Danuta Biterman and Eva Franzen
Centre for Epidemiology
The National Board of Health and Welfare
106 30 Stockholm
Sweden
Bjorn Gustafsson (corresponding author) and Torun Österberg
Department of Social Work
University of Göteborg
P.O. Box 720
SE 405 30 Göteborg
Sweden
E-mail: Bjorn.Gustafsson@socwork.gu.se
May 2006

Economic and Ethnic Segregation among youth and young adults in urban Sweden.

Preliminary, please do not quote without authors permission.

Abstract

Like in many other north European countries are in Sweden immigrants from less developed countries and their children concentrated to some less privileged neighbourhoods in the larger cities. This spatial concentration is generally perceived as harmful and has motivated a number of recent policy measures at the national level. This paper attempts to throw new light on those issues focusing on the economic situation of children. In the analysis we combine information at the neighbourhood level for the regions of Stockholm (271 urban neighbourhoods), Göteborg (138 urban neighbourhoods) and Malmö (92 neighbourhoods) with information at the household level. Investigating the situation in 1990, 1996 and 2002 makes it possible to show changes over a turbulent period.

Two related research questions are addressed. First: What is the extent of economic residential polarisation in each of the three regions and has it increased? We investigate this using a decomposition framework using additively decomposable inequality indices. This makes it possible to investigate how large proportion of inequality in child income in each of the three regions that is due to differences in mean income across neighbourhoods. The Stockholm regions is found to be have the largest residential polarisation. Spatial economic polarisation has increased at a remarkably high speed in all three regions.

Second we ask: How large is ethnic polarisation, has it increased and to what extent does it overlap with economic polarisation. To address this we cluster neighbourhoods after the concentration of visible minorities, compute for each city region ethnic polarisation as the proportion of inequality in child income that is due to differences in mean child income across such clusters. Most remarkably while mean child income in neighbourhoods with few or new visible minorities was much higher 2002 than in 1990, they remained constant in neighbourhoods where many visible minorities live. Ethnic residential polarisatioon has thus increased. Out of the three regions the Malmö region had the in 2002 largest ethnic polarisation and its overlap with economic polarisation had become larger than in the other regions.

1. Introduction

In many European countries do a high proportion of immigrants from less developed countries and their dependent children reside in less privileged neighbourhoods of the larger cities. Such a spatial concentration is often perceived as an obstacle for the integration into the host country. Space functions as a barrier. For children do residential segregations mean socialisation into rather different social settings which might have long run consequences. Residential segregation of recently arrived immigrants and other underprivileged means a polarisation in living conditions, a polarisation that can foster social tensions and unrest.

This paper is an empirical study of the extent and changes of residential economic polarisation and ethnic polarisation in one county, Sweden. Sweden has for long been known for its equal distribution of income and its ambitious social programs. However, the large downturn of the economy which took place in the beginning of the 90s led to widespread joblessness from which the economy has not fully recovered yet. The trend of increasing income inequality that started during the first part of the 80s has continued. Housing policy has been dismantled. All those processes can be supposed to have worked towards increased residential polarisation. Parallel to that has many new immigrants moved to the larger cities where they most often have found housing in less attractive areas. Residential segregation, economic as well as ethnic, has entered the political agenda. For the first time ever an urban policy for Sweden was formalised in 1998. This policy consists of programs aiming to support disadvantaged areas.(Andersson, 2006)

Although there are concerns to counteract residential segregation in Sweden, there have not been many systematic efforts to measure it and its changes. This paper is an attempt to shed new light on those issues. We apply a new operationalization of the neighbourhood concept, and use it as a building block when investigating residential polarisation in each of the countries three large-city regions. We derive results for 1990, 1996 and 2002 which makes it possible to show changes over time.

Residential segregation is an outcome of individual decisions and decisions at the policy level. The strongest argument for being concerned of residential segregation is when one considers children. Children are typically not the decisionmaker when it comes to choice of residency and for them is the location of where to grow up exogenous. In the political tradition in Western countries equality in opportunities for children is considered desirable. Therefore there should be consensus on that low residential segregation among children is desirable and it motivates us to study residential segregation from the perspective of children. Our target variable is "child income" a variable based on the disposable income and the expenditure needs in the family where the child lives.

Applying additively decomposable income index to income tax data we define economic polarisation as the proportion of inequality in child income in a particular region that can be attributed to differences in mean income across neighbourhoods. As a first research question we ask how large part of inequality in child income in each of the three regions that is due to inequality across neighbourhoods and how has this spatial polarisation changed?

Our second research task is to investigate ethnic polarisation and the link between spatial polarisation and ethnic segregation. We claim that it is relevant to distinguish between neighbourhoods according to their concentration of visible minorities and ask: How large

proportion of inequality in child income can be attributed to clusters of neighbourhoods that differ by ethnic compositon, and how has such proportions changed? Related to this we ask for the overlap between economic and ethic polarisation.

This work in progress has already produced some interesting results. We confirm that mean child income changed only little between years 1990 and 1996, while larger increases took place from 1996 to 2002. During the period studied inequality in child income increased profoundly. At the neighbourhood level there is considerable mobility across years in average child income which means that while some neighbourhoods had gain position in the ranking of neighbourhoods others lost.

A major finding is that in all regions and between all years of investigation has residential economic polarisation increase. For example while in the Stockholm region 7 percent of inequality (as measured by the MLD index) in child income in 1990 was due to differences in mean income across neighbourhoods the proportion had in 2002 increased to as much as 22 percent. We also show that ethnic polarisation to have increased in all three large city regions. Most remarkably while mean child income in neighbourhoods with few or new visible minorities was much higher 2002 than in 1990, mean income remained constant in neighbourhoods where many visible minorities live. We report relatively large overlap between economic and ethnic polarisation. Out of the three regions in 2002 did the Malmö region have the largest ethnic polarisation and its overlap with economic polarisation had become larger than in the other city regions.

The rest of the paper is laid out as follows: In the next section do we introduce the building bloc of neighbourhood used in this study while the central concepts child income, its inequality and polarisation are defined in Section 3. Results on the extent of spatial polarisation and its change are reported in Section 4 while Section 5 contains results on ethnic polarisation. The paper ends with a concluding section.

2. Neighbourhoods in the three major urban regions of Sweden

In all empirical studies of residential segregation is the choice of primary spatial unit central. In many cases do researchers by necessity have to work with administrative units as other alternatives are not available. Here, however, we are able to use a classification based on sociological considerations that has recently been constructed. (See Biterman, 2006)

In this classification is a neighbourhood an area smaller than a municipality / local government (Swedish: "kommun"), but larger than a city block or quarter. It is defined as an urban area that:
-   is demarked by "natural borders" (lager streets, green areas etc).
-   corresponds to a city district or a residential area.
-   house a number of inhabitants large enough to provide a basis for certain private or public services.
-   inhabitants can consider it as an "area of identification".

The neighbourhoods thus created most often have a population size of 4 000 to 10 000 individuals. The origin of this classification can be traced back several years as for example when the census of 1960 vas carried out "census tracks" were established. Further, each of the three large cities of Stockholm, Göteborg and Malmö have since some time their own systems

of area classification used for planning purposes. The new classification uses such information as input, makes the classification in a similar manner in each of the large cities and extends it to neighbouring local governments, see Table 1.

Table 1
Definition of the three large city regions, number of neighbourhoods, population size and country of origin composition.

Region	Stockholm	Göteborg	Malmö
Municipalities	Stockholm, Solna, Sundbyberg, Danderyd, Ekerö, Järfälla, Lidingö, Sigtuna, Sollentuna, Täby, Upplands-Bro, Upplands Väsby, Vallentuna, Österåker, Botkyrka, Haninge, Huddinge, Nacka, Salem, Turesö, Värmdö, Norrtälje, Nynäshamn and Södertälje	Göteborg, Kungälv, Ale, Lerum, Partille, Härryda, Mölndal and Kungsbacka	Malmö, Burlöv, Kävlinge, Lomma, Lund, Staffanstorp, Svedala, Vellinge and Trelleborg.
Number of neighbourhoods	337	205	154
Urban neighbourhoods with a population larger than 500 persons	271	138	92
Total population as of 2002	1 0830 600	769 900	528 300
Foreign born population as of 2002	324 400	116 400	90 700
Foreign born population 2002 as percent of the total population in the region	18	15	17

Our of Sweden's 9 million inhabitants are 3.3 million, or 37 percent living in the three large city regions. The region around Stockholm, the capital, in the middle-eastern part of the country is the largest, and it consists of not less than 24 municipalities (city level units) and 337 neighbourhoods. Eight municipalities make up the Göteborg region on the west coast, the second largest region when it comes to population size and has 205 neighbourhoods. As usually is the case in this type of studies we treat Malmö in the south together with eight municipalities surrounding it, as a separate region, although if disregarding the national boarder to Denmark it can be considered as the eastern (and smaller) part of the Copenhagen – Malmö region. The Malmö region has 154 neighbourhoods.

Foreign-born persons make up 12 percent of the population in Sweden, but as many as around half of the foreign-born live in the three regions, a profound concentration. In 2002 did the

foreign born in the Stockholm region make up 18 percent of the population, and the corresponding proportion is only slightly lower in the Göteborg and the Malmö regions.

There are more differences across regions when it comes to country of origin, a variation that to some extent mirrors the varying geographic distance to sender countries. Finland is the largest sender country of foreign-born living in the Stockholm region and it ranks as number two among sender countries to the Göteborg region but has a much lower position in the ranking in the Malmö region. In contrast Poland is the second largest sender country for immigrants living in the Malmö region, but ranks much lower in the other two regions. If considering Yugoslavia and its successor states as one unit it is the single largest sender of foreign-born living in both the Göteborg region and the Malmö region. Iraq ranks high as sender country for all three regions (number two in the Stockholm region, number four in the Göteborg region and number three in the Malmö region). Other high ranked sender countries are Iran (particularly in the Goteborg region) and Turkey (particularly in the Stockholm region).

3. Defining child income, its inequality and polarisation.

Out of different aspects for residential segregation possible to analyse this paper takes the perspective, as spelled out in the introduction, of the economic situation of children. We define a person under 18 as a child and measure his or her economic situation based on the disposable income of the parents. An important component of a household's disposable income is wages subject to income tax. In addition there can also be incomes from owning capital received as dividends, interests and capital gains that are subject to income tax. Tax files provides this information delivered to Statistics Sweden.

Other income components we add to receive "gross income" are receipt of social insurance benefits (sickness benefits and unemployment compensation for example) and transfers such as child allowances, housing benefits and social assistance. Statistics Sweden obtains this information from various registers kept by the authorities paying the transfers. Statistics Sweden also obtains information on income taxes paid by the households from the tax authorities and after subtracting this component from gross income the disposable income is obtained. We derive our target variable "child income" by adjusting the disposable income of each household having children with an equivalence scale used by Statistics Sweden. In a final step each person under 18 is assigned this income and we perform the analysis of child income using individuals (children) as the unit of analysis.

Some measurement problems make our measure of child income somewhat noisy. As is the case for all studies based on tax data, earning and capital income that have not been declared is not covered in the data and it is difficult to have a well based view of how important such a underreporting is. While there are thus reasons to expect child income to be under estimated in some cases, there are reasons to expect child income to have been overestimated in other cases. The latter as we have to work with a narrow income pooling and need unit. We do not know if in a particular case the real incomesharing unit includes also one or more persons over 18 years of age, a person that is not the father or mother of the child (and in such case the persons income). The probably largest category of such persons constitutes of older siblings living with the parents. Typically such persons are studying or unemployed meaning a low personal income, but adding to the real expenditure needs of the family.

In order to quantify economic segregation we decompose inequality in child income across neighbourhoods. We use two additively decomposable inequality index, namely the Theil index defined as:

$$I(y) = \frac{1}{n} \sum_i^N \left(\frac{y_i}{\mu}\right) \log\left(\frac{y_i}{\mu}\right)$$

and the Mean Logarithmic Deviation (MLD) defined as: income ine

$$I(y) = \frac{1}{n} \sum_i^N \log\left(\frac{y_i}{\mu}\right)$$

Where μ is the mean income, y_i income of ith individual and N the total number of individuals. If the sample is divided into k groups (here neighbourhoods), the Theil-index can be decomposed as:

$$I(y) = \sum_g^k \frac{n_g}{n} \left(\frac{\mu_g}{\mu}\right) I_g + I\ (\mu_1 e_1, ..., \mu_k e_k)$$

And the MLD can be decomposed as:

$$I(y) = \sum_g^k \frac{n_g}{n} I_g + I\ (\mu_1 e_1, ..., \mu_k e_k)$$

Where n_g is the number of individuals in the gth group (neighbourhoods), I_g inequality within the gth group, μ_g the mean of the gth group income, and e_g the n_g vector of ones.

Within this framework we define *residential economic polarisation* as the ratio between between-group-income inequality and total income inequality, a measure which by definition ranges from 0 to 1. The "between- group" part represents the inequality that would vanish in case mean income of all neighbourhoods were equally large. In a similar manner can we define *residential ethnic polarisation* based on a classification of clusters of neighbourhoods formed after ethnic composition. Details on this classification are provided in Section 5.

The measures of residential and ethnic polarisation are (for each large city region) related which can bee seen from the following identities:

Total income inequality =

Within neighbourhood inequality + Between neighbourhood inequality   (1)

Between neighbourhood inequality =

Between ethnic cluster inequality + Within ethnic cluster inequality   (2)

Substituting (1) into (2) we arrive at:

Total income inequality = Within neighbourhood inequality + Between cluster

inequality + Within ethnic cluster inequality   (3)

The relative size of the two right hand sign terms provide an indication of the overlap between residential segregation and economic segregation. We can for example define a measure of overlap as :

Between ethnic cluster inequality / Between neighbourhood inequality as a measure of the overlap.   (4)

By definition does the ratio defined in equation (4) assume values from 0, as is the case if there is no ethnic segregation up to 1.0 (or 100 percent) which is the case if economic and ethnic segregation strictly follows each other.

The tax data we work with contain all individuals and households living in the three regions studied. Thus there are no sample errors in our estimates. The database at our disposal ("Den sociala databasen") contains annual data from 1990 to 2002. We chose to make computations for the first and last year and include computations also for 1996 which makes it possible to investigate changes across two six year sub-periods. Out of those two the first is characterised by first some economic growth followed by a deep downturn of the economy, the latter sub-period was a period of rapid recovery.

4. The extent of spatial polarisation and its change

Table 2
Mean child income and inequality in the three regions combined 1990, 1996, 2002

Year	MLD	Theil	Gini	Mean disposable income 100s SEK in 2000 prices	Number of observations
1990	0.10254	0.10144	0.23336	1022	585 946
1996	0.14365	0.17112	0.27614	1058	630 163
2002	0.17410	0.24153	0.29979	1358	651 559

Table 2 provides an overview of development of child income in the three regions combined where in 2002 652 000 children lived. It can be seen that mean child income in 1996 was only 4 percent higher than in 1990, but between 1996 and 2002 had increased by as much as 28 percent. Further, inequality in child income increased between both pairs of years according to all inequality measures computed.

Table 3.
Mean child income and income inequality in the regions of Stockholm, Göteborg and Malmö 1990, 1996 and 2002

	MLD	Theil	Gini	Mean disposable income 100s SEK in 2000 prices	N	Between group inequality as a percent of total inequality (MLD)	Between group inequality as a percent of total inequality (Theil)
Stockholm							
1990	0.10754	0.10487	0.23919	1052	341 780		
1996	0.15625	0.18577	0.28665	1098	370 272		
2002	0.19565	0.29677	0.31737	1442	386 448		
Göteborg							
1990	0.09288	0.09483	0.22204	987	145 286		
1996	0.11916	0.14032	0.25376	1010	156 608		
2002	0.12671	0.13435	0.25903	1253	160 539		
Malmö							
1990	0.09599	0.09487	0.22312	974	98 880		
1996	0.12925	0.15381	0.26247	988	103 283		
2002	0.14872	0.14772	0.27445	1205	104 572		
Within group (region) inequality							
1990	0.10195	0.10086					
1996	0.14261	0.17009					
2002	0.17113	0.23860					
Between group (region)							

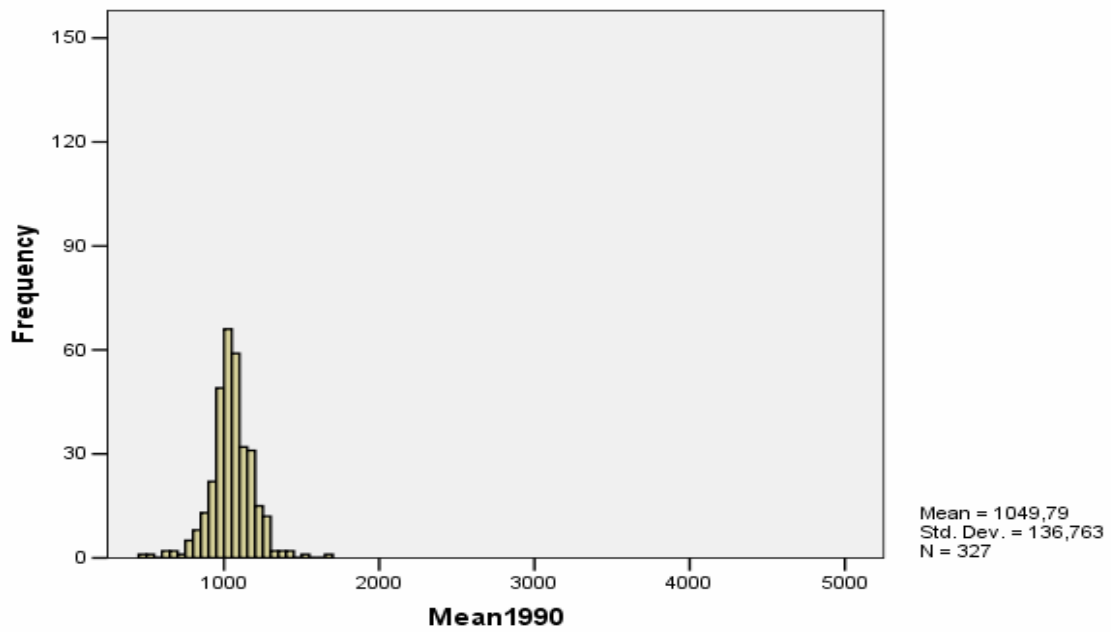| inequality					
1990	0.00058	0.00058		0.6%	0.6%
1996	0.00104	0.00103		0.7%	0.6%
2002	0.00297	0.00293		1.7%	1.2%

Table 3 reports mean child income and income inequality for each of the three regions. We also decompose inequality in child income for the three regions combined after large city region (the lower part of the table). Stockholm has the highest mean income, and the gap to the other two regions has widened slightly. This development shows up when we decompose inequality in the three regions combined after region (the last raws of Table 3) as larger parts can be attributed to the between region part. Still very little of inequality in child income in the three regions combined is due to differences in mean income across regions, for 2002 less than 2 percent.

Table 3 also shows that by all indices used child income is most unequally distributed in the Stockholm region, less unequal in the Göteborg region although the difference to the Malmö region is small. The pattern of increased inequality in child income is found to prevail in all regions during the first sub-period, but for the second sub-period increases are recorded according to all three indices only in the Stockholm region.

With this background we now look at mean income and income inequality at the level of neighbourhoods. Taking Stockholm as an example Figure 1 show neighbourhoods after mean child income each of the three years investigated. Clearly there is a wide dispersion and the same is the impression of Figure 2 showing income inequality (measured by MLD) at the level of neighbourhood in the same region.

Figure 1 Neighbourhoods in Stockholm after mean child income 1990, 1996 and 2002

Stockholm 1990

Mean = 1049,79
Std. Dev. = 136,763
N = 327

Stockholm 1996

Mean = 1116,79
Std. Dev. = 299,502
N = 325

Stockholm 2002

Mean = 1422,88
Std. Dev. = 387,258
N = 325
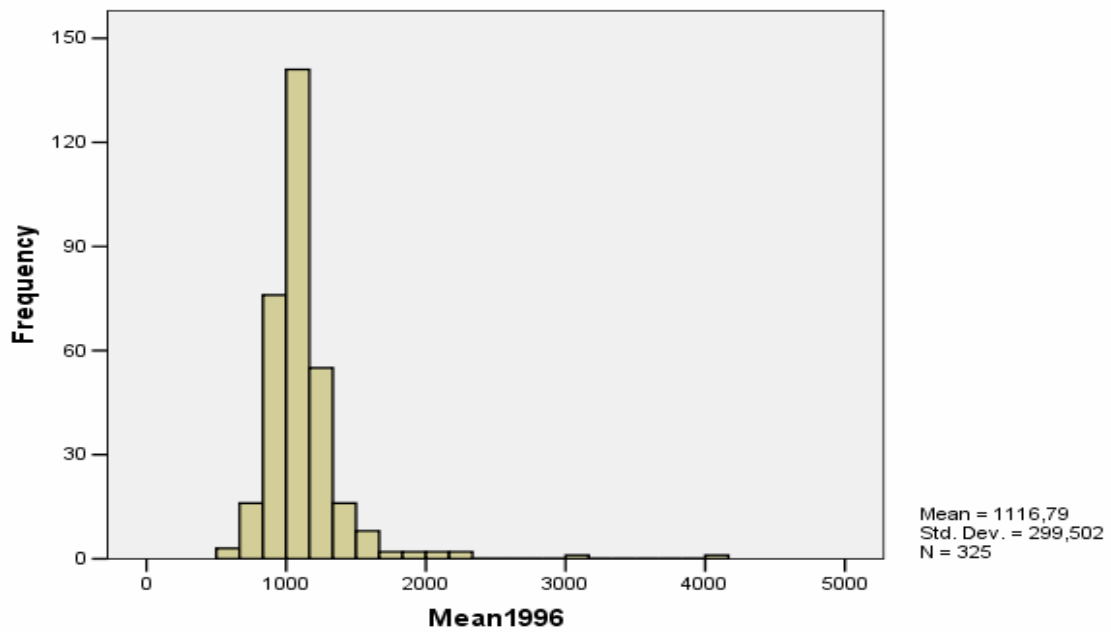
Figure 2 Neighbourhoods in Stockholm after inequality in child income as measured by MLD in 1990, 1996 and 2002

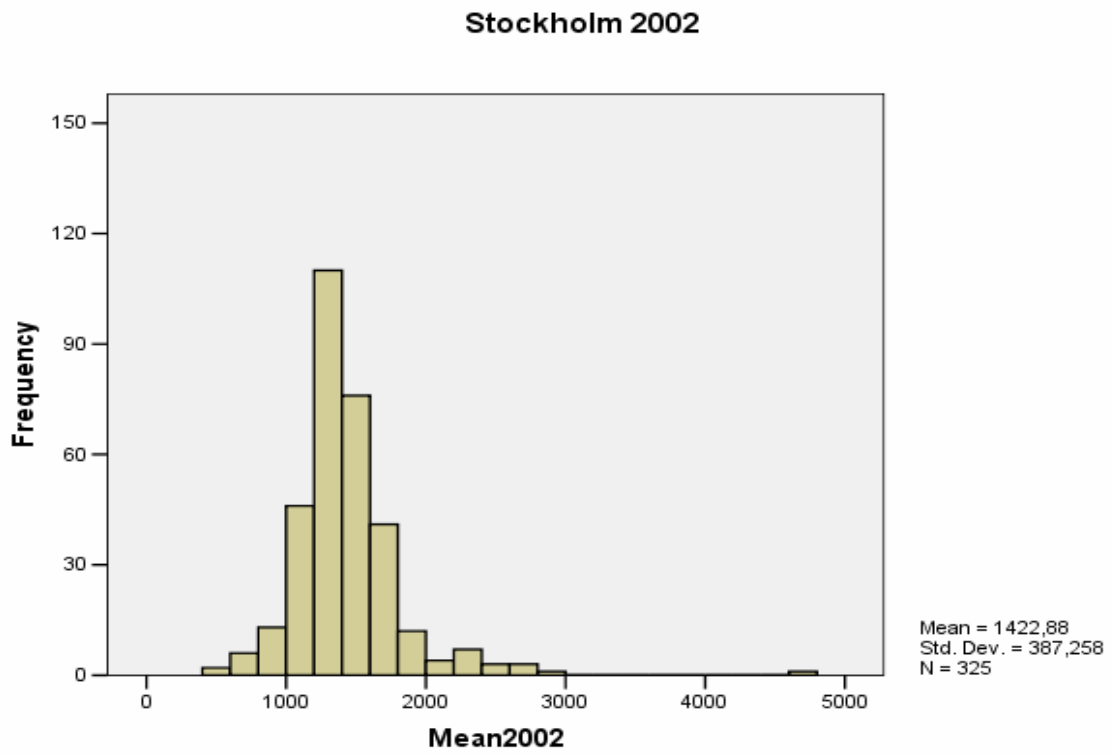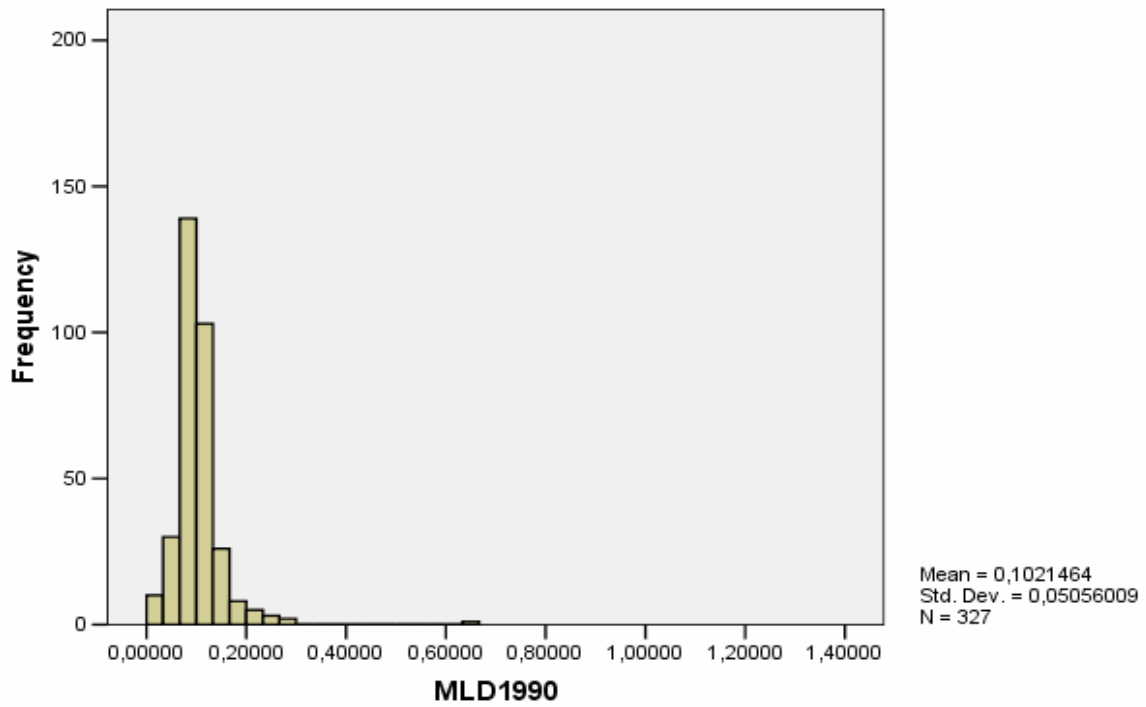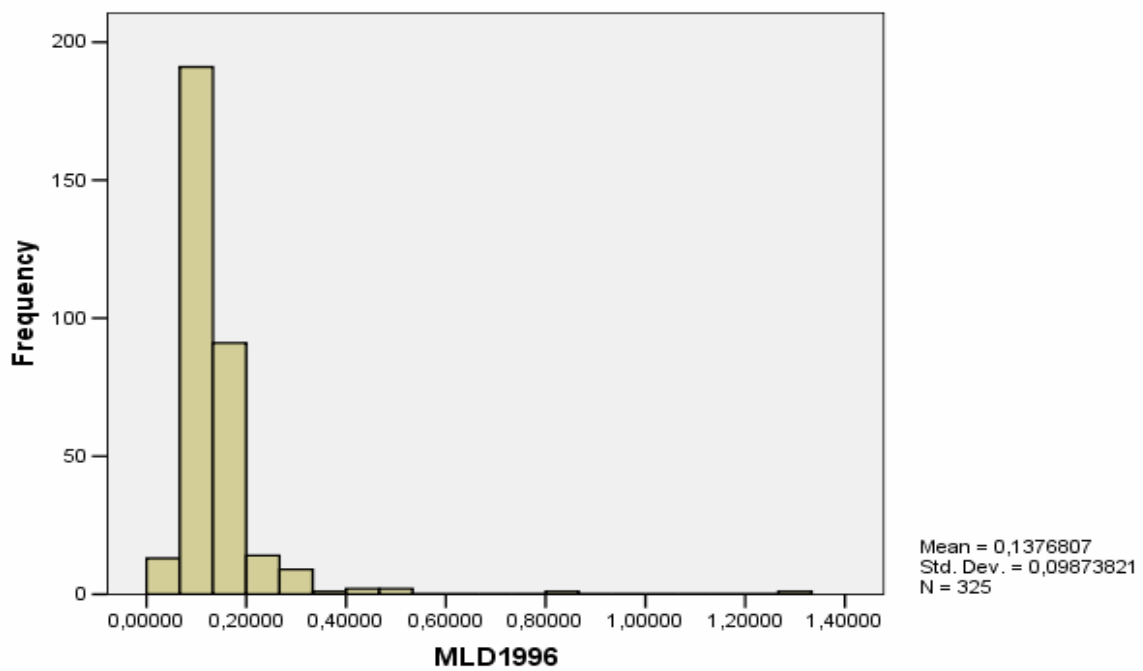## Stockholm 1990

Mean = 0,1021464
Std. Dev. = 0,05056009
N = 327

Stockholm 1996

Mean = 0,1376807
Std. Dev. = 0,09873821
N = 325

Stockholm 2002

Mean = 0,1550913
Std. Dev. = 0,09704743
N = 325
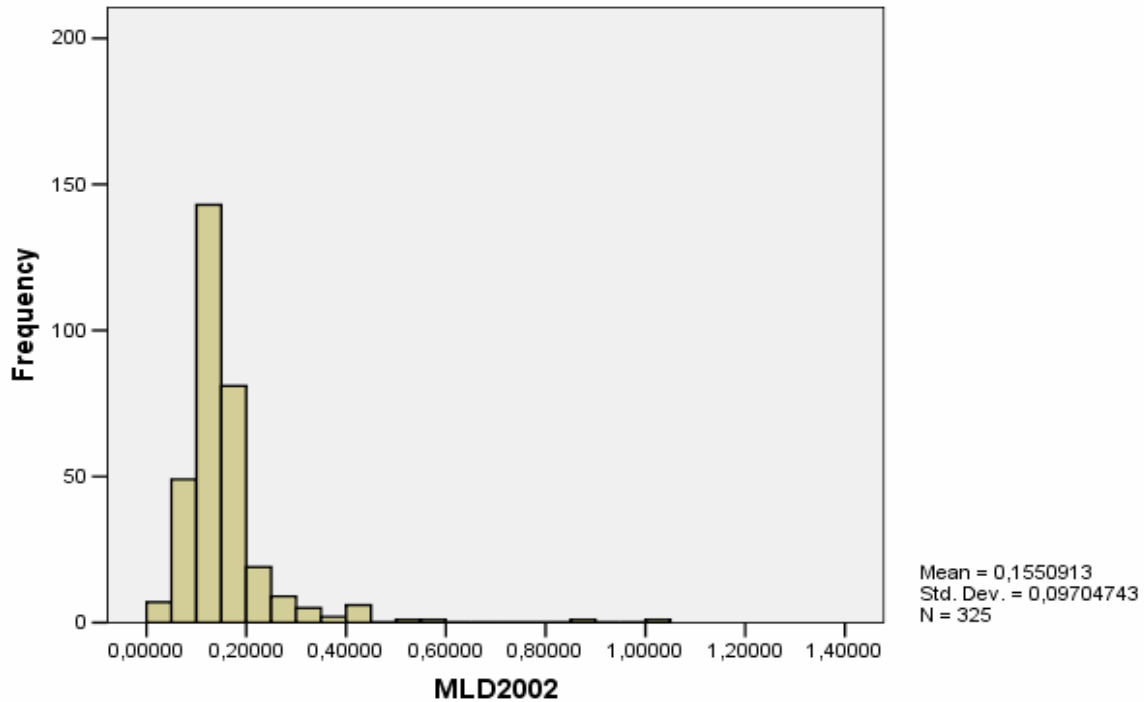
During the 12 year period here studied few houses were constructed and changes in the physical structure of the neighbourhoods were relatively small, particularly during the first part of the period as the construction industry had almost collapsed. However, demographic events led to many changes in the composition of the studied population in the neighbourhoods. Aging made more than half of the children observed at the beginning of the period leave the population as they became adult. They were replaced by newborn. In addition many parent and their children moved to other neighbourhoods in the same region, our out of the region. There was also mobility into the regions from other parts of the country as well as from abroad. With this background in mind it becomes understandable that we can observe a considerable mobility of neighbourhoods in the distribution of child income across the years.

Table 4
Neighbourhood mobility in the distribution of child income 1990 to 2002, the Stockholm region
(Row percent)

Decile in 1990/Decile in 2002	1	2	3	4	5	6	7	8	9	10
1	53.33	20.00	13.33	3.33	3.33	3.33	0	0	3.33	0
2	24.24	21.21	21.21	21.21	3.03	3.03	3.03	3.03	0	0
3	9.09	36.36	21.21	21.21	3.03	3.03	3.03	3.03	0.00	0.00
4	6.25	12.5	9.38	28.13	28.13	6.25	3.13	0	3.13	3.13
5	0	9.09	15.15	9.09	18.18	24.24	12.12	12.12	0.	0
6	3.13	0.	9.38	21.88	21.88	18.75	18.75	6.25	0.	0
7	0.	0	3.23	3.23	9.68	25.81	29.03	16.13	9.68	3.23
8	0	0	6.06	0	6.06	12.12	21.21	39.39	9.09	6.06
9	3.03	3.03	0	3.03	0	3.03	9.09	12.12	45.45	21.06
10	0	0	0	0	0	0	0	6.06	27.27	66.67

Table 4 shows the extend of mobility of neighbourhoods in the distribution of child income in the region of Stockholm as a matrix. It can be found that not more than slightly more than half of the neighbourhoods located in the bottom decile in 1990 remained in the same decile in 2002. Mobility is even larger in the middle of the distribution where a relatively small change in mean child income can make the neighbourhood change decile. Most stability is found in the top of the distribution, although actually one third of the neighbourhoods that were in the top in 1990 had moved down one or two deciles. While clearly neighbourhood mobility most often is short, Table 4 reports a few cases with long mobility. For example one neighbourhood moved from the first decile in 1990 up to the ninth in 2002 and another moved from the ninth decile down to the first.

Table 5.
Decomposing inequality in child income by neighbourhood in the Stockholm, Göteborg and Malmö regions 1990, 1996 and 2002.

	MLD	*Theil*	*Between group inequality as a percent of total inequality (MLD)*	*Between group inequality as a percent of total inequality (Theil)*
Within group inequality				
Stockholm				
1990	0.100505	0.09795		
1996	0.13504	0.16350		
2002	0.15978	0.25798		
Göteborg				
1990	0.08881	0.09705		
1996	0.10895	0.13000		
2002	0.11309	0.12124		
Malmö				
1990	0.09200	0.09097		
1996	0.11591	0.14037		

2002	0.12865	0.12900		
Between group inequality				
Stockholm				
1990	0.00703	0.00692	7.0%	7.1%
1996	0.02121	0.02227	15.7%	13.6%
2002	0.03587	0.03879	22.4%	15.0%
Göteborg				
1990	0.00407	0.00408	4.6%	4.2%
1996	0.01020	0.01032	9.4%	7.9%
2002	0.01363	0.01311	12.1%	10.8%
Malmö				
1990	0.00399	0.00390	4.3%	4.3%
1996	0.01335	0.01344	11.5%	9.6%
2002	0.02006	0.01872	15.6%	14.5%

We are now in a position to answer the first research question; the extent and changes in residential economic polarisation. Table 5 reports the within and between terms for all three regions and all three years computed for the two inequality indices. First compare the three regions. Residential economic polarisation is found to be largest in the Stockholm region according to both measures and for all years investigated. In most, but not all, cases is residential polarisation smaller in the Göeborg region than in the Malmö region. Now let us compare changes over time. Most profoundly, residential polarisation is found to have increased between each pair of years, in each region and according to both inequality indices. The increase is rapid. While for example the MLD index indicated that 7 percent in the Stockholm region of inequality in child income could be attributed to differences in mean income across neighbourhoods the corresponding proportion had increased to as much as 22 percent in 2002.

5. Ethnicity and polarisation

In order to study the degree of ethnic polarisation we classify neighbourhoods according to the ethnic composition of its population. Such a classification can obviously be done according to many different criterions. Here we apply one that is based on the rate between the number of visible foreign-born (of all ages) and the number of native born (of all ages). In the Swedish context is it generally perceived that various forms of discrimination and social exclusion are social problems for some, but not for all foreign-born. People from distant countries with a low or medium-high GDP easy to recognise by colour of the skin or name are unfavourably treated in many cases. Many such immigrants have entered Sweden as refugees or family members to such persons and often they have only a short history of living at the destination. In contrast, people from closely located countries with a high GDP that are visibly difficult to recognise from natives by colour of skin or by name are often treated similar to natives. Such migrants have in many cases arrived as economic immigrants, many have lived at the destination for many years and are well integrated in the Swedish society.

A more detailed description of the classification is the following: For each of the three large city regions is the average rate of visible foreignborn to native born computed and put equal

to 1.0, and for each neighbourhood is the corresponding ratio computed.[1] According to this definition does the number of non visible foreign-born persons in a particular neighbourhood not affect the ethnic classification of a neighbourhood. Based on the value for this variable is the neighbourhood classified into one out of 8 different categories. Neighbourhoods with a population of less than 500 individuals are not classified. There are three categories of neighbourhoods with varying degree of homogenous native-born population (values less than 0.25, 0.25 – 0.49, 0.50 – 0.79), two categories of integrated neighbourhoods (values 0.80 – 1.24, 1.25 – 1.99) and three categories with a concentration of visible foreign-born (2.0 – 3.99, 4.00 – 9.99, 10 and higher). Out of in total 594 neighbourhoods classified 416 are homogenous native born, 104 integrated and 74 have a concentration of visible foreign-born.

For each of the eight clusters of neighbourhoods defined in this manner as for the category of unclassified, we compute mean child income, income inequality in child income. Based on those numbers we decompose child inequality in order to show the extent of ethnic polarisation and its changes. The results are presented in Table 6 and in Figure 3 illustrates for each large city region how mean income differs by ethnic type each of the three years investigated.

Table 6. Decomposing inequality in child income by clusters of neighbourhood having different ethnic composition in the Stockholm, Göteborg and Malmö regions 1990, 1996 and 2002.

a) The Stockholm region

.

	MLD	Theil	Gini	Mean disposable income 100s SEK in 2000 prices	N	Between group inequality as a percent of total inequality (MLD)	Between group inequality as a percent of total inequality (Theil)
1990 all: *After ethnic type*	0.10754	0.10487	0.23919	1052	341 780		
0	0.12468	0.12077	0.26040	980	1217		
1	0.09837	0.09749	0.22947	1009	38877		
2	0.09818	0.10169	0.22637	1128	119797		
3	0.10661	0.10394	0.23736	1095	62019		
4	0.10040	0.09228	0.23094	1050	29820		
5	0.09900	0.09414	0.23458	1009	39199		
6	0.10480	0.09705	0.23999	971	21857		
7	0.13593	0.12339	0.27621	855	17622		
8	0.13465	0.12265	0.27299	775	11368		
1996 all: *After ethnic type*	0.15625	0.18577	0.28665	1098	370 272		

---

[1] See Social Rapport 2006 for the exact definition. It is to some extent arbitrary where the dividing line between visible foreign-born and other foreign-born should be put. Here people born in for example Hungary, Russia and Rumania are (together with those from for example Finland, Norway, Germany and United States) considered as not visible foreign-born. This in contrast to persons born in for example Yugoslavia (and its successor countries), Bulgaria, Greece, Spain and Italy who are considered as visible immigrants (together with people from Africa, Africa and Latin America).

	MLD	Theil	Gini	Mean disposable income 100s SEK in 2000 prices	N		
0	0.43567	0.89019	0.47348	1464	718		
1	0.15493	0.21698	0.28688	1122	51209		
2	0.15730	0.21019	0.28674	1232	127540		
3	0.12881	0.14273	0.26166	1120	67845		
4	0.12394	0.11829	0.25830	1059	34443		
5	0.12280	0.11558	0.25957	978	27508		
6	0.13992	0.12610	0.27380	947	29559		
7	0.17498	0.15661	0.30896	792	17358		
8	0.17307	0.15533	0.30880	695	14093		
2002	0.19565	0.29677	0.31737	1442	386 448		
After ethnic type							
0	0.25353	0.34061	0.37718	1604	522		
1	0.16681	0.22648	0.29858	1480	60638		
2	0.19888	0.32813	0.32193	1668	131593		
3	0.14880	0.18863	0.27690	1478	67284		
4	0.14450	0.14589	0.27332	1369	29270		
5	0.21237	0.59519	0.32348	1314	40260		
6	0.15845	0.14006	0.28663	1121	22619		
7	0.18525	0.16362	0.31677	920	20366		
8	0.19441	0.17187	0.32523	777	13889		
Within group inequality							
1990	0.10370	0.10122					
1996	0.14667	0.17686					
2002	0.17924	0.28202					
Between group inequality							
1990	0.00384	0.00365				3.57%	3.48%
1996	0.00959	0.00891				6.14%	4.80%
2002	0.01640	0.01475				8.38%	4.97%

The Göteborg region

	MLD	Theil	Gini	Mean disposable income 100s SEK in 2000 prices	N	Between group inequality as a percent of total inequality (MLD)	Between group inequality as a percent of total inequality (Theil)
1990 all:	0.09288	0.09483	0.22204	987	145 286		
After ethnic type							
0	0.08246	0.07710	0.20659	845	1621		
1	0.09022	0.10689	0.21536	994	38825		
2	0.07773	0.07855	0.20356	1010	36624		
3	0.09675	0.09598	0.22513	1026	21356		
4	0.09367	0.08743	0.22496	1005	15347		
5	0.09620	0.09155	0.22565	973	9861		
6	0.11045	0.10150	0.24792	932	10272		
7	0.10802	0.09860	0.24676	888	9266		
8	0.12430	0.11497	0.26536	797	2114		
1996 all:	0.11916	0.14032	0.25376	1010	156 608		
After ethnic type							
0	0.08345	0.08161	0.21026	910	1478		

|	MLD	Theil	Gini	Mean disposable income	N		
1	0.12198	0.16545	0.25466	1052	41994		
2	0.10607	0.14116	0.23931	1062	43059		
3	0.10994	0.12300	0.24632	1061	23472		
4	0.10178	0.09919	0.23862	996	12915		
5	0.11340	0.10117	0.24553	956	11948		
6	0.12510	0.11555	0.26608	899	9487		
7	0.12692	0.11937	0.27123	833	4726		
8	0.14810	0.13649	0.29009	713	7525		
2002	0.12671	0.13435	0.25903	1253	160 539		
After ethnic type							
0	0.08947	0.08822	0.22473	1155	963		
1	0.11354	0.13642	0.24839	1329	46373		
2	0.10922	0.11829	0.24340	1345	47924		
3	0.11323	0.11919	0.24439	1284	20690		
4	0.12592	0.14557	0.25563	1236	13121		
5	0.11813	0.10476	0.24851	1154	8984		
6	0.13472	0.12055	0.26926	1056	9693		
7	0.14723	0.13436	0.28706	929	5439		
8	0.16431	0.14760	0.30212	759	7351		
Within group inequality							
1990	0.09178	0.09377					
1996	0.11471	0.13620					
2002	0.11808	0.12663					
Between group inequality							
1990	0.00110	0.00106				1.18%	1.12%
1996	0.00445	0.00412				3.73%	2.94%
2002	0.00863	0.00773				6.81%	5.75%

c) The Malmö region

	MLD	Theil	Gini	Mean disposable income 100s SEK in 2000 prices	N	Between group inequality as a percent of total inequality (MLD)	Between group inequality as a percent of total inequality (Theil)
1990 all:	0.09599	0.09487	0.22312	974	98 880		
After ethnic type							
0	0.11654	0.1094	0.23709	930	1650		
1	0.08028	0.08706	0.20489	990	30582		
2	0.08664	0.0904	0.21294	1026	17093		
3	0.08158	0.08258	0.20953	978	14156		
4	0.10602	0.10676	0.23291	1008	10191		
5	0.09947	0.09276	0.23407	946	10496		
6	0.12533	0.10916	0.2527	921	9928		
7	0.18187	0.13067	0.26962	815	1750		
8	0.11878	0.10776	0.25441	767	3034		
1996 all:	0.12925	0.15381	0.26247	988	103 283		
After ethnic type							

0	0.13301	0.15233	0.25799	997	1603
1	0.10428	0.11746	0.23752	1046	33372
2	0.15027	0.26552	0.27798	1105	17741
3	0.10300	0.10365	0.23828	975	13865
4	0.12759	0.13410	0.25775	1027	9574
5	0.11312	0.10655	0.25057	923	9886
6	0.14289	0.12701	0.27932	847	11708
7	0.14062	0.13291	0.28061	763	2155
8	0.12619	0.12758	0.26917	573	3377
2002	0.14872	0.14772	0.27445	1205	104 572
After ethnic type					
0	0.11445	0.10773	0.24488	1222	1271
1	0.11725	0.13054	0.24864	1334	36602
2	0.13464	0.15729	0.26075	1354	16442
3	0.12180	0.12058	0.25038	1208	15732
4	0.14287	0.12751	0.26650	1221	7332
5	0.14411	0.12182	0.26908	1098	9806
6	0.17185	0.14604	0.29920	933	9680
7	0.17566	0.14810	0.29977	845	4201
8	0.15141	0.14195	0.29225	591	3506
Within group inequality					
1990	0.09436	0.09332			
1996	0.12131	0.14661			
2002	0.13349	0.13432			
Between group inequality					
1990	0.00163	0.00155		1.70%	1.63%
1996	0.00794	0.00720		6.14%	4.68%
2002	0.01522	0.01341		10.23%	9.08%

Figure 3
Mean disposable child income in clusters of neighbourhoods with different ethnic composition 1990, 1996 and 2002 for the Stockholm, Göteborg and Malmö regions
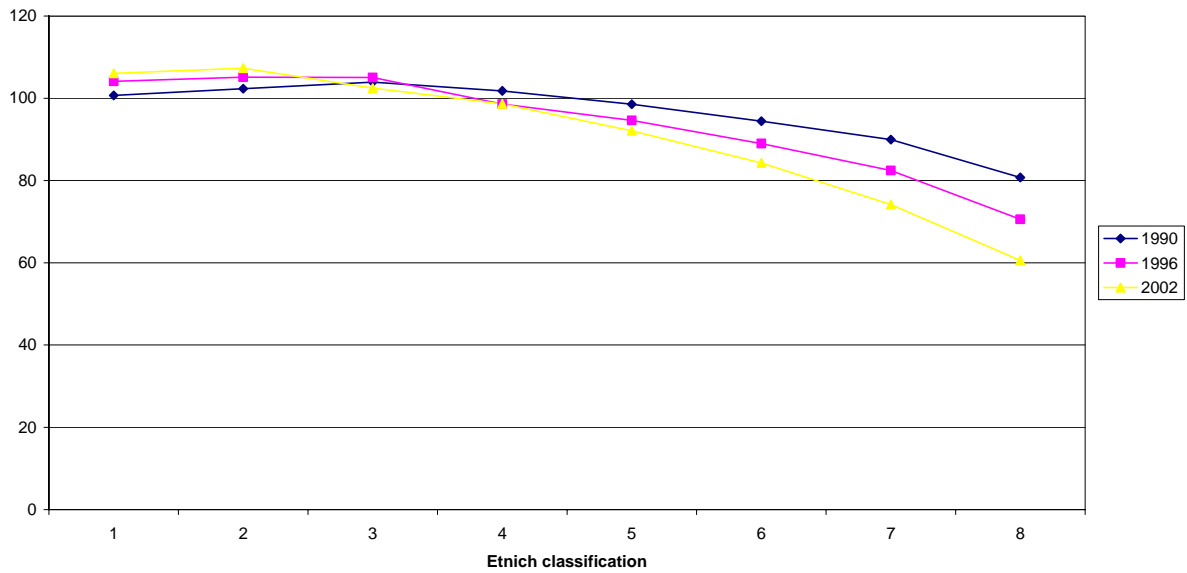
a) The Stockholm region

Development of mean disposable income in different neighbourhoods by year ant ethnic classification:
Stockholm
**(in relation to mean income in whole Stockholm each year)**
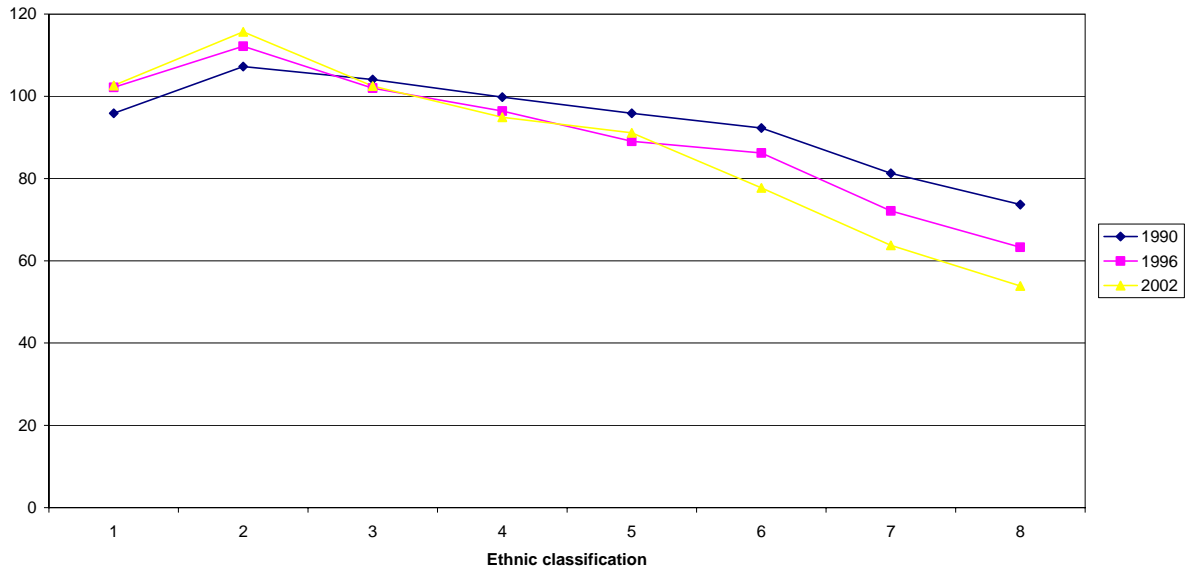
b) The Göteborg region

Development of mean disposable income in different neighbourhoods by year ant ethnic classification:
Göteborg
(in relation to mean income in whole Göteborg each year)

c) The Malmö region

Development of mean disposable income in different neighbourhoods by year ant ethnic classification:
Malmö
(in relation to mean income in whole Malmö each year)
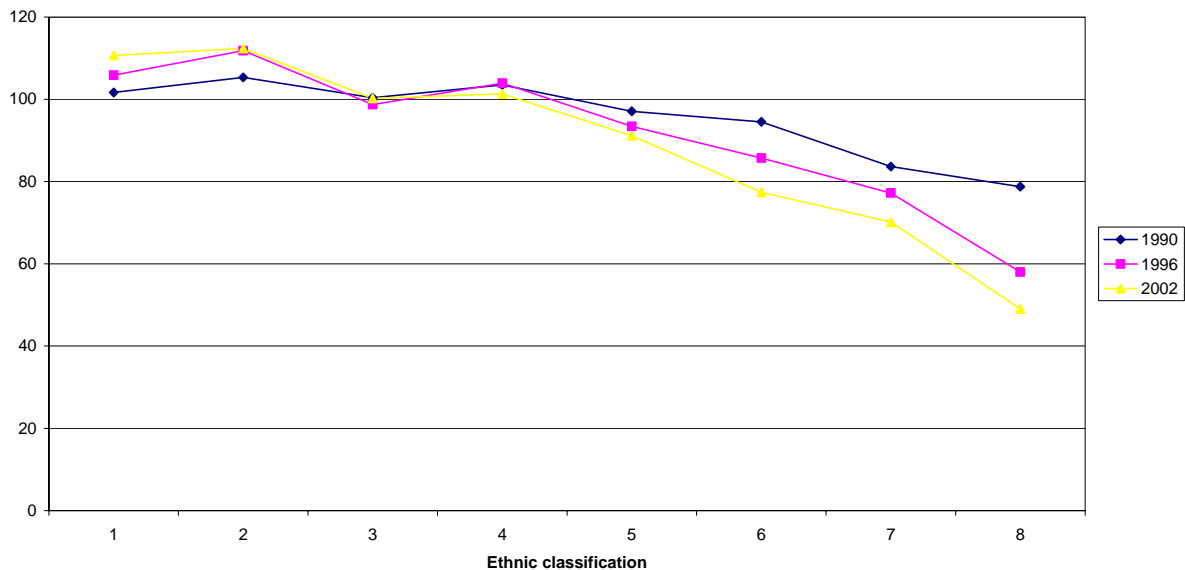
While there is not much of a pattern of differences in child income inequality across the ethnic categories, more is found when it comes to mean income, as well as changes in mean income. Not surprisingly the highest mean incomes are found in neighbourhoods with few visible foreign-born while the mean incomes are slightly lower is the clusters of neighbourhoods with more mixed composition of the population and the lowest means are found in clusters with a dominant composition of visible minorities. This gap in mean income across ethic clusters has increased, an increase with has been rapid and has taken place during both sub-periods.

An example from the Stockholm region can illustrate how different mean income has developed in clusters with varying ethnic composition. Observe first cluster 2 where 120 000 children lived and rather few of them were visible foreign-born. Having the second lowest concentration of visible foreign-born average child income was the highest among the clusters in 1990. Its mean income and in 1996 increased by 9 percent, and between 1996 and 2002 by another 36 percent so in 2002 was mean income as much as 48 percent higher than in 1990. Now observe cluster 8 with 11 000 children, having the highest concentration of visible foreign-born. From 1990 to 1996 did child mean income decrease by 10 percent, and the recovery from 1996 to 2002 was as small as 11 percent meaning that mean income in 2002 was almost exactly the same as in 1990. The gap in mean child income between cluster 2 and cluster 8 increased from 1:1.5, to 1:1.8 and then up to 1:2.2.

From this report of enlarged differences in mean income between clusters of neighbourhoods formed after ethnicity it comes as no surprise that our measure of ethnic polarisation shows increases in all regions and for both sub-periods. In 1990 was the ethic polarisation largest in the Stockholm region, but as the increase was most rapid in the Malmö region in 1990 did this region have the largest ethnic polarisation. While less than 2 percent of inequality in child income in the Malmö region could be attributed to differences in mean income across the clusters, this proportion had increased to 10 percent (when MLD is applied) in 2002.

Finally we study the overlap between residential economic segregation and ethnic segregation using the definition spelled out in Section 3. Table 7 provides the numbers. The table shows that the overlap has actually changed differently over time in the three large city regions. In the Stockholm region did the overlap decrease during the first sub-period, and then remained constant. In contrast did the overlap increase between each pair of years in the two other large city regions. The Malmö region in 2002 stands out as having the highest overlap.

Table 7
Overlap between economic and ethnic segregation in the Stockholm, Göteborg and Malmö regions 1990, 1996 and 2002. Percent

Year	Measures based on MLD			Measures based on the Theil index		
	Stockholm region	Göteborg region	Malmö region	Stockholm region	Göteborg region	Malmö region
1990	55	27	41	53	26	40
1996	45	44	60	40	40	54
2002	46	63	76	38	59	72

6. Conclusions

In this paper we have studied economic and ethnic segregation in the three large city regions of Sweden from the perspective of children using a new operationalization of the neighbourhood concept. Neighbourhoods were also clustered after their rate of visible foreign born. The target variable under study was child income computed from the income of parents and considering the expenditure needs of the family in which the child lives. Inequality in child income 1990, 1996 and 2002 was studied by decomposing additively decomposable inequality indexes. Based on this measure of residential economic polarisation and residential ethnic polarisation were obtained, as well as the overlap between economic and ethnic segregation.

A major finding is that in all three regions, and for both sub-periods studied did residential polarisation increase. For example while in the Stockholm region 7 percent of inequality (measured by the MLD index) in child income in 1990 was due to differences in mean income across neighbourhoods the corresponding proportion of the now larger inequality had in 2002 increased to as much as 22 percent.

The study has found that ethnic residential polarisation increased as well across both sub-period studied in all three cities. Most strikingly we found that while mean real income had increased rapidly from 1990 to 2002 in clusters where few visible foreign-born live. In contrast mean child income in clusters with many visible foreign-born live had not grown. We report relatively large overlap between segregation and ethnic segregation.

While there were many similarities across the three regions investigated in levels and changes still some differences were found. For example while inequality in child income continued to increase during the second sub-period in the Stockholm region, this was not the case in the other two regions. Further at the end of the period the overlap between economic and ethnic polarisation was larger the Malmö region than in the other two regions studied.

References

Anderson, R. (2006) "'Breaking Segregation' – Rhetorical Construction or Effective Policy? The Case of the Metropolitan Development Initiative in Sweden", <u>Urban Studies</u>, 43, no 4, 787 – 799.

Biterman, D. (2006) "Boendesegregation" Chapter 5 in Socialstyrelsen, <u>Social Rapport 2006</u>, Stockholm.