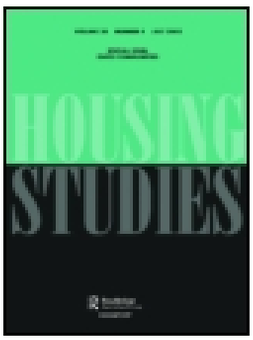

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Leaving poor neighbourhoods: the role of income and housing tenure

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ABSTRACT

To date, few studies have adopted a particular focus on the role of housing tenure when analysing ethnic and socioeconomic differences in out-mobility from poor neighbourhoods. This study contributes to filling this gap. The paper uses a full population data set covering every individual in the capital region of Sweden during the period 2006–2008. The findings indicate that the likelihood of leaving poor neighbourhoods increase for the foreign background population if their income is higher and they own their housing unit, while native Swedes seem to be less constrained by income. This lends support to the theoretical framework of place stratification. The results warrant efforts to broaden residential mix policy beyond the discussion on housing tenure if policy-makers want to counteract the ethnic and socioeconomic imbalances of residential mobility reproducing segregation.

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Selective migration; poor neighbourhoods; segregation; tenure mix; Stockholm

Introduction

In Sweden, and many other national contexts, housing tenure mix is argued to present possibilities for housing careers, and to keep and attract socioeconomically resourceful households to poor neighbourhoods (U.S. e.g. Galster, 2007; U.K e.g. Livingston *et al.*, 2013; Svenska Dagbladet (SvD), 2005; Swedish Government, 2016; the Netherlands e.g. van Kempen & Bolt, 2009). Housing tenure mix strategies are adopted, at least in part, to break mechanisms of residential mobility that contribute to segregation (e.g. Arthurson, 2013; Bergsten & Holmqvist, 2013; Boschman *et al.*, 2013). In Stockholm, there is an increase in owned tenure forms (tenant-owned cooperative housing (co-op)[1] in multi-family housing and homeownership in single-family housing) in poor neighbourhoods.

This paper addresses the link between housing tenure and selective residential mobility, that is, the imbalances of ethnic and socioeconomic groups' moving behaviour that contribute to increasing segregation, focusing on out-mobility flows from Stockholm's poor neighbourhoods between 2006 and 2008. The aim is to highlight

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the role of housing tenure for economic and ethnic selective residential mobility, the paper also contributes to the literature on the place stratification theory by testing to what extent economic and housing resources have varying impact for foreign and Swedish background movers.

Stockholm's housing market has lost affordable housing through tenure conversions of publicly owned rental housing to privately owned co-ops, a process similar to the development in many European countries (Stephens *et al.*, 2010). In Stockholm, conversions have not led to housing tenure mix even though the share of owned housing has increased in poor rental-dominated neighbourhoods. Most conversions have taken place in inner-city neighbourhoods (Andersson & Magnusson Turner, 2014), and Boverket [The National Board of Housing, Building and Planning] (2012) found that 128.952 apartments where converted between 1991 and 2011. This has effectively concentrated rental housing to poorer neighbourhoods, which could limit renters' choice of mobility destinations. Households that own their dwelling could benefit from the private capital accumulation from rising dwelling prices, realize the profit, and move to other areas where rental options are scarce.

Using register data, descriptive statistics and multivariate models, the paper answers three questions. The assumption that owned housing make people stay raises the first question addressing whether and how the probability of moving, in different tenure forms, vary between poorer neighbourhoods and the rest of the city. The second and third questions concern movers in poor neighbourhoods: To what extent does housing tenure affect out-mobility destinations from poor neighbourhoods for the Swedish and foreign background population? How does income affect Swedish and foreign background residents with regard to mobility destinations?

The following section provides an overview of research informing this study. It focuses on selective mobility in relation to the concentration of ethnic minorities and economically weak households in deprived neighbourhoods. Thereafter follows a section on housing tenure and residential mobility. The section on Swedish housing policy and trends in Stockholm then sets the context for the empirical study. Methods and data are presented and followed by the empirical results of the study. Conclusions are summarized in the final part of the paper.

Selective residential out-mobility from poor neighbourhoods

It has been suggested that the high out-mobility rates from poor neighbourhoods are a reflection of physical, social and economic problems (Dekker *et al.*, 2005). Other researchers have pointed to the demographic composition of the population as the primary factor for high mobility rates (Bailey & Livingston, 2007). Households tend to choose neighbourhoods that match their own characteristics in terms of demographic, socioeconomic and ethnic background (Clark, 1991; Schelling, 1971; van Ham & Manley, 2014). It is then expected that those moving out of poor neighbourhoods have higher incomes and education levels and are more often natives compared to stayers (Bolt *et al.*, 2008; Bråmå, 2006; Musterd *et al.*, 2016; Quillian, 2002). Pareja-Eastaway *et al.* (2003) also find high out-mobility among those with low education, probably due to younger people leaving for education and job opportunities

elsewhere. But out-mobility from poor neighbourhoods is high across income groups and ethnic sub-population groups (Andersson, 2013; Bråmå, 2006). Racial variation in mobility frequencies is partially explained by socioeconomic and demographic differences between the white and black groups in the U.S. (Quillian, 2002). Some scholars emphasize the lower socioeconomic status of foreign-born residents as an explanation for concentrations of foreign-born people in some neighbourhoods, and for the imbalances of out-mobility flows (Bråmå, 2006, in Sweden; Bolt *et al.*, 2008, in the Netherlands; South & Crowder, 1998, in the U.S.; van Ham & Manley, 2014, in the U.K). This is in line with the spatial assimilation theory. The stronger impact income variables have on leaving for the ethnic minority group (Bolt & van Kempen, 2003) suggests that a certain level of income is necessary to enable foreign-born residents to leave poor neighbourhoods. This falls under the *place stratification theory*. This theoretical framework suggests, following Pais, South and Crowder (2012), in a strong version that discrimination by various actors on the housing market makes minority residents unable to convert socioeconomic resources into desirable neighbourhoods. A *weak* version instead suggests that higher barriers of entry into desirable neighbourhoods for minority residents make socioeconomic resources more important for these groups in order to realize moving desires compared to the majority population. Important resources could be owned housing or income.

The ethnic and socioeconomic selectivity found when analysing who moves or stays also apply to mobility destinations. Possessing a high level of education, earning a high income and being native are more associated with destinations outside of poor neighbourhoods. Those moving between poor neighbourhoods more often belong to the minority population and/or are low-income earners (Bråmå & Andersson, 2005; Quillian, 2002). Findings from Stockholm suggest that high-income earners are less mobile but leave poor neighbourhoods when they move (Bråmå & Andersson, 2005).

Housing tenure and selective residential mobility

Most studies analysing out-mobility from poor neighbourhoods or neighbourhoods with high concentrations of foreign-born residents use variables to control for housing tenure. Bolt & van Kempen (2003, in the Netherlands, see also van Ham & Clark, 2009), Kearns & Parkes (2003, in the U.K.) and Crowder & South (2008, in the U.S) show that owners are less likely to make a move compared to renters. Van Ham & Clark (2009) add that non-western foreign-born owners are more likely to move than the native Dutch population. This finding suggests that ethnic minorities generally occupy different segments of the owner market compared to the native population, or that owner occupancy creates the capital accumulation necessary for foreign-born households to be able to move out. Since prices have risen in Stockholm there is potential for owned housing in poor neighbourhoods to be a way to accumulate capital, enabling moves to other neighbourhoods.

Results from the U.K. show that private renters are more likely, and Local Authority and Housing Association renters are less likely, to express a desire to leave compared to owners in poor neighbourhoods. Nevertheless, owners are least likely to move (Kearns & Parkes, 2003; for similar findings in a Dutch context, see Boschman

et al., 2017, Musterd *et al.*, 2016). Those living in flats are also more likely to move compared to those living in single-family housing units (Kearns & Parkes, 2003). U.S. findings show that the suppressed likelihood of moving for owners holds regardless of the share of minorities in the neighbourhood (Crowder, 2000), with small differences between ethnic groups in this regard.

Studies showing the effect of ownership on out-mobility destinations from *distressed* neighbourhoods find that owners are likely to stay and that there are small differences in neighbourhood attainment between moving renters and owners (South & Crowder, 1997). Andersson & Magnusson Turner (2014) suggest that the concentration of affordable rental homes in fewer neighbourhoods in Stockholm and the rising share of owned homes in these neighbourhoods increase the level of homeownership and co-op owning among poorer residents, but more out of necessity than choice. If sufficient private capital accumulation from owned housing is not reached, this could lead to increased concentration of low-income housing owners in the poorest neighbourhoods, with very few possibilities to leave these areas (van Ham & Manley, 2015).

There is no clear distinction between owning a house or an apartment in the above sampled research. They all use a binary rent/own variable, but show that living in flats and single-family houses have different effects (Kearns & Parkes, 2003). With Swedish data it is possible to make the distinction between owners of single-family housing and apartments through the conventional housing tenure definition implemented in the empirical contribution.

In relation to the above sampled research three hypothesis are formulated. (1) it is expected that co-op owning increases the likelihood of moving when living in poor neighbourhoods compared to other housing tenures and compared to other parts of the city, because they are used as a first step on a housing and spatial career. In line with the place stratification theory: (2) the foreign background population are dependent on higher income and owned housing to realize a move out from poor neighbourhoods. (3) The Swedish background population is not dependent on higher income or housing tenure to realize a move out from poor neighbourhoods.

Housing in Sweden

Sweden has three main tenure forms: homeownership in single-family houses (39.6 percent of the housing stock in 2013), tenant-owned cooperatives (co-ops, 20.2 percent) and rental tenure (30.1 percent), the two latter are primarily found in multifamily housing. The remaining housing stock include different forms of special housing for students or elderly, housing in buildings mainly constructed for other purposes than housing or are missing in the data (Statistics Sweden, 2017). Rental housing is either municipality owned (public rental) or privately owned. There is no social housing in Sweden, meaning that there is no designated housing for people with low income, but the social services arrange for housing within the general housing stock for some households. Rents in rental housing are set through negotiations between the Swedish union of tenants and the public and private rental companies. The rent-setting scheme is intended to erase large geographical differences in rent levels

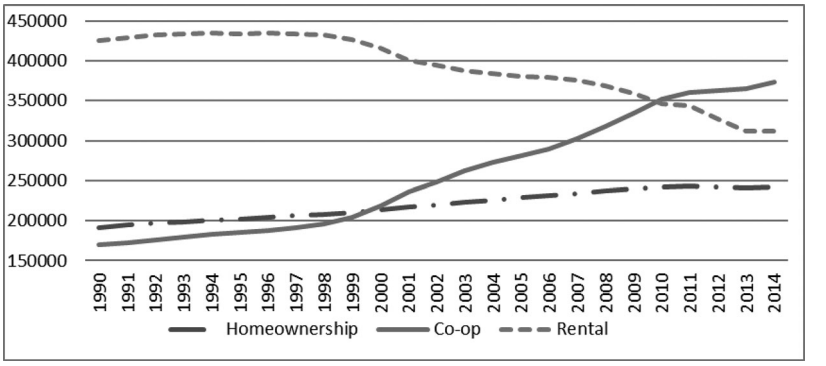

Figure 1. Dwellings by tenure in Stockholm 1990–2014.

between various neighbourhoods within the same local housing market and to prevent rent differences between private and public rental companies. In practical terms, for the tenant, the co-op is comparable with owner occupancy. The cooperative owns the real estate, usually the land it sits on, and has theoretical power over entry for new tenants. It is, however, hard for a cooperative to deny a buyer membership. The tenant owns the right to live in one apartment, and this right may be traded on the open market (Christophers, 2013). The homeownership market is an open market where buyers and sellers agree on the price for the dwelling.

Over recent decades, Swedish housing has lost many of its traditional characteristics, following large parts of Europe in a more market-oriented direction (Tammaru *et al.*, 2016). The changes include reduced tax benefits for building affordable rental housing (abolished during the 1990s), reduced housing allowances and tougher eligibility demands, and an emphasis on housing as an individual responsibility rather than as a social right. Encouragement of owning is widespread, including the abolishment of real estate taxation, replaced with a lower fee, and the sales of public rental housing to sitting tenants (Holmqvist & Magnusson Turner, 2014). The former non-profit public housing companies have shifted to a *business*-like model of operating, in compliance with EU competition regulation. Even if there is a general aim of neighbourhood mix through housing tenure mix it is mostly done through the increase of owned housing in rental dominated neighbourhoods (Bergsten & Holmqvist 2013).

Stockholm trends

In Stockholm County 128.952 apartments were converted between 1991 and 2011 (Boverket 2012). This mounts to 74.3 percent of all converted properties in Sweden. The conversions have increased the level of mobility in the converted segment, and one possible explanation is that people have tried to capitalize on the lucrative co-op contracts (Andersson & Magnusson Turner, 2014).

Figure 1 displays dwelling by tenure in Greater Stockholm. New constructions, skewed towards co-ops, and tenure conversions, have restructured the housing stock in Stockholm. Andersson & Magnusson Turner (2014) argue that the Swedish stock-transfer programme is pushing poorer residents out from the inner-city areas as rental apartments are converted. The share of co-ops increased across the whole city, but

the development is not uniform. In the inner city there has been a large shift from tenure diversity towards domination by co-op apartments while poorer neighbourhoods in the outskirts of Stockholm have had less dramatic shifts in their tenure composition. The income gap between renters and co-op tenants grows, strengthening the link between income levels and housing tenure (Holmqvist & Magnusson Turner, 2014).

For the poorest and most marginalized groups in Stockholm, there are diminishing options on the housing market, and rental dwellings are also less geographically spread. Furthermore, there is selectivity of mobility patterns in Stockholm, and increasing ethnic and socioeconomic segregation (Amcoff *et al.*, 2014) with some interesting nuances as some findings show that the ethnic segregation within different income brackets is declining (Andersson & Kährik, 2015).

Data and methods

This paper uses the Equipop software (Östh, 2014) to define neighbourhoods through a *k*-nearest neighbour approach (see also Malmberg *et al.*, 2014; Östh *et al.*, 2015). Equipop renders aggregated statistics for the population threshold *k*, adding individuals through an expanding circle around each individual coordinate. Since individuals in the database do not have unique coordinates, the *k*-nearest neighbours are gathered through the closest coordinate, which means that an entire square (100×100 metres) is incorporated at the same time until the *k* is reached. Using the closest neighbours to delimit a neighbourhood has both positive and negative aspects. For instance, fixed geographical size may overlook issues regarding population density that could affect measures of neighbourhood composition. On the other hand a k-nearest approach capture the closest neighbours and making them the neighbourhood, with large distances to neighbours the neighbourhood definition might not constitute what is perceived as a neighbourhood by the individual (Östh *et al.*, 2016).

In this paper the neighbourhoods are defined as the 500 nearest neighbours (aged 20–63 in 2006) to every individual in the data set. There are of course still difficulties with the Modifiable Area Unit Problem (Openshaw, 1984) associated with this technique. The 501st neighbour will not be included but the 500th will. Some relief comes with the distance decay effect in the model. Close neighbours are thus given more weight than remote ones. The main purpose of the distance decay is to deal with sparsely populated areas and the 292 populated islands of the Stockholm archipelago (Statistics Sweden, 2014). People living on one island, for instance, have their closest neighbour on the mainland or another island, and the impact of these remote neighbours is reduced by the distance decay function.[2] A single house or block could be categorized as a neighbourhood if 500 people live in it. For the total population in Stockholm in 2006, the minimum distance is zero (2.5 percent of the population) with a median distance of 223 metres; for 2008, 2.9 percent have their 500 closest neighbours within the same coordinate square. This, to some degree, reflects the structure of the data used. Real estate is categorized to the coordinate at the centre of the real estate. However, some estates cover several coordinate squares, fully or

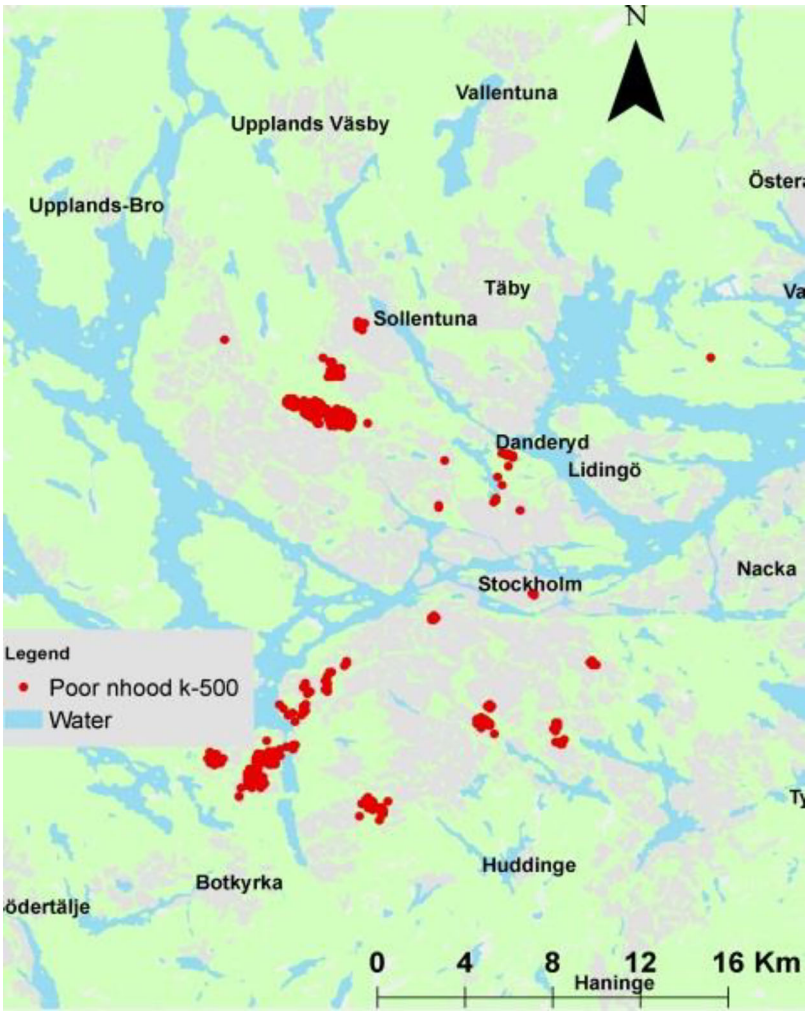

Figure 2. Map of Stockholm with poor neighbourhoods 2006, data from PLACE-database, author's calculations.

partially, leading to a concentration of individuals in one coordinate rather than reflecting the actual distribution in space.

Poor neighbourhoods are defined as having the share of poor exceeding two standard deviations above the mean ratio of poor. Poor individuals are defined using the EU definition for 'at-risk-of-poverty', that is, 60 percent of median disposable income (Bradshaw & Mayhew, 2010), at the regional Stockholm County level median disposable income for individuals was about 122.000 SEK in 2006. Naturally, median income differs across countries, and being poor in Sweden does not mean the same thing as being poor in another country; poor neighbourhoods should thus be seen as a relative concept. In calculating poverty ratios, students have been excluded as to avoid areas with student housing to be categorized as poor neighbourhood because these neighbourhoods are not particularly interesting in a policy discussion on neighbourhood mix and segregation.

Table 1. Variables in regression analysis, descriptive statistics 2006 individual data, population age 20–63.

	Stockholm, Total		Poor neighbourhoods	
Variables	N	%	N	%
Total population	1,198,157	100.0	64,409	100.0
Foreign-born	287,685	24.0	47,483	73.7
Non-western foreign-born	155,026	12.9	36,852	57.2
Swedish background	856,713	71.5	12,548	19.4
Foreign background	341,444	28.5	51,861	80.6
Male	598,506	50.0	30,031	46.6
Female	599,651	50.0	34,378	53.3
Couples with children	459,167	38.3	23,394	36.3
Couples	161,923	13.5	6,339	9.8
Single with children	122,717	10.2	7,864	12.2
Single	454,350	37.9	26,812	41.6
Changed family status (Between 2006–08)	210,804	17.6	14,661	22.7
Employed	912,498	76.1	34,479	53.5
High disposable income (Deciles 7–10)	477,854	39.9	6,909	10.7
Medium disposable income (Deciles 4–6)	414,769	34.6	22,263	34.5
Low disposable income (Deciles 1–3)	305,534	25.5	35,237	54.7
Social benefits	57,395	4.7	12,912	20.0
Low education (<10 years)	196,054	16.3	38,400	59.6
High education (>2 years at university)	696,716	58.1	15,692	24.3
Private rental detached housing	3,315	0.3	33	0.05
Co-ops detached housing	18,434	1.5	69	0.1
Owner-occupied housing	383,790	32.0	1,759	2.7
Public rental detached housing	3,349	0.3	466	0.7
Private rental multi-family housing	200,471	16.7	15,882	24.6
Co-ops multi-family housing	310,323	25.9	4,436	6.8
Public rental multi-family housing	226,251	18.9	34,656	53.8
Housing tenure missing	52,224	4.4	7,108	11.0
Movers (2006–2008)	274,634	22.9	17,989	27.9
	Mean	S.D.	Mean	S.D.
Yearly work income, in 100 SEK	22,627.7	26,50	8,932.7	12,20
Age	41.9	12.6	38.6	12.3
Average years in neighbourhood	6.9	6.0	6.3	5.9

Source: PLACE database, author's calculations.

Poor neighbourhoods are defined both at the beginning and at the end of the time period studied, letting neighbourhoods slip into, or rise out of, poverty. One possible way to set up the areal units would have been to let one year in the time period be the decider for poor neighbourhoods and to study the out-mobility from these areas.[3] The rest of the areas are categorized as non-poor neighbourhoods. Figure 2 displays a map of poor neighbourhoods in Stockholm. In this paper intra-urban movers are studied and it is the neighbourhood context before and after the move that is of analytical interest therefore the k-nearest approach is chosen.

The data used have been excerpted from the PLACE database at the Department of Social and Economic Geography, Uppsala University. This is a longitudinal database with annual data, including the total population of Sweden with socioeconomic variables, coordinate data (100×100 metre square grid) and housing variables. Demographic variables and family variables are also available, and the whole database ranges from 1990 to 2014. In this paper, a subset of the database is used which includes all individuals, aged 20–63 (in 2006), that have had their permanent residence in Stockholm during the period 2006–2008. Since the movers are defined as having changed their housing unit at some point between the beginning and the end

of the period, two types of potential problems arise. The first problem is that we do not know if someone living in the same place in both 2006 and 2008 happened to be living someplace else in 2007; the short time span used reduces the importance of this source of uncertainty. The second problem is that we cannot detect movers within the same multi-family house or unit. At the time of data analysis, housing variables were only available for every second year in the 2000s, and 2008 was the latest available year with data. This is a clear limitation of the study. The study design could make it difficult to draw conclusions for a wider time period. But there are benefits as well. The share of rental housing units in Stockholm in 2008 had not yet surpassed the share of co-op units making rental housing the dominating tenure form which could make results more applicable to other cities within Sweden, even though Stockholm may be seen as a unique case in Sweden.

In the statistical models, a number of variables were chosen to control for various demographic, social, economic and neighbourhood aspects (see Table 1). The variable *foreign background* is dichotomous and separates those born abroad or those born in Sweden whose parents were both born outside Sweden from Swedish-born or residents with at least one Swedish-born parent. *Foreign-born* is a variable constructed from data on country of birth and so is *Non-western foreign-born* used in the first set of regression models. The non-western foreign-born category is also derived from country of birth and captures groups that are more often targets of racism; this variable includes countries of birth in South America, Africa and Asia. The 'non-western foreign-born' category is an estimation based on the assumption that people born in these countries are of a different colour than native Swedes or European immigrants. Of course, these categories are not precise and there are variations that the data cannot deal with.

Other background variables include (definitions in Table 1) *High/Low education*, *disposable income*, *change of income group*, and also dummy variables for *social benefits*, *students* (derived from who gets a student allowance) and *employment*. Employment is measured as having employment in November for the year data are collected; short-term contracts and temporary unemployment may cause some problems. The contrasting group is not necessarily unemployed as, for example, students usually do not have employment but are not characterized as unemployed. Disposable income variables should help mediate the potential inaccuracy of the employment variable. Demographic variables are included with a dummy for *gender* and a categorical variable separating different *family types*. In the database there is no way to differentiate between singles and childless couples that are unmarried; unmarried childless couples are listed as singles. The family variable should be interpreted with this in mind. There is a dummy variable for any type of *change in family status*.

Housing variables in the analysis are *rental housing*, *co-ops* and *homeownership*. Even though rental housing and co-ops may be found in both multi- and single-family housing, the low numbers of single-family housing units with these tenures make them statistically inappropriate to use in the models; these are included in respective housing tenure category.

From the descriptive data for Stockholm it is clear that poor neighbourhoods have high shares of renters, people born in other countries, younger people, more single

Table 2. Intra urban out-movers, poor neighbourhoods in Stockholm 2006–2008, age 20–63.

	Out movers					
	To other poor		To non-poor		Stayers	
	N	%	N	%	N	%
From multi-family rental (private + public)	5,890	11.5	11,866	23.2	33,281	65.2
From co-ops and owner occupancy	497	7.9	1,477	23.5	4,290	68.4
From other tenures and missing	818	11.5	1,982	27.8	4,308	60.6
Foreign-born	5,879	12.3	9,967	20.9	31,637	66.6
Born in Sweden	1,326	7.8	5,358	31.6	10,242	60.5
Non-western immigrants	4,965	12.4	7,680	20.8	24,207	65.6
Foreign background	6,325	12.1	11,213	21.6	34,323	66.1
Swedish background	880	7.0	4,112	32.7	7,556	60.2
High education	1,439	9.1	4,977	31.7	9,276	59.1
Low education	3,729	9.7	10,213	26.5	24,458	63.6
Employed	2,898	9.6	8,090	27.0	18,942	63.2
Below 60% of median disposable income (poor)	1,398	8.8	3,957	24.9	10,499	66.2
High disposable income	559	8.0	1,869	27.5	4,481	64.8
Medium disposable income	2,230	10.0	5,097	22.8	14,936	67.0
Low disposable income	4,416	12.5	8,359	23.7	22,462	63.7
Total	7,205	100.0	15,325	100.0	41,879	100.0

Source: PLACE Database, author's calculations.

households and also generally lower levels of education, income and labour market participation, this is also found in other countries (e.g. the U.K see Bailey and Livingston 2007).

Out-mobility from Stockholm's poor neighbourhoods

Table 2 presents descriptive statistics of intra-urban out-movers from Stockholm's poor neighbourhoods and shows that out-mobility is high across sub-populations in poor neighbourhoods. It is notable that foreign-born residents have high levels of mobility between poor neighbourhoods (12.3 and the Swedish-born category at 7.8 percent). The housing tenure variables show that there are somewhat higher shares of stayers in the homeownership and co-op segments of the housing stock. Out-mobility frequencies towards non-poor areas are similar for the different housing tenures, but renters move between poor neighbourhoods to a higher degree.

Table 3 presents data on stayers and out-movers to non-poor and poor neighbourhoods by background, income and housing tenure. There are more people moving towards non-poor, instead of poor, neighbourhoods regardless of their ethnic background, income or housing tenure. There are, however, higher shares of stayers within the foreign compared to the Swedish background group. The highest shares of stayers are found among homeowners regardless of them having foreign or Swedish background and regardless of income levels. Interestingly, the low-income Swedish background group has high shares of stayers within the co-op sector.

Key findings from the descriptive statistics outlined above are (i) The Swedish background part of the population have higher shares of leavers from poor neighbourhoods regardless of housing tenure form compared to those with foreign background. However, the differences between the Swedish and foreign background groups are smaller when incomes are higher. (ii) It is only in the low-income Swedish background group that we find lower shares of movers to non-poor

Table 3. Share of the population staying or moving to other poor neighbourhood or non-poor neighbourhoods by background, income level and housing tenure.

			Stayers		To other poor area		To non-poor area		Total
			N	%	N	%	N	%	N
Swedish background	High income	Renter	967	65	86	6	430	29	1,483
		Coop	308	57	27	5	206	38	541
		Owner	124	79	5	3	27	17	156
	Mid income	Renter	2,340	64	252	7	1,065	29	3,657
		Coop	370	61	44	7	190	31	604
		Owner	145	79	6	3	33	18	184
	Low income	Renter	1,872	55	279	8	1,252	37	3,403
		Coop	273	62	28	6	138	31	439
		Owner	176	55	8	2	138	43	322
Foreign background	High income	Renter	2,387	66	342	9	894	25	3,623
		Coop	247	64	38	10	103	27	388
		Owner	200	82	7	3	37	15	244
	Mid income	Renter	10,008	68	1,662	11	3,022	21	14,692
		Coop	695	68	93	9	234	23	1,022
		Owner	362	87	18	4	35	8	415
	Low income	Renter	15,707	65	3,269	14	5,203	22	24,179
		Coop	963	64	181	12	367	24	1511
		Owner	427	77	42	8	83	15	552
Total	Swedish background		6,575	61	735	7	3,479	32	10,789
	Foreign background		30,996	66	5,652	12	9,978	21	46,626

Note: Excluded include missing housing tenure N = 7,108 (Stayers 4,092, to other neighbourhoods 818 and to non-poor areas 1,868 and 330 missing).
Source: PLACE database, authors' calculations.

neighbourhoods in the co-op sector compared to renters. This last finding is perhaps due to the fact that the low-income Swedish background group occupies different segments of co-op housing in poor neighbourhoods compared to the low-income foreign background group, or that low-income Swedes buy into this housing form with the intent to stay there over a longer period of time.

Mobility in Stockholm and poor neighbourhoods

The first question this article sought to address was whether there are any differences between the likelihood of moving in a particular tenure form based on where the dwelling is located. This is important because if residential mobility is found to be different in, for instance, co-op apartments in poor neighbourhoods compared to the rest of the city, housing tenure mix may not be implemented on the basis of an assumption that the tenures carry similar characteristics across the city. A logistic regression model is fitted to the data. Through a dummy variable interaction the differences between the explanatory variables' impact on moving are separated between Stockholm's non-poor and poor neighbourhoods. Results are displayed in Table 4.

Renters are the most likely movers, followed by co-op owners and homeowner, as expected. However, the results suggest that rental and co-op owners have a fairly similar likelihood of moving. From the interactions between tenure and neighbourhood type we find no significant differences between neighbourhood types, but that renters in poor neighbourhoods are less likely to move compared to renters in the

Table 4. Odds ratios for staying (0) or moving (1) between 2006 and 2008. Total population Stockholm County age 20–63.

		Non-poor neighbourhoods			Poor neighbourhoods		
	Variables	Exp(B)	S.E.	Sig.	Exp(B)	S.E.	Sig.
Ethnic background	Foreign-born (1 = yes)	1.043	0.014	**	0.819	0.053	***
	Non-western foreign-born (1 = yes)	0.987	0.012		1.109	0.038	**
	Swedish background (1 = yes)	1.136	0.011	***	1.053	0.047	
Demographic variables	Female (male = ref.)	0.986	0.005	**	0.975	0.024	
	Age	0.906	0.002	***	1.028	0.008	***
	Age (sqr)	1.001	0.000	***	1.000	0.000	*
	Single (ref.)	0	0	***	0	0	***
	Couple with children	0.898	0.009	***	0.828	0.039	***
	Couple	0.932	0.010	***	0.895	0.047	*
	Single with children	0.959	0.007	***	0.896	0.029	***
	Change family status (1 = yes)	3.072	0.006	***	0.642	0.028	***
Income and work	Employed (1 = yes)	1.091	0.008	***	1.127	0.030	***
	Low disposable income (ref.)	0	0	***	0	0	**
	High disposable income	1.031	0.008	***	1.011	0.030	
	Mid disposable income	1.053	0.009	***	1.142	0.042	**
	Change disposable income category (yes = 1)	1.357	0.006	***	0.934	0.026	**
	Social benefits	1.097	0.014	***	1.035	0.036	
	Student 2006 (1 = yes)	1.071	0.010	***	1.100	0.039	*
Education	High education (1 = yes)	0.993	0.006		1.200	0.030	***
	Low education (1 = yes)	0.989	0.008		0.967	0.028	
Housing and neighbourhood	Years in neighbourhood	0.969	0.001	***	0.985	0.002	***
	Homeownership housing (ref.)	0	0	***			
	Co-op housing	1.962	0.007	***	1.153	0.082	
	Rental housing	2.208	0.007	***	0.988	0.074	
	Poor neighbourhood (1 = yes)	0.611	0.160	**			
	Constant				2.950	0.078	***
	Nagelkerke R Square						0.186
	−2 Log likelihood						969,516.6
	N						934,227

Notes: Coefficients for poor neighbourhoods obtained through a dummy variable interaction, columns for poor neighbourhoods thus display the difference between non-poor and the poor neighbourhoods. *Significant at the .05 level, **significant at the <.01 level, ***significant at the <.001 level. Missing housing tenure has been excluded.
Source: PLACE database, author's calculation.

rest of the city, while co-op owners in poor neighbourhoods are more likely to move compared to co-op owners in non-poor neighbourhoods.

It does not seem that owning co-ops in poor neighbourhoods makes people stay in these areas. The regression results show the potential constraints renters experience in poor areas with respect to moving. The housing tenures does not display major differences, in relation to residential mobility, between poor and non-poor neighbourhoods. Rather, the models show that mobility in different tenure forms is similar across Stockholm. The results corroborate earlier findings; the neighbourhoods' demographic and socioeconomic composition affects residential mobility frequencies.

Poor neighbourhoods do not influence moving, but they largely consist of a mobile population (Bailey & Livingston, 2007). The findings are not in line with the first hypothesis stating the expectation that co-op owning increases the likelihood of moving when living in poor neighbourhoods compared to other housing tenures and compared to other parts of the city.There are signs of systematic differences concerning moving based on the socioeconomic status. Those with higher socioeconomic status are more likely to make a move if they live in a poor neighbourhood (for a Dutch example see Musterd *et al.*, 2016).

The control variables show expected results. Those who are foreign-born are more likely to move compared to those born in Sweden. In poor neighbourhoods the likelihood of foreign-born individuals moving is lower compared to the rest of the city, and there is a larger difference between singles and the other family categories. Similarities between poor and non-poor neighbourhoods are that odds ratios are not significantly different for the variables Swedish background, gender, social benefits and low education. For an analysis of who makes what type of move, a multinomial logistic regression is fitted to a sample of the data covering the poor neighbourhoods of Stockholm.

Out-mobility from poor neighbourhoods

In Table 2, descriptive statistics showed that 32.7 percent of the Swedish background group in poor neighbourhoods left for non-poor neighbourhoods between 2006 and 2008. For the foreign background group, it was lower, 21.6 percent. The share of stayers was also higher among the foreign background group, at 66.1 percent compared to 60.2 percent for the Swedish background group. Table 5 show the results from a multinomial logistic regression comparing stayers (reference category) and out-movers to other poor or non-poor neighbourhoods.

When looking into the different tenure forms we find that co-ops seem to present more possibilities to leave for non-poor neighbourhoods. People in both rental and co-op housing are more mobile compared to those in homeownership housing, as expected. When interactions between foreign and Swedish background and housing tenure are added to the analysis it becomes clear that Swedish background co-op owners and renters leave for non-poor neighbourhoods, and homeowners stay or leave for non-poor areas. Foreign background renters are marginally more likely to move between poor neighbourhoods (coefficients of .789) compared to co-op owners (.757). Foreign background co-op owners are more likely (.911) to leave for non-poor neighbourhoods compared to renters (.771). Notably, the coefficients for foreign background interacted with housing tenure show that foreign background co-op owners move to non-poor neighbourhoods and renters are more likely to move between poor neighbourhoods. Perhaps this sorting of movers is also important for understanding the odds of moving (Table 4). It seems plausible that co-ops attract a mobile part of the population, as this tenure seems to open up possibilities for spatial careers, especially for those with foreign background.

It is shown here that housing tenure matters less for the Swedish background part of the population compared to the foreign background population. This implies that

Table 5. Multinomial logistic regression displaying residents in poor neighbourhoods 2006, age 20–65. Comparing stayers (0) with out-movers to other poor neighbourhoods (1) and non-poor neighbourhoods (2).

		To poor neighbourhoods						To non–poor neighbourhoods					
		Model 1			Model 2			Model 1			Model 2		
	Variables	B	S.E.	Sig.	B	S.E.	Sig.	B	S.E.	Sig.	B	S.E.	Sig.
Intercept	Intercept	−0.787	0.202	***	−0.816	0.197	***	0.202	0.154		0.306	0.145	*
Background	Immigrant (1 = yes)	0.069	0.058		0.068	0.058		−0.189	0.042	***	−0.192	0.042	***
Demographic variables	Age	−0.038	0.008	***	−0.038	0.008	***	−0.066	0.007	***	−0.066	0.007	***
	Age (sqr)	0.000	0.000	**	0.000	0.000	***	0.000	0.000	**	0.000	0.000	***
	Male (female = ref.)	−0.130	0.029	***	−0.129	0.029	***	−0.028	0.022		−0.026	0.022	
	Couples with children (singles = ref.)	−0.223	0.034	***	−0.222	0.034	***	−0.186	0.026	***	−0.185	0.026	***
	Couples (singles = ref.)	−0.203	0.050	***	−0.202	0.050	***	−0.226	0.040	***	−0.217	0.040	***
	Singles with children (singles = ref.)	−0.266	0.048	***	−0.267	0.049	***	−0.287	0.037	***	−0.291	0.037	***
	Change family type 06-08 (1 = yes)	0.272	0.033	***	0.273	0.033	***	0.633	0.025	***	0.637	0.025	***
Education	High Education (>2 years at university or equivalent) (1 = yes)	−0.096	0.040	*	−0.095	0.040	*	0.198	0.028	***	0.200	0.028	***
	Low education (<10 years) (1 = yes)	−0.125	0.032	***	−0.125	0.032	***	0.058	0.026	*	0.056	0.026	*
	Student (1 = yes)	0.018	0.047		0.020	0.047		−0.195	0.033	***	−0.182	0.034	***
Neighbourhood variables	Not immigrant dense	−0.069	0.087		−0.065	0.087		0.020	0.050		0.028	0.050	
	Non-poor area k-4000 (1 = yes)	−0.425	0.055	***	−0.425	0.055	***	0.089	0.035	*	0.090	0.035	*
	Years in neighbourhood	−0.042	0.003	***	−0.042	0.003	***	−0.060	0.002	***	−0.060	0.002	***
Income and work	Employed (1 = yes)	0.094	0.035	**	0.094	0.035	**	0.314	0.027	***	0.313	0.027	***
	Social benefits (1 = yes)	−0.451	0.034	***	−0.452	0.034	***	−0.061	0.029	*	−0.064	0.029	*
	Change disposable income group (1 = yes)	0.151	0.031	***	0.150	0.031	***	0.377	0.023	***	0.373	0.023	***
	High disposable income	−0.108	0.058					0.188	0.040	***			
	Mid disposable income	−0.060	0.036					−0.018	0.028				
	Low disposable income (ref.)												
Income * Background	High disposable income * Swedish background (1 = yes)				−0.229	0.126					0.128	0.075	
	Mid disposable income * Swedish background (1 = yes)				−0.217	0.086	*				0.210	0.057	***
	Low disposable income * Swedish background (1 = yes)				−0.177	0.083	*				0.376	0.055	***
	High disposable income * Foreign background (1 = yes)				−0.096	0.064					0.253	0.046	***
	Mid disposable income * Foreign background (1 = yes)				−0.054	0.037					0.013	0.030	
	Low disposable income * Foreign background (ref.)												
Housing	Rental housing				0.812	0.122	***				0.647	0.080	***
	Coop				0.785	0.132	***				0.732	0.087	***
	Owner occupancy (ref.)												
Housing * Background	Rental * Swedish background	0.583	0.144	***				1.051	0.103	***			
	Coop * Swedish background	0.585	0.175	***				1.032	0.117	***			
	Owner occupied * Swedish background	−0.450	0.385					0.712	0.175	***			

(*continued*)

Table 5. Continued.

Variables	To poor neighbourhoods						To non–poor neighbourhoods					
	Model 1			Model 2			Model 1			Model 2		
	B	S.E.	Sig.	B	S.E.	Sig.	B	S.E.	Sig.	B	S.E.	Sig.
Rental * foreign background	0.789	0.130	***				0.771	0.096	***			
Coop * foreign background	0.757	0.143	***				0.911	0.106	***			
Owner occupied * foreign background (ref.)												
−2 Log Likelihood	84449			84451								
Chi-Square	6918			6916								
Nagelkerke	0.139			0.139								
N	48.09			48.09								

Note: ***Sig. < .001; **Sig < .005; *Sig < .01.
Source: PLACE database, author's calculations.

those with Swedish background have resources at their disposal to realize a move out from poor neighbourhoods. Such resources could be time in the rental queuing system or financial means (other than higher income) to buy outside poor neighbourhoods. The foreign background part of the population is more dependent on being inside the co-op sector in order to move out. Of course preference of neighbourhoods also plays a part in the decision to move or stay.

In line with what may be expected, the control variables in Table 5 show that being young and being single increase the probability of moving. High education is strongly associated with leaving for non-poor neighbourhoods, as has been established in previous research (Musterd, 2003). Low education is also positively associated with leaving poor neighbourhoods, perhaps reflecting younger people's moving behaviour when seeking education and work elsewhere (Pareja-Eastaway *et al.*, 2003). The findings further show the higher propensity among foreign-born residents to move between poor neighbourhoods rather than leaving these types of areas.

Generally, the findings show that owned forms of housing, and especially co-op housing is a resource important for the foreign background group in order to realize moves out from Stockholm's poor neighbourhoods. This is above and beyond economic selectivity of moves out from poor neighbourhoods and lends support to the place stratification theory as those with foreign background are more dependent on income and housing resources to navigate the housing market. In relation to destinations outside poor neighbourhoods, the probability of leaving increases with income for the foreign background group and decreases with income for the Swedish background group. This indicates that the traditionally mobile low-income group is more likely to realize moves to other neighbourhood types if they have a Swedish background.

Robustness checks

In this paper the threshold to define poor neighbourhoods is set to 2 standard deviations above the mean share of poor among the closest 500 neighbours. This is a rather harsh cut, sampling the highest poverty concentrations in Stockholm and including only 5 percent of the total population. This may raise questions about the generalizability of the results to broader trends of ethnic and economic selective residential mobility in Stockholm's low-income neighbourhoods. Therefore, a set of additional models have been fitted with delimitations of poor neighbourhoods at, 1/2, 1 and 2 standard deviations above mean share of poor residents among the closest 500, 1000, 2000 and 4000 neighbours. The findings from these robustness checks generally show results similar to those presented in the empirical section, thus the empirical section allows for meaningful conclusions that are robust across different neighbourhood definitions. The positive effects of being a co-op owner for the foreign background part of the population is somewhat reduced when the definition of a poor neighbourhood is relaxed.

In addition to modeling residential mobility out from poor neighbourhoods it may be fruitful to have a closer look at actual flows out from alternative definition of poor neighbourhoods to the rest of the city as to bring some additional evidence about the

Table 6. Movers in Stockholm 2006–2008 across neighbourhoods classified by the share of poor (decile 10 = highest share).

		Highest share			Destination decile					Lowest share		Total
		10	9	8	7	6	5	4	3	2	1	N
Origin decile	10	46.2%	16.6%	9.7%	6.7%	4.8%	4.6%	3.9%	2.9%	2.5%	2.0%	32697
	9	13.9%	26.5%	17.6%	10.3%	7.2%	6.5%	5.5%	4.6%	4.2%	3.6%	32691
	8	5.4%	14.8%	17.2%	15.0%	11.4%	11.1%	8.3%	6.4%	5.3%	5.1%	32221
	7	3.9%	9.6%	13.7%	15.0%	15.1%	12.9%	10.5%	7.5%	6.0%	5.9%	30895
	6	3.4%	7.4%	11.7%	14.7%	14.3%	12.2%	12.5%	9.4%	6.9%	7.6%	28700
	5	3.3%	6.2%	9.5%	12.6%	12.5%	15.5%	13.3%	10.6%	8.8%	7.6%	28500
	4	3.0%	6.2%	7.6%	10.2%	11.9%	14.1%	15.2%	13.4%	9.5%	8.9%	25076
	3	2.5%	5.8%	8.1%	9.7%	10.2%	11.0%	14.9%	14.3%	13.0%	10.5%	22387
	2	2.6%	5.4%	8.0%	7.7%	8.7%	10.4%	10.9%	14.6%	16.2%	15.4%	19364
	1	2.1%	4.0%	6.2%	7.2%	7.5%	7.3%	8.4%	11.1%	17.3%	29.0%	20097
	Total	26767	30457	31275	30492	28363	28569	27320	24201	22158	23026	272628

Source: PLACE-database author's calculations.

interconnectedness of neighbourhood types in relation to residential mobility. Table 6 displays intra-urban residential movers within Stockholm between 2006 and 2008. The share of poor residents by deciles for both origin (2006) and destination (2008) neighbourhoods (following Clark & Maas 2016) defines neighbourhood types. Notable is that 46.2% of those leaving decile 10 neighbourhoods (highest poverty concentration) ends up in a similarly poor neighbourhood in 2008. The share of movers ending up in decile 9 neighbourhoods is much lower (16.6%) and the shares are gradually reducing as destination neighbourhood decile approaches 1. This adds to the picture of the relatively disadvantaged position of Stockholm's poor neighbourhoods but simultaneously show that a majority of movers leave the poorest neighbourhoods when they move.

Conclusion

The aim of this paper was to understand the effect of housing tenure and income on selective residential mobility in poor neighbourhoods. The first hypothesis, out of three, stated the expectation *that co-op owning increases the likelihood of moving when living in poor neighbourhoods compared to other housing tenures and compared to other parts of the city*. No significant differences between housing tenure in relation to the probability of moving comparing non-poor and poor neighbourhoods where found. With that said, the odds for moving are lower for renters in poor neighbourhoods compared to the rest of the city, and higher in poor neighbourhoods for the co-op segment. These are interesting findings, suggesting that it is hard for renters in poor neighbourhoods to find housing alternatives. The higher mobility in the co-op sector in these areas indicates that this tenure might present advantages, compared to renting, in an increasingly owner-dominated housing market. The results support earlier findings from Bolt *et al.* (2008) who show that residential mobility in poor neighbourhoods is not particularly affected by housing tenure. Higher mobility frequencies in poor neighbourhoods are to a large extent explained by demographic and socioeconomic variables (Bailey & Livingston, 2007). Interestingly, socioeconomic variables seem to have a stronger impact on who moves when analysing poor neighbourhoods compared to non-poor neighbourhoods. Since buying a co-op necessitates a

somewhat higher income compared to renting, it is likely that there is a socioeconomic selection into co-ops also in poor neighbourhoods. Socioeconomic resources were found to increase the likelihood of moving, a likely interpretation is that co-ops in poor neighbourhoods attract a mobile part of the population that makes use of co-ops to facilitate housing and spatial careers. The results should be viewed in the light that native swedes enter co-ops at a much earlier age compared to the non-native population (Magnusson Turner & Hedman 2014). Thus the part of the foreign background population that have entered co-ops are probably more integrated on the labour market.

Earlier research has shown support for the place stratification theory when analyzing differences between the majority and minority population when it comes to residential mobility. The second and third hypothesis stated that (ii) *the foreign background population are dependent on higher income and owned housing to realize a move out from poor neighbourhoods* and (iii) *the Swedish background population is not dependent on higher income or housing tenure to realize a move out from poor neighbourhoods*. The descriptive statistics show that the majority of the population stay between 2006 and 2008. It is also found that the majority of movers leave for non-poor neighbourhoods. Within the category of movers there are strong group differences where the foreign background category more often stays or moves between poor neighbourhoods compared to the group with Swedish background. When breaking down the housing tenure categories and analysing across income groups and foreign and Swedish background, it was found that homeowners have the highest shares of stayers, followed by renters, and the least prone to stay were co-op owners. This is surprising as a general idea is that owned housing (co-ops in this case) increases the likelihood of staying compared to renting.

Two additions to the earlier research findings are made here. In line with hypothesis two and three, those with foreign backgrounds have higher probability of ending up in non-poor neighbourhoods after a move if they have higher income and are co-op owners, the Swedish background population does not display the same dependency on these variables in order to move out from poor neighbourhoods. This displays the applicability of the *weak version* of the place stratification model. In addition to Bolt *et al.* (2008), results indicate that owning an apartment, rather than a house, is increasing the likelihood of moving among the foreign background group.

Despite that the source of data is from 2006 to 2008 the findings are still applicable in a policy context. The importance of owned forms of housing in order to be able to navigate the housing market and with the share of co-op housing rising across Swedish cities makes the results in this paper important. From a policy perspective, it is worth noting that tenure mix, i.e. increased levels of non-rental tenures in rental dominated neighbourhoods, is not necessarily a tool for counteracting segregation dynamics. However, there could be positive effects on an individual level as many with foreign background that have entered the co-op market move and subsequently leave poor neighbourhoods. There thus seem to be some individual gains opening up a larger choice base for these households. The selection bias into the co-op tenure should be recognized; higher income is a prerequisite for buying a co-op. This paper shows that economic means play a strong part in the reproduction of ethnic

segregation, and addressing the process of ethnic and economic segregation must include an ambition to achieve a wide tenure mix, giving special attention to those who have trouble navigating an owner-based housing stock, especially if they are part of the foreign background population.

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Notes

1. Co-ops are a unique, to Sweden, form of owning an apartment where the tenant owns the right to live in one particular apartment but not the actual apartment. The cooperative owns the apartments, and the tenant has a share of the cooperatives' assets. The right to live in one apartment can be traded by the individual tenant on the open market just as with owner-occupied housing units, but the cooperative has the power to decline a buyer as a tenant. A buyer is rarely declined membership in the cooperative. Co-ops are also found, but less commonly, in single-family housing.
2. The exponential-decay function used in this text can be written:
   (1)
   Where is the distance (d) between location *i* (coordinate pair) and location *j* (coordinate pair when the *k*-threshold is met).
   The half-life decay function used has been introduced and proven useful on detailed data on commuting (Östh et al. 2016). The curve has a rather steep slope, which means that the impact of neighbours decays quite quickly with distance, but the effect of close neighbours remains high. The beta-value in the model to determine the rate of decay is calculated:
3. In the data set, 248 coordinate squares were categorized as poor neighbourhoods in both 2006 and 2008, containing a total of 68,245 and 70,145 individuals, inclusive of all ages, respectively. There were 170 squares that were categorized as poor in 2006 but not in 2008 (inhabited by 32,951 individuals) and 79 additions to poor neighbourhoods between 2006 and 2008 (with 14,325 people). There were 16,736 fewer people in poor neighbourhoods in 2008 compared to in 2006.

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