



Rural-Urban Migration Pathways and Residential Segregation in the Helsinki Region

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Abstract

Migration and residential segregation are intrinsically linked. However, little attention has been given to internal migration and its relationship with socioeconomic segregation. In this study, we illustrate the pathways individuals take between rural and urban settings and examine the association between these pathways and segregation in the Helsinki region. We use register data from Statistics Finland and sequence analysis to illustrate the mobility patterns of two 1980s birth cohorts aged 7 to 37. The majority of Finnish rural-urban pathways are associated with either a childhood spent in an urban area or a move to an urban area in young adulthood. We show that an even larger majority of people living in Helsinki at age 37 spent their childhood there or in other urban environments. We find that internal migrants are positively selected for education and income. A childhood in the outer urban regions of a city reduces the probability of living in low-income neighbourhoods when controlling for socioeconomic status and family structure. We found no association between rural childhood and living in poor neighbourhoods.

Keywords: internal migration, rural-urban pathways, residential segregation, childhood environment, sequence analysis

Introduction

Internal and international migration flows are one of the main drivers of socioeconomic segregation. The discussion on such flows often revolves around socioeconomic segregation linked to intra-urban residential mobility, on the one hand, and to international migration and ethnic segregation on the other. Urbanization in Finland is still mostly driven by internal migration. Finns have a higher than average rate of geographical mobility, wherein approximately 1 in 3 persons will move at some point in their lives (Nivalainen 2010). Geographical mobility is also concentrated in the five largest urban regions, especially the Helsinki Metropolitan Area (Aro 2007; Ghosh et al. 2019; Pekkala 2003). The trend has further accelerated in recent years, and in 2019 the total net migration to the capital region was the highest in at least 50 years (Official Statistics of Finland 2019). This translates into very large numbers of individuals moving into the city. In 2019, the number of inter-municipal migrations totalled 286,700 cases, while intra-municipal moves totalled 596,171. In contrast, the number of immigrants to the county was approximately 32,758 (Official Statistics of Finland 2019).

Especially in rapidly urbanizing countries where the international migration flows are relatively low, it would be fruitful to concentrate on internal migration flows to deepen understanding of the dynamics behind urbanization and segregation. Urban areas are not closed systems, and migration flows in and out of the cities are crucial elements shaping segregation patterns as well (Bailey et al. 2017). Previous studies rarely link internal migration to discussions on immigration and segregation.

We expand the analysis of segregation and internal migration by examining rural-urban migration flows in Finland and their relationship with living in low-income neighbourhoods in the Helsinki region (Pääkaupunkiseutu). We use microlevel yearly register data from Statistics Finland and cohorts born in 1980 and 1981. By employing sequence analysis, we illustrate rural-urban migration patterns in early adulthood in the country as a whole and identify the pathways most often linked to living in the Helsinki region at age 37, and more specifically, living in low-income neighbourhoods in the region.

First, we discuss the internal migration flows and segregation with a focus on the Finnish context. Then, we proceed to a discussion of our analytical setup, data, and methods, followed by the results of our analysis. We conclude with a discussion of our main results.

Internal migration

Studies on internal migration tend to be divided into studies that examine residential moves between neighbourhoods and homes, and those that focus on inter-city or inter-municipality longer distance moves. The former is generally associated with family migration, while the latter, is more often associated with life-course events in early adulthood, for example starting university or entering the labour market (Thomas 2019).

Migration selection, i.e. who moves when and for what reasons, can play an import-

ant role in determining the type of neighbourhood in which individuals ultimately reside. On the one hand, those with better educational and labour market opportunities may be more inclined to migrate to urban regions to pursue a higher education or jobs related to their qualifications (see, e.g. Brandén 2013). On the other hand, it is also likely that individuals with better qualifications are more competitive in their local labour markets, with the consequence being that the unemployed and those with less education may be forced to migrate elsewhere to find labour market opportunities. Also, the supply of job market possibilities differs between urban and non-urban settings. Recent international evidence suggests that the polarization of job markets and replacement of middle-sector jobs with high-paid jobs are more likely to take place in large cities (Davis et al. 2020).

While low-cost housing in poorer urban areas may be an attractive option for those who migrate for studies, at least in the beginning, students also have greater opportunities to move to more affluent areas once their studies are completed. Over time, both processes (those less well-off moving in and the better off moving out) can potentially lead to a concentration of low-paid, low-skilled internal migrants in more disadvantaged neighbourhoods. In other words, entry into low-cost accommodation in more disadvantaged areas in major urban centres can potentially act as a “sticky floor” for the least well-off while providing temporary cheaper accommodation for internal migrants with better skills.

The reasons for moving also change over a person’s life course. Families may move more often for qualitatively different reasons than just entering the labour market, i.e. for reasons of parental separation or divorce (Feijten & van Ham 2007; Jalovaara & Kulu 2019; Mulder & Malmberg 2011), or for repartnering or childbearing purposes (see Bernard et al. 2014). The role played by ties to non-resident family members (as an explanation for why people choose to remain in a locale or move) has also received more attention in recent years (see Mulder 2018). Family migration, particularly with school-aged children, is less common than moving during young adulthood (Bernard et al. 2014; Ghosh et al. 2019; Bernelius & Vilkama 2019). Although families do sometimes move for such reasons as employment, it can entail a certain cost with respect to children’s socio-emotional well-being and educational attainment (see Gambaro et al. 2017; McMullin et al. 2020; Tønnessen et al. 2016). It has also been observed that children experiencing a move during childhood are more likely to relocate in adulthood (Bernard & Vidal 2020). This type of mobility inevitably has consequences for socioeconomic segregation within cities and between neighbourhoods.

In Finland, the residential mobility rates are somewhat higher compared to most European countries (Bernard & Kolk 2019). The mobility patterns show both better educated individuals moving to urban regions and older and less educated people relocating to their regions of origin (Pekkala 2003). Especially in the case of longer distance moves, more educated and unemployed people are more likely to move (Nivalainen, 2004). Ghosh et al. (2018) have found that the propensity for individual migration peaks at the time of infancy and in early adulthood between the ages of 18 and 28. These migration patterns indicate that in Finland, internal migration primarily takes place when people undertake a higher level education, when they enter the labour market, and when starting families (see also Sutela et al. 2016).

Urban residential segregation and mobility

Many European cities have witnessed increases in socioeconomic residential segregation during the last few decades (Musterd et al. 2017). At the general level, segregation can be defined as “*the degree to which two or more groups live separately from one another, in different parts of the urban environment*” (Massey & Denton 1988, 282), as well as the process through which such a state of affairs is produced. Usually, socioeconomic residential segregation refers to segregation on the basis of educational level, occupation, and/or income (Tammaru et al. 2015, 2). Besides socioeconomic segregation, many studies have also analysed ethnic segregation, i.e. differentiation based on ethnicity. Finnish studies have conceptualized such differentiation as being related to country of origin, first language, or nationality (e.g. Kauppinen 2002; Kauppinen & Ham 2019; Vaalavuo et al. 2019). Segregation is often perceived as a negative phenomenon if associated with, e.g. socioeconomic inequalities, housing market constraints, or differences in educational achievement or quality of housing and amenities between residential areas. As with much other segregation research, our focus here is on this “bad” type of segregation (see Peach 1996), which tends to polarize neighbourhoods into less and more well-off ones. More specifically, we are interested in the backgrounds of those persons living in less advantaged neighbourhoods. Internal migration is one factor affecting such an outcome in the segregation process.

There has been a rapid increase in the amount of segregation research in Finland during the last two decades, although the oldest research dates back to the 1930s (Waris 1932). The majority of the studies have focused on describing the levels and patterns of socioeconomic or ethnic segregation, either based on GIS squares (250x250 m) (e.g. Vaattovaara et al. 2018) or postal codes (e.g. Saikkonen et al. 2018). Most studies have focused on the Helsinki region or the greater metropolitan area around it (e.g. Kortteinen & Vaattovaara 2015; Vaattovaara et al. 2018; Vaattovaara & Kortteinen 2003; Vilkkama et al. 2014), but some analyses have also focused on other large cities (e.g. Turku and Tampere) or compared the situation in the three largest urban areas (Rasinkangas 2013; Saikkonen et al. 2018). The majority of studies have analysed the deprivation of neighbourhoods or the risks of social exclusion, although some research on the segregation of upper classes and gentrification does exist (Kortteinen et al. 2005; Lankinen 2006; Karhula 2015a).

In Helsinki region, neighbourhoods that are perceived as segregated, i.e. areas with higher unemployment rates, lower education levels or income, include neighbourhoods with a greater share of housing estates built in the 1960s and 1970s and more social housing units, usually in the outer circle of the city (Vaattovaara et al. 2018). To some degree, residents with an immigrant background cluster in the same areas (Vilkkama et al. 2014).

Compared to many other large European cities, socioeconomic segregation levels in Helsinki are still low, although there has been some increase recently. Urban residential segregation is still a concern in Finland, though, especially in the Helsinki region (Kortteinen & Vaattovaara 2015; Saikkonen et al. 2018). There was a clear decline in segregation until the 1990s, and by 1990 Helsinki was considered a city with very low

levels of segregation (Lankinen 1997). After a deep recession in the early 1990s and the economic boom that followed, however, segregation steadily increased well into the 2010s (Kortteinen & Vaattovaara 2015; Vaattovaara et al. 2018; Vilkkama & Hirvonen 2018). On the other hand, a study comparing the Helsinki, Tampere, and Turku regions concluded that no large changes had occurred in the levels of socioeconomic segregation during the years 2005–2014, while ethnic segregation had increased slightly (Kauppinen & Vaalavuo 2017; Saikkonen et al. 2018). Still, income inequality has risen in Finland during recent decades (Riihelä & Tuomala 2020), and it tends to be higher in larger cities, notably in Helsinki (Saikkonen et al. 2018). Since income inequality is one factor fuelling segregation, albeit with a time lag (Tammaru et al. 2020), levels of residential segregation may be expected to rise in the future. Segregation in urban areas is shaped by intra-urban and inter-urban mobility (Bailey et al. 2017; Nieuwenhuis et al. 2020), although any satisfactory explanation of segregation dynamics needs to also consider several structural factors, such as the welfare state and income inequality (Musterd 2005; Tammaru et al. 2015). This type of mobility is considered selective, i.e. migration patterns are shaped by the preferences as well as by the socioeconomic constraints and opportunities of households, with income and wealth being among the most important factors (e.g. Hedman et al. 2011; Wind & Hedman 2018).

Research has shown that selective mobility patterns shape segregation in the Helsinki region as well (Bernelius & Vilkkama 2019; Kauppinen & van Ham 2018; Vaalavuo et al. 2019). First, there are indications of a relationship between schools, mobility, and segregation. Areas with better-off school catchment areas tend to be more desirable for families with children, while more disadvantaged areas experience avoidant moving behaviour (Bernelius & Vilkkama 2019). Second, mobility residents of Finnish origin and those with an immigrant background differ: the latter are more inclined to move to neighbourhoods with higher shares of people with an immigrant background, and vice versa (Vilkkama 2011). This mobility pattern is likely shaped by socioeconomic determinants and housing market constraints, as there seems to be no indication of self-segregation among immigrant households (Dhalmann & Vilkkama 2009; Kauppinen & van Ham 2018) and upward income mobility translates less often into mobilities from low-income neighbourhoods to higher income ones among immigrants compared to the native-born population (Vaalavuo et al. 2019). Likewise, avoidant or selective mobility by native-born Finns may be the main contributor to increases in segregation. This seems to hold true at least on an intra-regional level, as it has been shown that the mobility of Finnish-born residents increases segregation, while the mobility of residents with a non-Western origin decreases it (Kauppinen & van Ham 2018). In Helsinki, scholars have also concluded that the mobility of native Finns reflects the avoidance of certain neighbourhoods or moving out of areas perceived as socially excluded rather than “white flight” as such (Vilkkama et al. 2013).

Living in or growing up in a certain neighbourhood might have negative or positive effects on an individual’s life chances or longer term socioeconomic prospects. Relatedly, the concept of “neighbourhood effects” refers to an independent effect that a certain neighbourhood context has on an individual. The concept remains a contested one, though, as causal mechanisms are quite difficult to prove (Galster 2012) and certain con-

ceptual problems have also given rise to criticism (Bauder 2002; Slater 2013). Still, some empirically strong results from the US context have been reported, showing that childhood neighbourhood affects, e.g. future earnings and educational outcomes (e.g. Chetty et al. 2016; Chetty & Hendren 2018). The little research on neighbourhood effects that has to date been done in the Finnish context indicates that the school and neighbourhood effects are quite minimal, but they might be increasing as a result of the increased segregation rates especially since the 1990s (Kauppinen 2007, 2008; Kosunen et al. 2016).

Research questions

As the existing literature on the rural-urban mobility of recent cohorts is relatively scarce, our first research objective is to describe the rural-urban pathways throughout Finland. Therefore, we pose the following questions:

(1) What do the rural-urban pathways look like in Finland?

We illustrate the pathways of the most recent cohorts, tracking them from ages 7 to 37 using sequence analysis and relative frequency plots (Aisenbrey & Fasang 2010; Fasang & Liao 2014). The pathways are grouped according to the most typical environment observed during childhood.

Our second research question is concerned with the pathways leading to residency in the Helsinki region and especially to low-income neighbourhoods therein.

(2) Which pathways are associated with living in the Helsinki region and low-income neighbourhoods in the region?

We first illustrate the pathways leading to residency in the Helsinki region and low-income neighbourhoods using the sequence analysis approach described above. We further examine whether the different pathways are associated with gender, socioeconomic status, and/or family structure differences. For such further analyses, we operationalize the pathways according to the most typical rural-urban environment encountered between the ages of 7 and 17.

Third, we assess whether the observed associations between childhood residency and living in a low-income neighbourhood are related to differences in socioeconomic status or family structure.

(3) When accounting for socioeconomic and family structure differences, do certain childhood residential pathways reduce or increase the risk of living in a low-income neighbourhood in adulthood?

Data and methods

We employ Finnish register data for our analysis. All individual-level information was obtained from the total population data of Statistics Finland (data register number: TK-52-1454-12). The data contains yearly observations on rural-urban mobility starting from 1987 and continuing until 2018 for the entire Finnish population. For our purposes, we analysed cohorts born in 1980 and 1981, the most recent cohorts with somewhat stabilized residential trajectories at the end of our observation window of persons until the age of 37. We tracked their progress yearly from age 7 to 37. For the sequence analysis, we took a random subsample of 30,000 persons to limit the computational power requirements. For the regression models concerning the Helsinki region (pääkaupunkiseutu), our sample size was 35,334 individuals.

The Helsinki region consists of the municipalities of Helsinki, Espoo, Vantaa, and Kauniainen. We define neighbourhoods based on postal codes, as has been done in many previous studies on Finland (e.g. Kauppinen & Ham 2019; Vaalavuo et al. 2019). We extracted the average income of residents in various postal code areas from the Statistics Finland open postal code information database (Tilastokeskus, 2020) and linked it to the individual-level register data. We defined low-income neighbourhoods in this region as those within the lowest quintile of the postal code areas based on the individual-level income. We evaluated those living in low-income neighbourhoods at age 37 (years 2017/2018).

We defined our rural-urban sequences along the lines of the rural-urban classification (MAKA) system created by Finnish Environment Institute (SYKE) (Helminen et al. 2014). The classification system uses data from 2010 to classify the whole of Finland into three types of urban areas and four types of rural areas (Figure 1). The classification is based on the division of Finland into 250m x 250m square grids. The urban areas are population agglomerations with populations consisting of more than 15,000 individuals. An *inner urban area* is a compact and densely built area, while an outer urban area is a densely built area that extends from the boundary of the inner urban area outwards and a *peri-urban* area consists of intermediate zones between urban and rural areas directly linked to urban areas. Rural areas outside the defined urban areas are further divided into local centres with higher population concentrations, *rural areas close to urban areas* functionally connected to urban areas, and *rural heartland areas* with relatively intensive land use and dense population compared to the *sparsely populated rural areas* represented by dispersed small settlements mostly in forested land areas. New urban areas have still been constructed in Finland in the last decades, and the population is increasingly concentrating in the larger cities. As the classification system is based on the urban structure in the year 2010, a certain level of bias causes the living environments to appear more urban for the earlier years (before age 30/31) and less urban compared to the actual urban structure for the later years (after age 30/31). This is important to note when interpreting the results. It also means that the observed changes in the living environment reflect actual moves to the new environment. For more details on the classification system, see Helminen et al. (2014) or the website of SYKE.

One should note that compared to urban classifications in other countries, the urban categories of the Finnish classification system are not necessarily very dense. Many areas with single-family housing are classified as inner urban areas. Indeed, almost the whole municipality of Helsinki is defined as an inner urban area (Figure 2). Inner urban areas do not consist only of city centres. The classification system captures the rural-urban differences in the Finnish context, but it captures the differences inside cities only very roughly. For instance, 79 percent of our sample population living in the Helsinki region at age 37 lives in the inner urban regions.

Besides employing the MAKa classification system, we used two factors to define our sequence categories. First, we defined the categories for the Helsinki region (pääkaupunkiseutu), i.e. Helsinki, Espoo, Vantaa, or Kauniainen, separately for inner and outer urban areas based on the register information of the municipality in a given year. The small number of residents in the Helsinki region living in peri-urban or rural areas, approximately 2 percent of the population, were kept in their original categories. Second, we classified people for whom we had incomplete areal information as living outside Finland if we could see that they had either immigrated to Finland after a missing spell of information on living environment or emigrated from Finland before a missing spell of information on living environment. This left us with a total of ten categories: inner urban area in the Helsinki region, outer urban area in the Helsinki region, inner urban area, outer urban area, peri-urban area, local centre in rural area, rural area close to an urban area, rural heartland area, sparsely populated rural area, and living outside Finland.

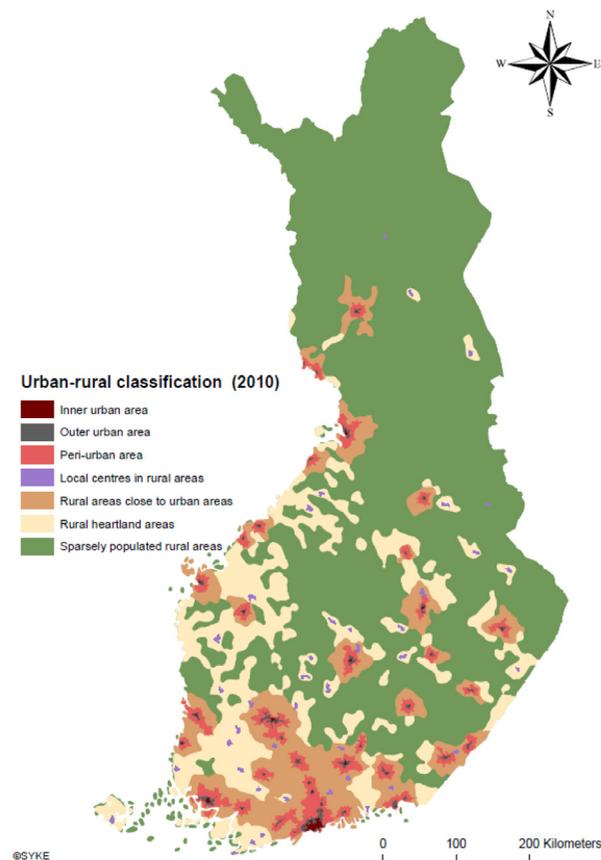


Figure 1. Map of rural-urban classification (MAKA) for all Finland (Helminen et al. 2014).

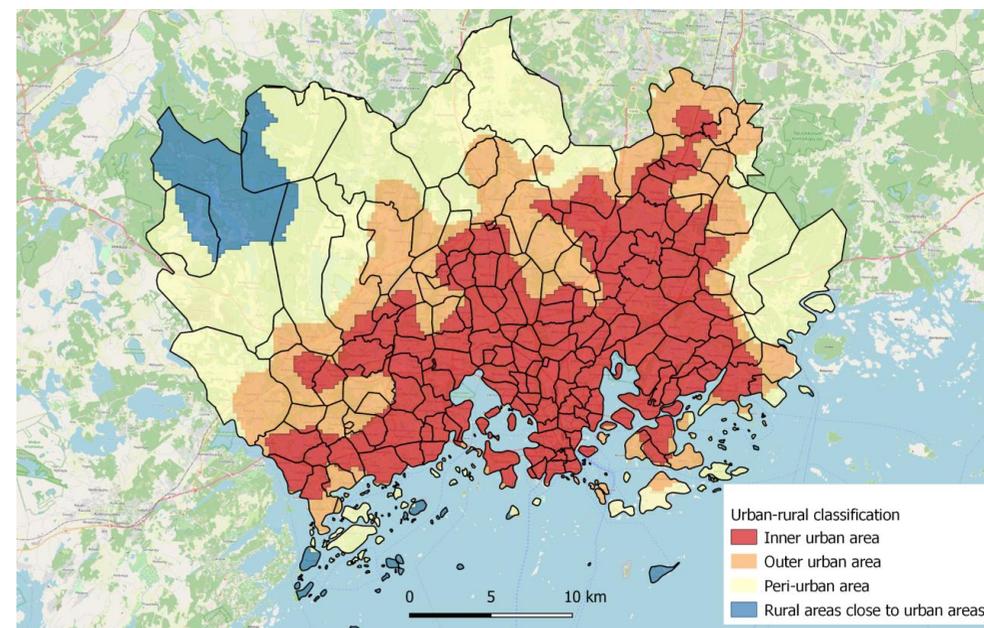


Figure 2. Rural-urban classification (MAKA) for the Helsinki region.

Source: SYKE, YKR 2017, CC BY 4.0.

To study the sequences, we employed sequence analysis techniques and relative frequency plots using the TraMineR and WeightedCluster packages in R (Aisenbrey & Fasang 2010; Fasang & Liao 2014; Gabadinho et al. 2011; Studer 2013). We obtained the colours used for the classification scheme from the RColorBrewer and wesanderson packages (Neuwirth 2014; Ram et al. 2018). Note that for the RF plots (for details, see Fasang & Liao 2014), one representative sequence was selected for every 50 sequences, thus hiding some of the rarer housing paths.

We classified the people into clusters based on their most typical living environment in childhood (7 to 17). Since sequences are usually clustered using a clustering algorithm, this represented a somewhat unconventional choice motivated by theoretical reasoning. We wished to analyse the origins of the people and not their later paths. Robustness analysis using standard optimal matching with a substitution cost of two and an insertion/deletion cost of one and pamward clustering yielded relatively similar patterns, but it did tend to classify some persons more according to their later trajectories in adulthood; however, no clear and distinct patterns compared to our classification are visible in these trajectories (results available upon request from the authors).

We used linear probability models (LPMs) to further analyse the association between childhood environment and the likelihood of later living in low-income neighbourhoods. The coefficients of the models can be interpreted as percentage point changes in the likelihood of living in a low-income neighbourhood at age 37. As controls, we used gender, information of the highest degree obtained from the registers in four categories, equalized household income, and family structure (single, couple without children, couple with children, single parent).

Results

Our first research question concerned rural-urban pathways in Finland more generally. Figure 3 (below) illustrates the pathways (for the graph translated into Finnish see online supplementary material). We tracked people from age 7 to 37 and classified the pathways according to their most typical environment during school age and adolescence (each line illustrates one representative person colour coded at an early point of time in the rural-ur-

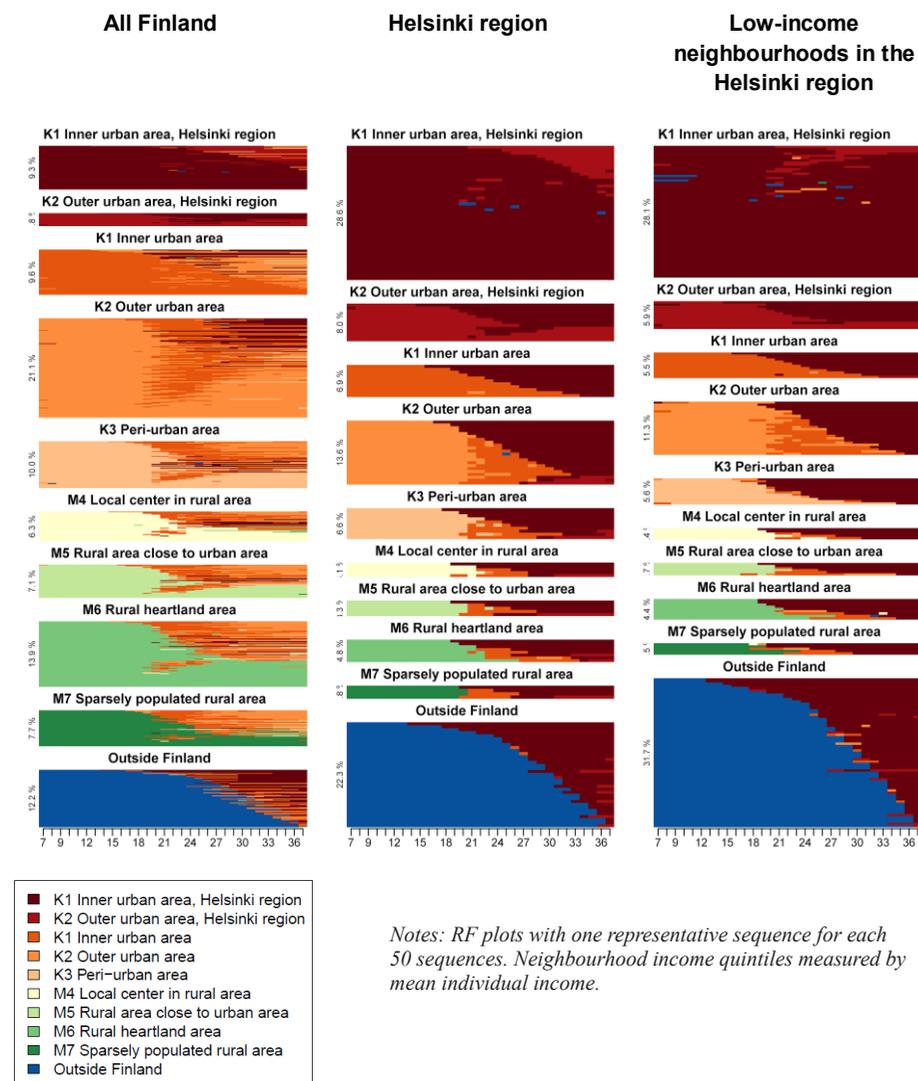


Figure 3. Rural-urban housing trajectories at ages 7 to 37 in Finland for the whole population (left), for people living in the Helsinki region (middle), and for people living in low-income neighbourhoods in the Helsinki region (right) at age 37.

ban categories). The illustration also shows the life-course mobility to inner urban areas in early adulthood and a return to areas further away from city centres later in life. The mobility between regions occurs mainly in early adulthood.

For example, for those in the first group whose most typical childhood environment consisted of inner urban areas in the Helsinki region (dark red), we can observe relative stability until the early 20s and some movement to other urban areas (dark orange) and outer urban areas in the Helsinki region (red), but very little movement to rural areas (green). On the other hand, for those in the fourth group whose childhood in outer urban areas excluding the Helsinki region (orange), we can see much more movement to inner urban areas in the late teens and early 20s (dark orange) and later, when in their late 20s and early 30s, movement back to outer urban areas (orange) and to some extent to the Helsinki region (dark red and red).

In Table 1, we provide more precise numbers on the childhood environment of our cohorts. We can see that most of the people in the cohorts born in 1980 and 1981 lived their childhood in an urban or semi-urban environment, with approximately 18 percent spending their childhood in the inner urban areas, 24 percent in the outer urban areas, and a further 24 percent in peri-urban areas, rural areas close to urban areas, or local centres in rural areas (see Table 1). Although the rural heartland areas and sparsely populated areas comprise the majority of the Finnish landmass (see Figure 1 in the previous section), only 22 percent of our cohorts spent their childhood in these areas and half of them moved away in their early 20s. Some, though very few, move back before age 37, with over 60 percent of the people living in inner or outer urban areas at age 37 and only around 12 percent living in the rural heartland or sparsely populated areas at that age.

This tells a story of an already quite urbanized country, with ongoing urbanization being in line with previous research and official statistics (Ghosh et al. 2019; Official Statistics of Finland 2019; Pekkala 2003). The findings are also in line with earlier Finnish and international studies, which have found that internal migration rates peak between late teenage years and the late 20s in the case of rural-urban migration (Bernard et al. 2014; Ghosh et al. 2019). People's pathways become much more stable after those ages. We did not observe much return migration back to rural regions or childhood residential environments, but this might also be linked to the truncation of our observations at age 37. Some life-course events linked to residential mobility, i.e. divorce or retirement, often occur later in life and might trigger return migration at later ages.

When focusing on the Helsinki region, we found that residential mobility to other parts of the country is rare, but also partly hidden in the representative sequences that we used. Approximately 80 percent of people who spent their childhood years from age 7 to 17 mainly in the Helsinki region still lived in the region at age 37. Most of the people who had moved away either lived in other either urban or peri-urban regions, whereas we found that people rarely move to the rural heartland or sparsely populated areas.

When comparing people living in the Helsinki region at age 37 (Figure 3, in the middle) to the whole of Finland, we found that residents in the region more often come from the Helsinki region or have immigrated from other countries. The share of population with rural roots in either the rural heartland or sparsely populated rural areas is around eight percent, and thus, smaller compared to the whole of Finland (Table 1). Very few of

the people living in the Helsinki region at age 37 had spent their childhood in core rural areas. The Helsinki region is also still growing rapidly, and more than 60 percent of the people in our cohorts had come from other regions, especially from urban and peri-urban regions as well as outside Finland.

When looking more at the demographics of people from different childhood environments living in the Helsinki region at age 37 (Table 2), we observed clear differences. Persons moving from the countryside and other urban regions to the region are, on average, better educated, have higher equalized household incomes, and are more likely to be women. They are also less likely to be single parents and more likely to be couples without children. Most likely, the main reason for this selection is that the reasons for moving are related to study or work opportunities in the region. These findings corroborate discussions on selective migration in earlier studies (Aro 2007; Heikkilä & Pikkarainen 2010). The Helsinki region is attracting, on average, a better educated population who earn more money compared to those who spent their childhood in the region.

Figure 3 (next page) shows the rural-urban pathways of people living in the lowest income quintiles in neighbourhoods in the Helsinki region at age 37. The clearest difference between neighbourhoods in the lowest quintiles compared to the whole Helsinki region is the share of those with an immigrant background, which is considerably higher in the low-income neighbourhoods: 32 percent compared to 22 percent for the whole of Helsinki.

Perhaps somewhat surprisingly, the differences regarding people's pathways into the lowest quintile neighbourhoods did not vary so much from the pathways of people in the Helsinki region in general (Figure 3). This finding is not terribly surprising, as illustrated in Table 2 above, given the fact that the people moving from other urban areas and rural areas have, on average, better education and higher equalized household incomes. Table 2 also shows that, besides immigrants, those who spent their childhood in the inner urban area of Helsinki region have the greatest likelihood of living in low-income neighbourhoods.

To properly analyze the extent to which the association between the different trajectories and the likelihood of living in low-income neighbourhoods is related to socioeconomic factors rather than to one's childhood environment, we used linear probability regression models (Table 3). In the first M0, we can see the association between childhood environment and the likelihood of one day living in a low-income neighbourhood. All the childhood environments under observation differed significantly from the reference category of inner urban childhood in the Helsinki region by around 3 to 6 percentage points. Furthermore, we can see that immigrants have an even greater likelihood of living in low-income neighbourhoods.

In the following M1 model, we controlled for gender, education, equalized household income, and family structure (Table 3). When taking these controls into account, we can see that the association between spending a childhood in an inner urban environment in the Helsinki region compared to most other childhood environments is related to differences in these factors. Those who spent their childhood in the inner urban Helsinki region had, on average, less education and income (Table 2), while the greater likelihood of living in low-income areas is related to these differences and to differences in the family structure.

Table 1. *The distributions of independent variables throughout all Finland, in the Helsinki region and low-income neighbourhoods in the Helsinki region at age 37*

	All Finland	Helsinki region	Low-income neighborhoods in the Helsinki region
Childhood environment (7 to 17)			
K1 Inner urban area, Helsinki region	9.1	28.6	28.3
K2 Outer urban area, Helsinki region	2.8	8.1	6.2
K1 Inner urban area	9.3	6.8	5.8
K2 Outer urban area	21.6	14.0	11.0
K3 Peri-urban area	10.2	6.1	5.1
M4 Local centre in rural area	6.3	3.4	3.0
MS Rural area close to urban area	7.2	3.1	2.6
M6 Rural heartland area	13.8	5.1	4.5
M7 Sparsely populated rural area	7.8	2.7	2.4
Outside Finland	11.9	22.3	31.1
Gender			
Men	51.2	50.7	51.9
Women	48.8	49.3	48.2
Education			
Primary school or less	13.5	17.4	24.4
Vocational or general upper secondary degree	42.7	29.7	34.3
Bachelor's degree	24.0	22.9	20.4
Master's degree or higher	19.7	30.1	20.9
Household income quintile			
1. Quintile (Lowest)	20.0	19.0	27.7
2. Quintile	20.0	14.7	18.9
3. Quintile	20.0	15.7	17.2
4. Quintile	20.0	19.7	17.3
5. Quintile (Highest)	20.0	31.0	18.9
Family structure			
Single	20.6	25.2	30.5
Couple without children	13.2	16.6	15.7
Couple with children	58.0	50.4	43.5
Single parent	8.1	7.9	10.4
N	136641	35334	9478

Table 2. *The distributions of the dependent and independent variables in Helsinki region at age 37 by the childhood environment (%)*

	K1 Inner urban, area, Helsinki region	K2 Outer urban area, Helsinki region	K1 Inner urban area	K2 Outer urban area	K3 Peri-urban area	M4 Local centre in rural area	M5 Rural area close to urban area	M6 Rural heartland area	M7 Sparsely populated rural area	Outside Finland
Neighbourhood										
Not living in a low-income neighbourhood	73.4	79.3	77.0	78.9	77.6	76.1	77.2	76.2	76.4	62.5
Living in the low-income neighbourhood	26.6	20.7	23.0	21.1	22.4	23.9	22.8	23.8	23.6	37.5
Gender										
Men	52.9	52.1	46.6	47.1	48.0	48.5	45.7	45.1	43.3	54.9
Women	47.1	47.9	53.4	52.9	52.0	51.5	54.3	54.9	56.7	45.1
Education										
Primary school or less	12.0	10.5	4.3	4.0	4.8	4.1	4.3	3.5	3.7	51.1
Vocational or general upper secondary degree	37.6	38.5	25.2	26.3	30.2	28.7	28.5	28.0	29.9	20.2
Bachelor's degree	22.9	25.1	26.6	28.6	27.2	31.7	28.6	29.0	31.3	11.7
Master's degree or higher	27.5	25.9	43.8	41.2	37.8	35.5	38.6	39.5	35.1	17.0
Equalized household income										
1. Quintile (Lowest)	14.2	13.0	10.3	9.0	9.7	10.1	8.5	9.6	8.6	44.8
2. Quintile	15.8	15.3	11.9	10.4	12.0	11.6	11.4	12.5	13.9	19.1
3. Quintile	17.1	18.4	15.3	15.7	14.7	18.5	17.6	15.8	17.7	12.2
4. Quintile	21.2	22.0	21.3	23.8	22.2	23.6	22.8	23.5	22.2	11.0
5. Quintile (Highest)	31.6	31.3	41.2	41.2	41.4	36.2	39.7	38.6	37.5	13.0
Family structure										
Single	25.2	24.0	25.9	23.9	24.0	27.1	25.3	25.9	27.2	25.7
Couple without children	13.8	13.6	21.2	20.0	20.0	19.9	20.9	20.2	20.2	14.4
Couple with children	51.7	52.6	48.0	50.7	50.4	46.9	48.1	48.8	45.8	50.3
Single parent	9.3	9.8	4.9	5.4	5.6	6.1	5.8	5.2	6.7	9.5
N	10088	2854	2406	4961	2147	1189	1093	1786	949	7861

Table 3. Linear probability model of association between childhood living environment and likelihood to live in a poor neighbourhood in Helsinki region at age 37

	M0 Only childhood living	M1. M0 + control variables
Childhood living environment (7 to 17) (ref. K1 Inner urban area, Helsinki region)		
K2 Outer urban area, Helsinki region	-0.06*** (0.01)	-0.06*** (0.01)
K1 Inner urban area	-0.04*** (0.01)	-0.01 (0.01)
K2 Outer urban area	-0.06*** (0.01)	-0.03*** (0.01)
K3 Peri-urban area	-0.04*** (0.01)	-0.02* (0.01)
M4 Local centre in rural area	-0.03** (0.01)	-0.01 (0.01)
M5 Rural area close to urban area	-0.04*** (0.01)	-0.01 (0.01)
M6 Rural heartland area	-0.03** (0.01)	-0.01 (0.01)
M7 Sparsely populated rural area	-0.03** (0.01)	-0.01 (0.01)
Outside Finland	0.11*** (0.01)	0.05*** (0.01)
Gender (ref. Men)		
Women		-0.00 (0.00)
Education (ref. Primary school or less)		
Vocational or general upper secondary degree		-0.01 (0.01)
Bachelor's degree		-0.05*** (0.01)
Master's degree or higher		-0.07*** (0.01)
Household income quintile (1. Quintile, lowest)		
2. Quintile		-0.01* (0.01)
3. Quintile		-0.04*** (0.01)
4. Quintile		-0.09*** (0.01)
5. Quintile (Highest)		-0.15*** (0.01)
Family structure (ref. Single)		
Couple without children		-0.03*** (0.01)
Couple with children		-0.07*** (0.01)
Single parent		-0.01 (0.01)
N	35,334	35,334
R2	0.02	0.05

*** p<0.01, ** p<0.05, * p<0.1

The evidence shows that especially a childhood spent in the outer urban areas of the Helsinki region reduces the likelihood of living in a low-income neighbourhood by around 6 percentage points and one spent in other outer urban regions by 3 percentage points. It is hard to say if this finding is related to selection based on some unobserved characteristics, such as wealth or family background, or if there are childhood socialization issues or other mechanisms responsible for the association. With respect to the results concerning outer urban areas, we also found a similar weakly significant ($p < 0.1$) negative association between a childhood spent in peri-urban areas and living in a low-income neighbourhood at age 37.

We also found that although there were both statistically significant raw differences and associations after taking into account the controls, the proportion of the variance explained was relatively small in both cases ($r^2 = 0.02$ and $r^2 = 0.05$, respectively). This indicates that although one's childhood environment (i.e. rural-urban pathways) can perhaps play a somewhat significant role in the likelihood of living in certain neighbourhoods later in life, it is only one of many factors influencing such decisions. In the case of couples, the background and resources of both influence the decisions on where to live, although here we did not take this into account when focusing on the whole population.

Conclusion

We first showed the rural-urban pathways across the whole of Finland in our study for birth cohorts from the years 1980 and 1981 (Figure 3, previous section). These pathways paint a picture of an already urbanized country with still some ongoing urbanization processes: approximately 40 percent of the cohorts had spent their childhood in inner or outer urban areas and a further 24 percent in peri-urban areas, rural areas close to urban areas or in local urban centres in rural areas. Only 22 percent of our cohorts had their childhood in the rural heartlands or in sparsely populated areas and around half of them had already moved by their early 20s.

Second, when analysing the pathways to the Helsinki region compared to the rest of Finland, we found that the people living in the region at age 37 come disproportionately from the Helsinki region and other urban regions, while the share of pathways to the urban area for those with a rural childhood was only eight percent. Still, the Helsinki region is growing rapidly, and over 60 percent of the population (at age 37) are internal or international migrants. Compared to the entire Helsinki region, the immigrant pathways and pathways of those originating from the inner urban Helsinki region were overrepresented in low-income neighbourhoods. This finding went hand in hand with the observation that people with pathways originating in other Finnish regions were, on average, positively selected based on education and equalized household income.

Third, we found when using linear probability models to control for education, household income and family structure that an immigrant background was positively associated and a childhood spent in outer urban areas negatively associated with the likelihood of living in low-income neighbourhoods in later life. This indicates that there are

unobserved factors related to an outer urban childhood that reduce the risk of living in low-income neighbourhoods. These factors might be related to childhood socialization in certain environments, but we could not empirically verify any mechanisms behind the association in this study. We did not observe an association between a childhood spent in rural areas and the likelihood of living in low-income neighbourhoods to any significant degree compared to those who spent their childhood in inner urban areas. This indicates that, unlike immigration, internal migration does not increase the likelihood of one day living in low-income neighbourhoods.

Any empirical study has some caveats, and this study is no exception: we would like to highlight three limitations when interpreting the results. First, one should note that the relative frequency plots used in the general description of the rural-urban pathways (Figure 3) tend to hide the rarer trajectories. This makes it possible to illustrate the pathways as a whole, but it presents a somewhat overly clean picture of the pathways. Second, when modelling the association between childhood environment and the likelihood of one day living in a low-income neighbourhood, it should be clear that we cannot fully control for the socioeconomic or other factors or claim with certainty that the remaining associations would represent certain, e.g. cultural or socialization, mechanisms. The associations might be related to many unobserved factors, and thus further research on the proposed mechanisms would be needed. As a third caveat, although the registers provide almost a unique possibility to track people through time without severe problems regarding truncation and missing data, one should note that the registered place of residence does not always coincide with the actual place of residence or the everyday environment people encounter. The address information used here for the classifications is based on quite reliable data (Hokka 2012), but such information does not always capture multiple places of residence. Furthermore, even in the Helsinki region the postal code areas used for neighbourhood identification can be relatively heterogeneous and constitute rather large areas for capturing the actual neighbourhoods that people might identify with. Our results are also based on only one measure of neighbourhood deprivation, i.e. average income. Other neighbourhood measures or ways to identify disadvantaged neighbourhoods might alter the results.

All in all, our results underline that the place where children spend their childhood may well be a significant factor influencing the dynamics behind residential segregation processes. Our results indicate that urban to urban internal residential mobility might be more influential in shaping segregation patterns compared to rural to urban mobility. After accounting for socioeconomic factors and family structure, we found that a person's rural childhood environment is not associated with the likelihood of someday living in low-income neighbourhoods, but an outer urban childhood, especially one spent in the Helsinki region, seemingly reduces this risk. The potential influence of the childhood environment on the decision of which neighbourhood to live in later in life should be kept in mind when designing policies aimed at reducing segregation. The MAKA classification system that we used is excellent for analysing rural-urban differences, but it proved quite rough for the analysis of city regions. Further research is needed to clarify the meanings of our finding in relation to the protective influence of the outer urban regions.

As a side note to the discussions on the positive and negative selection affecting moves to various municipalities (e.g. Aro 2007; Laakso 2013, 2019), our results show that as a whole, the internal migration flows to the Helsinki region are positively selected in a way that migrants have a relatively high education and household income when these factors are measured at age 37 (after the time of move). As internal migration usually happens much earlier, before the age of 30, the selection would almost certainly look quite different if we had not tracked the people until later ages. This underlines the importance of also examining selective migration with panel data, making it possible to track people beyond the actual year of relocation.

Our findings encourage future research into the relationship between childhood residence and housing pathways into adulthood. The association discussed here could be related to childhood socialization, social networks, various other socioeconomic factors (e.g. wealth, social origin) and/or structural dynamics in the urban housing markets (e.g. housing policies, housing supply). Together, these factors could contribute not only to the likelihood of living in low-income neighbourhoods later in life, but to housing opportunities and constraints more generally (see Karhula 2015b; Wind & Hedman 2018; Haartti et al. 2015). This type of intra- and intergenerational housing research is often lacking in the existing literature (see Bailey et al. 2017). Our results encourage further research on the topic.

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