td>Men, Sw, post-sec3</td>
<td></td>
<td>95 522</td>
<td>85</td>
<td>88</td>
<td>89</td>
<td>90</td>
<td>93</td>
<td>93</td>
<td>94</td>
<td>94</td>
<td>95</td>
</tr>
<tr>
<td>Women, abr, comp</td>
<td></td>
<td>14 078</td>
<td>85</td>
<td>94</td>
<td>96</td>
<td>97</td>
<td>98</td>
<td>98</td>
<td>99</td>
<td>99</td>
<td>99</td>
</tr>
<tr>
<td>Women, abr, upper sec</td>
<td></td>
<td>32 167</td>
<td>87</td>
<td>94</td>
<td>96</td>
<td>97</td>
<td>98</td>
<td>98</td>
<td>99</td>
<td>99</td>
<td>99</td>
</tr>
<tr>
<td>Women, abr, post-sec2</td>
<td></td>
<td>10 999</td>
<td>90</td>
<td>94</td>
<td>96</td>
<td>97</td>
<td>98</td>
<td>98</td>
<td>98</td>
<td>98</td>
<td>99</td>
</tr>
<tr>
<td>Women, abr, post-sec3</td>
<td></td>
<td>16 345</td>
<td>91</td>
<td>94</td>
<td>96</td>
<td>96</td>
<td>98</td>
<td>98</td>
<td>98</td>
<td>98</td>
<td>99</td>
</tr>
<tr>
<td>Men, abr, comp</td>
<td></td>
<td>17 056</td>
<td>83</td>
<td>92</td>
<td>95</td>
<td>96</td>
<td>97</td>
<td>97</td>
<td>98</td>
<td>98</td>
<td>99</td>
</tr>
<tr>
<td>Men, abr, upper sec</td>
<td></td>
<td>33 334</td>
<td>84</td>
<td>91</td>
<td>93</td>
<td>95</td>
<td>96</td>
<td>96</td>
<td>97</td>
<td>97</td>
<td>98</td>
</tr>
<tr>
<td>Men, abr, post-sec2</td>
<td></td>
<td>9 409</td>
<td>87</td>
<td>92</td>
<td>93</td>
<td>94</td>
<td>96</td>
<td>96</td>
<td>96</td>
<td>97</td>
<td>98</td>
</tr>
<tr>
<td>Men, abr, post-sec3</td>
<td></td>
<td>16 286</td>
<td>89</td>
<td>92</td>
<td>94</td>
<td>94</td>
<td>97</td>
<td>97</td>
<td>97</td>
<td>97</td>
<td>98</td>
</tr>
</tbody>
</table>

Some explanations to the abbreviations: born in Sweden (Sw), born abroad (abr), compulsory school (comp), upper secondary education (upper sec), post-secondary education less than three years (post-sec 2), post-secondary education three years or more (post-sec 3).
A comparison between 1990 and 2000

One of the aims with this study has been to analyse if the Stockholm region has grown between 1990 and 2000 and – if so – to what extent. In this chapter the economically active population of Stockholm county (the people who work in the county, regardless of where they live, also called the day-time population) is described and compared 1990 and 2000. There has also been necessary to look at the employed living in Stockholm county and in adjacent counties (also called the night-time population), when the commuting is described.

The day-time population in Stockholm County has grown through increasing ingoing commuting

The ingoing commuting to Stockholm county has grown considerable after a recession in the beginning of the 1990-ies. Year 2000 there are almost 81,000 people who commute to a work in the Stockholm county from other counties. The change between 1990 and 2000 is 17,000 people.

The day-time population of Stockholm county has only increased by 8,900 people during the same period, which indicates that the growing ingoing commuting explains all of the increase in day-time population, while the number of people both living and working in Stockholm county has decreased.

Table B: Day-time population of Stockholm county 1990 and 2000

<table>
<thead>
<tr>
<th>Year</th>
<th>Total day-time population (number)</th>
<th>Of which living in Stockholm county (number)</th>
<th>Of which ingoing commuters (number)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>951 531</td>
<td>887 18493</td>
<td>64 347</td>
</tr>
<tr>
<td>2000</td>
<td>960 405</td>
<td>879 58392</td>
<td>80 822</td>
</tr>
<tr>
<td>Change, number</td>
<td>8 874</td>
<td>-7 601</td>
<td>16 475</td>
</tr>
<tr>
<td>Change, percent</td>
<td>1</td>
<td>-1</td>
<td>26</td>
</tr>
</tbody>
</table>

The increasing commuting might be a result of people moving from Stockholm county to some adjacent county, due to the difficult housing-situation in Stockholm county. You choose to live at a longer distance from your work and commute.

To what extent does the employed people in the counties surrounding Stockholm (the night-time population) commute to Stockholm county? At first it may be interesting to know that the share of the employed both living and working in Stockholm county is as
high as 97 percent both in 1990 and in 2000. Of the surrounding counties Uppsala county had the largest share of night-time population working in Stockholm county, both 1990 and 2000. In real figures the increase represents 5,000 people, from a total of 20,000 to 25,000 in the year 2000.

*Diagram 3: Share of the night-time population in adjacent counties working in Stockholm county 1990 and 2000*

Another way to measure the increase of employed commuting to Stockholm county is to count the number of grid frames of 1 x 1 kilometre with at least one person living there and working in Stockholm county. In 1990 there were 13,100 grid frames outside Stockholm county where there lived at least one person working in Stockholm county, in 2000 the number had increased by 2,500 to a total of 15,600 grid frames.

**Four out of ten lives in the ten kilometre-zone**

In 1990 almost four out of ten of the day-time population of Stockholm county was living within a radius of 10 kilometre from the Sergel square in Stockholm city. In 2000 there is still four out of ten of the day-time population of Stockholm county living in this zone. The pattern is the same when you compare the share of day-time population living in the different zones 1990 and 2000; the share hasn’t changed during this ten year-period. Nine out of ten lives within a 50 kilometre radius and if you go as fast as 200 kilometres from the centre you cover the living-areas of most of the day-time population of Stockholm county.
The women works closer to their home than the men

The analysis show, not surprisingly, that the share of women working in Stockholm county gets lower the longer you get from Stockholm city. If you distribute the day-time population of the county by men and women and study the rings surrounding Stockholm city you get an evident pattern.

In the most central zone, with a radius of 10 kilometre, lives as many men as women who work in Stockholm county. The percentage of women then decrease, at first slowly but when you get 100 kilometres from the city the share of women is only 33 percent. The pattern was equal in 1990 and 2000.
Diagram 5: Day-time population of Stockholm county 2000; share of women living in each ring

Percent

Why is there a decrease of employed living in the ring between 10 and 20 kilometres from the city?

What has happened between 1990 and 2000; has there been any change in the geographical living-patterns of the day-time population if you analyse the rings surrounding Stockholm city? The decrease of day-time population both working and living in the county with 7.600 people – is there any geographical distribution of the decrease?

The analysis show that there has been a change between the rings; the 10-kilometre zone has an increase of the day-time population living there, while the ring between 10 and 20 kilometres from the centre has a decreasing day-time population. The patterns doesn’t correspond to the change of the total population living in these areas, as there has been an increase of population both in the centre zone and in the ring between 10 and 20 kilometres with 11-12 percent between 1990 and 2000.
Diagram 6: Change of where the day-time population of Stockholm county live between 1990 and 2000, distributed by origin and ring where they live

The whole decrease of day-time population living in the ring between 10 and 20 kilometres consist of people born in Sweden, which indicates that people born in Sweden who has got a job have left this ring and moved either to the centre or to more outlying living-regions.

The increase of day-time population living in the ring between 60 and 70 kilometres from the city is larger than the increase in the other peripheral rings; in this ring you find great parts of Uppsala locality together with Enköping and parts of Strängnäs.

About the statistic source: Labour Statistics Based on Administrative Sources

The register labour statistics based on administrative sources (RAMS) is maintained by Statistics Sweden. RAMS is primarily built on data from a number of registers originally organised at central authorities for administrative purposes. The main condition for linking data from different registers is that the attached registers contain standard identities for combining objects (persons, enterprises and work places).

The register system enables labour conditions to be observed from both the supply and the demand sides. This makes possible the quantification of individuals and their
movements on the labour market, as well as the composition of employed and labour mobility at any single enterprise or work place. Thus, there are many opportunities to quantify the functioning of the labour market from different aspects.

A large number of variables can be obtained from the RAMS’ registers. The Employment register is the most commonly used among these registers. The Employment register focuses on conditions in November each year. Another important register in RAMS is the Occupational register, which describes all jobs including self-employment.

There are two main concepts in labour statistics worth mentioning, namely “night-time population” and “day-time population”. The night time population is linked to the location of the dwelling and the daytime population is linked to the location of the work place. It is also possible to study commuting between where people live and where they work.

The night time population in RAMS has the building as its smallest geographical unit. This means that it is possible to link every individual entered into RAMS to a specific geographical point. You can choose to view a municipality as a whole, or look at the population on a grid-frame or other area designed for your needs. Secrecy requirements must be observed; statistics cannot be obtained where it is possible to identify specific individuals.

The daytime population are linked to their work places by data originally collected from the Business Register. This causes a quality-problem since all work places do not have addresses in the register, and thus the possibility of linking the daytime population to a building is limited. The lowest, geographical level with good quality is the municipality level.

A new method to define the employed and the new Standard Industrial Classification system (SNI 92) were introduced in 1993. This implies that the data for 1990 in this study show the employed according to the old method and the data for 2000 show the employed according to the new method. More information on methods concerning RAMS is published by Statistics Sweden in the report (SCB, 1994).
Literature

Mälardalsrådet (2002): Mälardalen – en region?


Arena för tillväxt (2002): Regionförstoring i Mälardalen, en studie av pendlingsmönster och boendekostnader, rapport nr 2-02

Mälardalsrådets Planerings- och Trafikutskott (2002): Pendlingsekonomi, en analys av de ekonomiska förutsättningarna för pendlingens roll i skapandet av en utvidgad bostads- och arbetsmarknad i Mälardalen, rapportutkast 2002-03-08

SCB (1994): Att mäta sysselsättning med skatteadministrativa kontrolluppgifter. Dokumentation av ny metodik för sysselsättningsavgränsningen i ÅRSYS.