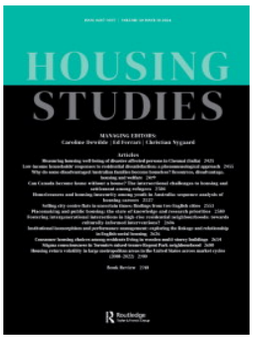

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Migrant residential mobility and tenure transitions within different housing regimes: evidence from three Nordic capital cities

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ABSTRACT

Migrant housing-related disadvantages and residential segregation are both important concerns in migrant-receiving countries. However, there exists little understanding about the connection between the two. According to the spatial assimilation framework, migrants who establish themselves in the labour market and experience income increase tend to move to higher-income neighbourhoods. However, migrant opportunities to rent or buy an apartment may vary across cities due to each city having its own distinctive housing regimes, along with related tenure structures, as emphasised by the housing availability framework. Different opportunity structures may lead to different pathways of spatial assimilation, as moving into a higher-income neighbourhood does not necessarily entail becoming a homeowner, and vice versa. The main findings of our comparative and longitudinal study reveal that different pathways of spatial assimilation indeed do arise in cities which have different housing regimes, as has been proposed by the housing availability framework.

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Residential mobility; tenure transitions; spatial assimilation; housing availability; longitudinal analysis; Nordic welfare states

Introduction

With the global rise in international migration, residential disadvantage for migrants has become a common concern in receiving societies (Galster *et al.*, 2024). Several mechanisms contribute to residential disadvantages for migrants upon their arrival in their destination country. These include discrimination in housing and labour markets, lower incomes, a general lack of knowledge about local housing markets, and reliance on co-ethnic social networks to establish their new living arrangements (Krysan & Crowder, 2017). As a consequence of these mechanisms, migrants are

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more likely than natives to live in lower-income neighbourhoods with less access to opportunities such as better schools and jobs (Tammaru *et al*., 2021). This location-related disadvantage is often passed to the next generation of migrants, whose residential mobility is influenced by initial parental neighbourhood of residence (Skovgaard Nielsen, 2016). Additionally, migrants are more likely to rent than are natives. This can have long-lasting consequences, as tenants tend to pay more for housing over their lifetime, while failing to accrue wealth from homeownership, and are unable to leave the property as an inheritance to their offspring (Coulter, 2018). Consequently, migrants who are settling in as renters in lower-income neighbourhoods upon their arrival into the country are likely to reproduce or even amplify existing patterns of housing disadvantage and residential segregation (Andersen, 2016; Marcińczak *et al*., 2015). To understand the role being played by the post-arrival residential mobility of migrants when it comes to perpetuating migrant-native inequality, it is therefore critical to focus on those who are settling in as renters in lower-income neighbourhoods by jointly studying the two processes of residential mobility across neighbourhoods and tenure transitions.

The spatial assimilation theory (Massey & Denton, 1985; Massey & Mullan, 1984) conceptualises residential mobility as being an integral part of social mobility. As migrants improve their socioeconomic standing in the host country, they use their newly-acquired resources (such as income) to move into wealthier neighbourhoods. The theory is less straightforward about whether becoming a homeowner is part of the spatial assimilation process. In essence, there may be different pathways towards achieving spatial assimilation, and becoming a homeowner may not necessarily coincide with moving into more affluent neighbourhoods or achieving a higher degree of co-residence with members of the native population in the same neighbourhoods as them. The housing availability model (South *et al*., 2011) helps to address this gap by suggesting that tenure transitions depend upon the specific housing market structure in each city. Rental housing in some cities is available across the entire neighbourhood affluence spectrum, while in others it is only present in less affluent neighbourhoods. Similarly, owner-occupied housing in some cities may be concentrated in more affluent neighbourhoods, while in others it is spread more evenly across various neighbourhoods. The relative size and spatial distribution of different tenures therefore affect the process of spatial assimilation by shaping both migrant opportunities for residential mobility across neighbourhoods and the possibility of becoming a homeowner.

The main objective of this study is to identify various pathways of spatial assimilation for newly arrived migrants from diverse origin regions who initially settle as renters in lower-income neighbourhoods. This will be achieved by simultaneously examining residential mobility across neighbourhoods and tenure transitions among migrants earning different incomes during the first years after arrival. The study will cover three cities which have varying housing regimes, these cities being Helsinki, Oslo, and Stockholm. Theoretically, migrants who settle in as renters in lower-income neighbourhoods and who thereafter experience a rise in income may see one of the following outcomes: a) they remain renters in lower-income neighbourhoods; b) they become homeowners in lower-income neighbourhoods; c) they move into higher-income neighbourhoods but remain renters; or d) they move to higher-income

neighbourhoods and become homeowners. Our specific focus is on outcomes b, c, and d, which we define as being three different pathways of spatial assimilation. In this light, the study's main research questions are as follows:

1. Which combinations of residential mobility and tenure transitions are most common in newly-arrived migrants who settle in as renters in lower-income neighbourhoods and who experience an income rise during the first years after their arrival?
2. Do these combinations of residential mobility and tenure transitions vary among migrants who arrive from different regions of origin and who settle in cities which have different housing regimes?

Residential mobility refers to moves between neighbourhoods, with a specific focus in this study on moves from lower-income neighbourhoods to higher-income neighbourhoods. Tenure transition refers to changes in tenure status, with a specific focus in this study on transitions from being a renter to becoming a homeowner. We draw our empirical evidence from the three Nordic capital cities of Helsinki, Oslo, and Stockholm, with these being very similar in many aspects, and which represent social democratic welfare regimes which possess extensive similarities in terms of social benefits, welfare coverage, institutions, and taxation (Esping-Anderson, 1990). However, they differ markedly in their housing regimes (Wessel *et al.*, 2017). Most importantly, the tenure structures vary significantly across these three Nordic capitals. Oslo has a strongly market-orientated housing regime with almost no social housing being available. Helsinki has a sizeable social housing sector which is distributed relatively evenly across the city's various neighbourhoods. Stockholm falls in-between these two, being characterised by the combination of a strongly regulated rental sector and deregulated homeownership. This makes it possible to apply a differentiation method when it comes to comparing cases (see George & Bennett, 2005).

Building on the aim and research questions, and being grounded within the context of the three aforementioned Nordic capitals, this study makes several important contributions to the existing body of research. Firstly, we will simultaneously focus on residential mobility across neighbourhoods and on tenure transitions during the process of spatial assimilation. Secondly, we will determine whether immediate post-arrival patterns of residential mobility and tenure transitions differ for migrants arriving from different countries of origin. For example, migrants who are arriving from countries with different levels of wealth may have different levels of resources available to them when it comes to undertaking residential mobility. Thirdly, we will examine how these processes vary in cities which have different housing regimes. When taken together, we expect to uncover diverse rather than uniform pathways of spatial assimilation in migrants who are arriving from various regions of origin and who are settling into different housing regimes.

We begin with a literature review of migrant residential mobility as seen through the lens of spatial assimilation and place stratification theories. We then draw on the housing availability framework to argue that traditional explanations of spatial assimilation can be improved by referring to the contextual features of the local housing regime. This is followed by a section which presents the housing regimes

in Helsinki, Oslo, and Stockholm. As a next step, we present the analytical framework of the study and explain our data and methods. This is followed by an examination of the residential mobility and tenure transitions of the newly arrived migrants, focusing on differences along the lines of income, region of origin, and the urban housing context in the three case study cities. Finally, we discuss the significance of our findings in relation to existing spatial frameworks of migrant integration. Additionally, our findings inform ongoing housing policy debates which are aimed at reducing housing inequality and residential segregation in migrant-receiving societies.

The residential mobility and tenure transitions of migrants upon arrival: spatial assimilation, place stratification, and housing availability perspectives

For several reasons, migrants tend to settle in lower-income neighbourhoods upon their arrival. Migration is an ethnic network-related process which connects people in origin and destination countries through information flows (Massey *et al.*, 1993). Because established migrants tend to be overrepresented in lower-income neighbourhoods which possess affordable housing the network-based immigration process reproduces these residential patterns among newcomers (Zorlu & Mulder, 2008). Migration brings with it varying degrees of adaptive stress, and the process of settling in neighbourhoods which have a high presence of people who are of a co-ethnic origin can help to alleviate this stressful process by providing newcomers with a familiar cultural and language environment, a sense of belonging and security, and various forms of social support, including assistance in finding a job in the destination country (Boschman & van Ham, 2015). Co-ethnic assistance is also crucial for finding housing (Aigner, 2019). This assistance can come in several forms, from obtaining information about affordable housing from co-ethnic friends and family members to renting an apartment from a co-ethnic landlord. Migration for reasons of family reunification often reinforces existing ethnic housing and neighbourhood patterns (Skovgaard Nielsen, 2016; Zorlu & Mulder, 2008). This occurs when newcomers settle into neighbourhoods in which established migrant communities already reside. Limited financial resources and the selective availability of information on housing, along with the discriminatory attitudes of landlords towards newly-arrived migrants and higher levels of insecurity about the future, may also contribute to these initial settlement patterns (Andersen, 2016). In short, several factors affect the initial sorting into neighbourhoods and housing of newly-arrived migrants.

Migrant residential mobility following their initial settlement is the specific subject of the spatial assimilation theory. According to this theory, as migrants establish themselves in the labour market and increase their incomes, they improve their residential outcomes. This includes moving from lower-income neighbourhoods to higher-income neighbourhoods (Vogiazides & Chihaya, 2020), with a higher concentration of the local native population (Zorlu & Mulder, 2008). Moving into higher-income neighbourhoods also enables migrants to acquire a 'residence in neighbourhoods with greater advantages and amenities' (Alba & Logan, 1992, p. 1318), i.e. to benefit from urban opportunities such as higher-quality schools, workplaces, or leisure-time activities (Tammaru *et al.*, 2021). The original theory—and

the related debate in the US in the 1990s and 2000s—considered homeownership as being an integral part of the process of spatial assimilation (Alba & Logan, 1992). However, empirical studies which have followed the spatial assimilation framework analyse for the most part residential mobility between neighbourhoods, following the theory's core idea that minorities achieve residential contact with the native majority population by moving into more affluent parts of the city (Massey & Denton, 1985). Existing research further shows that moves to higher-income neighbourhoods do not necessarily coincide with becoming a homeowner (Friedman *et al*., 2013; Sanchez-Moyano, 2021). Furthermore, Friedman *et al* (2013) find that becoming a homeowner in the US may even contribute to increased ethnic residential segregation as minority ethnic/racial groups tend to cluster into those urban neighbourhoods in which house prices are lower. Andersson *et al*. (2022) developed a tenure-type classification of Swedish neighbourhoods, and were not able to find a strong correlation between this classification and general neighbourhood income levels or a foreign-born classification. Torpan *et al*. (2022) followed the housing and neighbourhood trajectories of migrants in Finland, finding only a weak overlap between the transition to homeownership and moving into a higher-income neighbourhood.

There are many reasons for why migrants who are settling in as renters in lower-income neighbourhoods are unable to become homeowners in high-income neighbourhoods. According to the place stratification theory, migrants face many barriers in their attempts at residential mobility (Pais *et al*., 2012). Discrimination in the housing market is important in reducing migrant opportunities when it comes to their being able to overcome residential disadvantages (Krysan & Crowder, 2017; Verhaeghe & De Coninck, 2022). Subtle forms of discrimination can constrain their ability to enter into homeownership or to make the most of any opportunity to move into a higher-income neighbourhood, or both. Therefore, migrant income growth may not be sufficient to allow those migrants to become homeowners in higher-income neighbourhoods (Torpan *et al*., 2022). Newly-arrived migrants do not have local credit histories. They are, therefore, often considered by those banks which offer mortgages as being less solvent customers (Andersen, 2016), something which constrains their available opportunities to be able to move into higher-income neighbourhoods and become homeowners, even if their incomes do allow them to take this step. Additionally, the act of living and working abroad may be a temporary phase in the life course of migrants, with the underlying aim perhaps instead being to improve one's own housing conditions in one's country of origin—or those of the family in general—(Anniste & Tammaru, 2014; de Haas & Fokkema, 2011) instead of improving one's residential situation in one's host country. There may also be a preference towards living side-by-side with lower-income but co-ethnic neighbours, even when incomes do rise (Clark, 1992; Li, 1998).

Finally, the urban context also influences how the processes of residential mobility across neighbourhoods and tenure transition tend to evolve. According to the housing availability model (South *et al*., 2011), the likelihood of gaining access to a particular type of neighbourhood is contingent upon the quantity and quality of housing opportunities which are being generated by local housing markets. The relative size of different housing tenures and their distribution across neighbourhoods with

various levels of affluence further shape migrant residential trajectories (Andersson *et al.*, 2022; Skifter Andersen *et al.*, 2016; Wimark *et al.*, 2020). Skifter Andersen *et al* (2016) explicitly focus on how sorting into housing tenures relates to sorting into residential neighbourhoods in Nordic capital cities. They found that the relative size and spatial distribution of social housing matters for residential mobility. For example, the authors showed that the more even spatial distribution of Helsinki's large social housing sector tends to allow migrants to move into higher-income neighbourhoods without their becoming homeowners. Wessel *et al.* (2017) focused on moves into higher-income neighbourhoods in Nordic capital cities. The results show that homeowners are likelier to move to higher-income neighbourhoods in Copenhagen, Helsinki, and Stockholm but not in Oslo. The authors explain that one of the reasons for Oslo standing out may be the more equal distribution of owner-occupied housing throughout the city, with owner-occupation also being prevalent in lower-income neighbourhoods. Hence, migrants in Oslo have a higher chance of becoming homeowners in low-income neighbourhoods.

In conclusion, previous research indicates that for migrants, moving to a higher-income neighbourhood and simultaneously achieving homeownership is challenging. Therefore, existing studies have not found a strong correlation between becoming a homeowner and transitioning to a higher-income neighbourhood, largely due to the significant financial burden which is associated with this. The less challenging alternatives for migrants may include the following options: a) remaining renters in lower-income neighbourhoods; b) moving to higher-income neighbourhoods while retaining one's status as renters; or c) transitioning to homeownership in lower-income neighbourhoods. Existing research further indicates that residential sorting into neighbourhoods and tenures is shaped either by city-specific housing regimes or the availability of various housing tenures in the city, with the additional question of how these tenure types are distributed between neighbourhoods with their varying levels of affluence. Hence a multi-country research design in countries representing different housing regimes helps to shed new light on how post-arrival residential mobility across neighbourhoods and tenure transition are related to each other.

The main features of the housing regimes in Helsinki, Oslo, and Stockholm

We draw our empirical evidence from three Nordic capital cities which, over the past three decades, have experienced a significant rise in immigration. The five main countries of origin for each destination country are as follows: Russia, Estonia, Sweden, Iraq, and Somalia for the destination country of Finland; Poland, Lithuania, Sweden, Somalia, and Germany for Norway; and Syria, Iraq, Finland, Poland, and Iran for Sweden. Area-based policy programmes are common in Helsinki, Oslo, and Stockholm, with these ranging from housing to the delivery of public services. However, concerns have arisen regarding the residential disadvantage which has been experienced by migrants (Andersson, 2010; Lujanen, 2004; Skifter Andersen *et al.*, 2016). Specific manifestations of residential disadvantage vary across Helsinki, Oslo, and Stockholm due to there being significant differences in the sizes of various

tenures, the distribution of tenures across neighbourhoods, and access to different tenures out of the three Nordic capital cities. Oslo can be characterised as a strongly market-based housing regime which has a tiny social housing segment embedded in generous social welfare. In contrast, the housing regime in Helsinki is characterised by a sizable social housing sector in which the means-tested allocation of public housing ('ARA' housing) is an essential element. Rental fees in terms of social housing in the Finnish capital city are significantly lower than they are in the private sector. This ensures that individuals and families alike who have limited financial means can access safe and affordable housing in well-maintained neighbourhoods in various parts of the city. Applicants are evaluated through three criteria: need, wealth, and income. As a consequence, public rental sector residents mainly include people who are earning lower incomes, including migrants, and who need subsidised and affordable housing more than anyone.

The housing regime in Stockholm is characterised by a combination of public housing, cooperative housing associations, and a competitive private housing market. In many respects the housing situation in Stockholm falls between those in Oslo, which is dominated by home ownership, and Helsinki, which is characterised by a high share of means-tested social housing. Firstly, public rental housing in Stockholm cannot exclusively be taken under consideration as social housing in the way it is in Helsinki. The allocation of public-owned apartments in Stockholm is based on a queue system, one in which applicants accumulate points over time, with those who are on the waiting list for longer periods being prioritised. Hence migrants do not have immediate access to public housing, although households of all income levels can live in this housing segment. However, there is also considerable diversity in allocation policies between those different municipal housing companies which own public housing in Stockholm. Furthermore, the housing policy in the Swedish capital city has favoured the selling of public housing to rental companies or cooperative associations (Andersson & Turner, 2014), thereby moving the city closer to a market-based housing regime in which ownership is encouraged. In combination, these factors have led to a rental housing shortage and a decrease in housing affordability (Christophers, 2013), something which has contributed to the uneven distribution of migrants across neighbourhoods (Sandberg, 2023). Additionally, there exists evidence of discrimination against some migrant groups in the burgeoning informal rental market, a market which would otherwise be the only alternative to the housing shortage (Ahmed, 2010; Ahmed & Hammarstedt, 2008). Finally, there also exist major differences in residential outcomes in Stockholm based on migrant country of origin. About two-thirds of migrants who come from lower-income countries settle in rental housing and lower-income neighbourhoods upon their arrival. Among those migrants who originate from higher-income countries, only about one-third settle in rental housing and lower-income neighbourhoods upon their arrival.

The main quantitative features of the housing sectors in the three Nordic capital cities are as follows: the share of people who live in owner-occupied housing is at about eighty percent in Oslo and Stockholm, but is at forty percent in Helsinki (see Table 1). Owner-occupied housing in Helsinki is spatially clustered in the city's various central areas, and the share of homeownership is low in many parts

of the city, whereas there are only small differences in homeownership between neighbourhoods in Oslo (Figure 1-A). Homeownership in Oslo is common in both lower-income and higher-income neighbourhoods (cf. Wessel *et al.*, 2017). In all three cities, homeownership increases in line with income. For example, about one-third of people in the first income decile in Stockholm own a home, while about nine out of ten people in the tenth income decile are homeowners (Andersson *et al.*, 2010). Additionally, the spatial distribution of incomes above the 60th percentile also largely mirrors the spatial distribution of homeownership in all three cities, with the patterns being more clearly visible for Oslo and Stockholm. (Figure1-B). The local native population in all three cities is overrepresented in terms of homeowners and residents who find themselves in higher-income neighbourhoods, whereas immigrants are overrepresented in the rental sector and lower-income neighbourhoods (Skifter Andersen *et al.*, 2016). Only minor differences exist in the share of people who live in cooperative housing

Table 1. The housing context of Oslo, Helsinki, and Stockholm in 2011.

	Oslo	Helsinki	Stockholm
Owner-occupied housing			
Individually owned	58.6%	21.3%	57.1%
Co-operatively owned	22.6%	19.2%	21.8%
Rental housing			
Private-owned	16.9%	51.2%	10.4%
Public-owned	1.7%	8.3%	10.7%
Total	100%	100%	100%

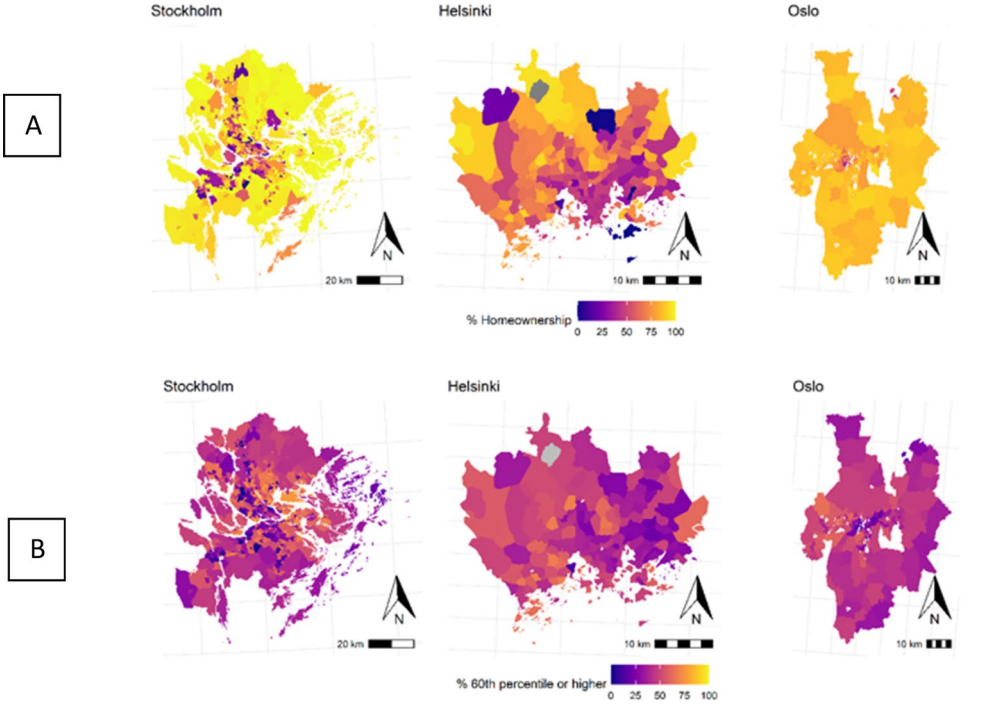

Figure 1. The spatial distribution of neighbourhoods by: a) homeownership and b) affluence in Stockholm, Helsinki, and Oslo (2011).

in the three Nordic capital cities which are being studied here. In contrast, differences are significant in the rental sector, which houses about half of Helsinki's population, seventeen percent of it in Oslo, and about ten percent of it in Stockholm. The share for the public rental sector is only two percent in Oslo, providing residences only to the most vulnerable households (Skovgaard Nielsen *et al.*, 2015).

To conclude, although the three Nordic cities in this study share similar social democratic equity values, their housing regimes exhibit significant differences.

Study design

Our analytical framework focuses on the diverse pathways of spatial assimilation among migrants who settled in as renters in lower-income neighbourhoods upon their arrival in the three Nordic capital cities. The framework's construction is based upon various combinations of residential mobility across neighbourhoods and tenure transitions (Figure 2). The first option is to stay put or to 'Remain a renter in a lower-income neighbourhood'. The next three outcomes refer to the different spatial assimilation pathways which are: 'Moves to a higher-income neighbourhood but remains a renter', 'Becomes a homeowner in a lower-income neighbourhood', and 'Becomes a homeowner and moves to a higher-income neighbourhood'.

By adhering to the spatial assimilation framework (cf. Massey & Denton, 1985), we regard achieving a higher income as the primary pathway to homeownership and moving to a higher-income neighbourhood. Based on the place stratification framework (cf. Pais *et al.*, 2012), we assume that migrants face barriers in terms of residential mobility even if their incomes increase, resulting in persistent residential isolation. When following the housing availability model (cf. South *et al.*, 2011), we expect migrant residential mobility and tenure transitions to vary in different urban contexts which are characterised by differing housing regimes. While we acknowledge that the precise social and symbolic meanings of residential mobility and tenure

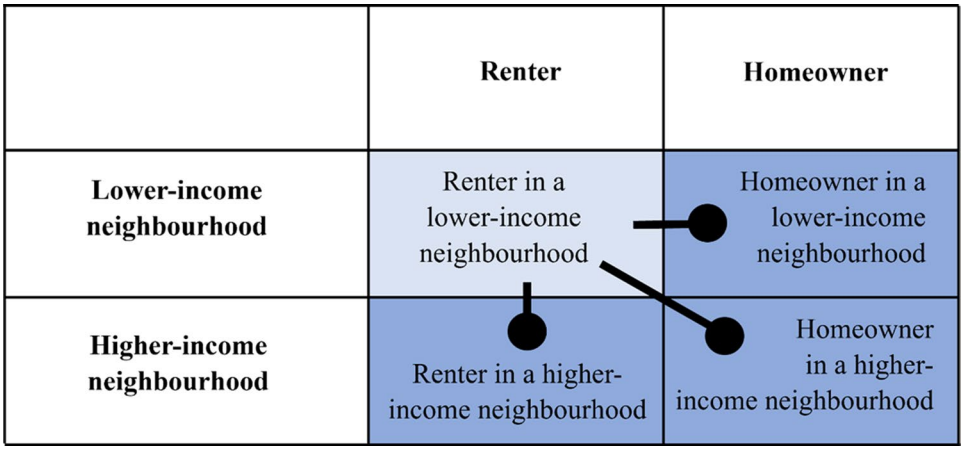

Figure 2. Outcomes for the residential mobility of migrants who are settling in as renters in lower-income neighbourhoods upon their arrival.

transitions may vary across different housing regimes, our approach emphasizes the differences in availability and affordability across the three studied cities.

Data

Our analysis is based on register microdata from Finland, Sweden, and Norway. It includes all migrants who are residing in the three capital cities. Register data from multiple countries cannot be pooled into one dataset and need to be analysed separately. All three datasets provide comprehensive information on individuals, housing tenures, and neighbourhoods. We organise the data for each city into a panel dataset with annual observations being recorded at the end of the calendar year and covering each year in the 2011–2017 period. Harmonised data is available for us for the three studied cities and within the period being studied. The data includes migrants who are aged between 25–60 who arrive from abroad and who settle in as renters in lower-income neighbourhoods in the Helsinki, Oslo, and Stockholm metropolitan areas (MAs) upon their arrival in 2011 and who also live in those MAs in all subsequent years up until the end of 2017. We exclude students, individuals who were older than sixty years upon arrival, and anyone who arrives or leaves the city in any year during the study period. The total sample size amounts to 2,783 individuals in Helsinki, plus 2,998 in Oslo, and another 4,692 in Stockholm.

We adopt a longitudinal research design by following migrants in each city between 2011–2017. This implies that we are able to detect the early (short-term) spatial assimilation pathways of migrants who settle in as renters in lower-income neighbourhoods upon their arrival. We classify migrants according to their first residential move as shown in Figure 2. Higher-income neighbourhoods and lower-income neighbourhoods are classified as follows: firstly, we calculate the average individual disposable income for all residents who live in each neighbourhood in order to be able to characterise neighbourhood affluence. Secondly, we classify neighbourhoods which belong to quintiles one and two as being lower-income neighbourhoods and neighbourhoods which belong to quintiles 3–5 as being higher-income neighbourhoods. We capture two housing tenure types in this study, as the details of the tenure situation differ between the registers of the three case study countries. The two tenures we include are rental housing (public or private rental) and homeownership (full property or housing company share ownership).

It is possible that some of the variances which appear in residential mobility for newly-arrived migrants can stem from disparities in the wealth of their home countries. Hence, we categorise migrants into three groups based upon the wealth level for their particular country of origin. The first group includes lower-income and lower-middle-income countries according to the World Bank classification (Appendix 1). The second group includes new member states from the European Union (EU) from the 2004 and 2007 EU enlargement waves. The remaining countries are considered as being higher-income countries. The main countries of origin are classified as follows: Iran, Iraq, Russia, Somalia, and Syria are lower-income countries; Estonia, Lithuania, and Poland are new European Union member states; and Finland, Germany, and Sweden are higher-income countries. Neighbourhoods are defined for the Helsinki MA as postcode areas, while they are 'small-area market statistics'

(SAMS) areas in the Stockholm MA, and track neighbourhoods in the Oslo MA. The average neighbourhood size numbers 5,300 in the Helsinki MA, while the Stockholm MA is at 1,900, and the Oslo MA is at 5,000. Different neighbourhood sizes may slightly affect our findings. Generally, defining neighbourhoods using larger geographic areas instead of more fine-grained ones leads to less cross-neighbourhood variation. However, a recent comparative study has found that the impact of neighbourhood size on the measured segregation levels in cross-country studies is not as pronounced as previously thought, and that the most consistent variances occur across national contexts (see, e.g. Marcińczak *et al.*, 2023).

When following the ideas of spatial assimilation theory in constructing our models, we include mean household income as the main variable of interest. We also control for other relevant individual background characteristics (Table 2). As with other register-based studies, our data have some important limitations. Firstly, we miss out on some relevant individual background variables, such as educational attainment. Although the Nordic population registers collect information which covers education, actual coverage and the quality of the variables are somewhat low for newly-arrived migrants. However, income does partially capture migrant skill levels. Secondly, the main neighbourhood units are not fully comparable in the three cities, being somewhat larger in terms of spatial reach and population size in Helsinki and Stockholm than they are in Oslo. Thirdly, the register data does not fully capture the family situation for the participants. Notably in this regard we are unable to detect cohabiting couples without children. Those are often younger people who have less stable partnerships, meaning that our data capture more stable family situations. Finally due to restrictions imposed by the data providers, register data from different countries cannot be pooled. As a result, we are not able estimate statistical models that have the type of housing regime as a predictor variable.

The main characteristics of the research sample

The key individual characteristics of migrants included in our samples vary between the three Nordic capital cities upon arrival (Table 2). Whilst the average age of migrants is similar, ranging between 25–30, the gender compositions differ. Men are overrepresented among migrants in Oslo and Stockholm, whereas women are overrepresented in Helsinki. Migrants who come from higher-income countries are predominantly single in all the studied Nordic capital cities, whereas those from lower-income countries and new EU member states mainly live in unions. While most migrants in Stockholm didn't have children upon arrival, the opposite was true for Helsinki and Oslo.

There are major differences for migrants in their labour market outcomes and financial resources. Employment rates are significantly lower among newly-arrived migrants in Stockholm when compared to those in Helsinki and Oslo, with minor differences being exhibited between migrant-origin groups. Migrants from lower-income countries living in Helsinki and Oslo tend to exhibit significantly lower employment rates than those who come from new EU member states and higher-income countries. Mean household income is at its lowest among migrants who come from new EU countries in all studied Nordic capital cities. The

Table 2. The main characteristics of the research population, 2011.

	Oslo MA				Helsinki MA				Stockholm MA			
	All migrants	Lower-income countries	New EU countries	High-income countries	All migrants	Lower-income countries	New EU countries	High-income countries	All migrants	Lower-income countries	New EU countries	High-income countries
N	2,998	1,180	1,165	653	2,783	972	1,032	779	6,533	4,692	1,089	747
Mean age	33.5	32.9	34.4	32.8	31.6	30.2	33.6	31.0	32.7	32.7	33.1	31.6
Sex												
Males	59.5	47.3	68.8	65.1	46	45	49	46	56.7	56.6	56.7	57.7
Females	40.5	52.7	31.2	34.9	54	55	51	54	43.3	43.4	43.3	42.3
Children												
Yes	90.0	87.5	90.8	93.1	83.8	92.3	73.4	85.4	26.7	28.9	23.0	18.1
No	10.0	12.5	9.2	6.9	16.3	7.7	26.6	14.6	73.3	71.1	77.0	81.9
Family status												
Single	47.4	33.2	45.5	76.6	58.1	53.4	49.6	71.5	44.8	38.4	49.4	75.1
In union	52.6	66.8	54.5	23.4	41.9	46.6	50.4	28.5	55.1	61.6	47.8	24.9
Mean household size	1.9	2.3	1.7	1.6	1,7	1.2	1.8	2.1	1.56	1.64	1.42	1.28
Mean income (EUR)	43,161	45,680	38,470	47,006	32,775	28,274	29,050	41,003	26,835	27,576	21,349	29,652
Employed												
No	33.6	51.9	23.0	19.6	20.4	36.6	10.3	11.4	40.6	40.5	45.4	34.7
Yes	66.4	48.9	77.0	80.4	74.0	56.3	81.2	87.4	43.7	41.5	50.0	48.6
Students	4.9	7.5	1.7	5.8	5.6	7.1	8.5	1.2	15.7	18.1	4.8	16.7
Share of local native neighbours	74.1	72.8	75.6	73.8	58.1	51.7	53.4	69.2	45.6	41.9	47.3	66.6

differences between migrants from lower-income and higher-income countries in Oslo and Stockholm are modest, whereas the differences in Helsinki are significant.

Different spatial assimilation pathways: a modelling approach

Our modelling approach focuses on detecting the different spatial assimilation pathways for of migrants who settle in as renters in lower-income neighbourhoods upon their arrival (Figure 2). We fit multinomial regression models separately on the register data from the Helsinki, Oslo, and Stockholm MAs since register data cannot be pooled into a single dataset. The regression model is expressed as follows:

$$\log \frac{p\left(Y_{it}=j\right)}{p\left(Y_{it}=J\right)}=\alpha+\sum_{k=1}^{K}\beta_{jk}X_{ikt}$$

where $p(Y_{it} = j)$ is an individual's $i = 1, I$ probability of being in an outcome category j at time t. In our case, it is the probability at any given time t of being in each of the outcome categories: 'remains a renter in a lower-income area' (reference category), 'moves to a high-income neighbourhood but remains a renter', 'becomes a homeowner in a lower-income neighbourhood', or 'becomes a homeowner and moves to a higher-income neighbourhood'. In the same formula, α is a constant, X_{it} is the value a set of k predictors for an individual i at time t, and β_{jk} is the parameter measuring (on the log-odds scale) the impact of each of these K variables on the probability of being in each of the $j = 1, J$ outcome categories. The main variable of interest is disposable household income measured in percentiles. We also split the models by region of origin in order to learn about differences in residential mobility among migrants who come from lower-income and higher-income countries. We further control for other relevant individual characteristics in the models, such as age, family status and the share of local natives in the neighbourhood. We present the results using average marginal effects to ensure comparability across different models and samples (see e.g. Mood, 2010).

Main findings

Spatial assimilation pathways for different migrant groups in differing housing regimes

At the beginning of the study period, in 2011, all of the migrants in our study lived as renters in below-average-income neighbourhoods. Figure 3 illustrates the residential outcomes at the end of the 2017 study period. Approximately twenty-five percent of migrants in Oslo still live as renters in lower-income neighbourhoods seven years after their arrival in Norway. Most newly-arrived migrants become homeowners in lower-income neighbourhoods (Figure 3). We further find that the higher the income level in the origin country, the higher is the share of migrants who are homeowners and who live in higher-income neighbourhoods.

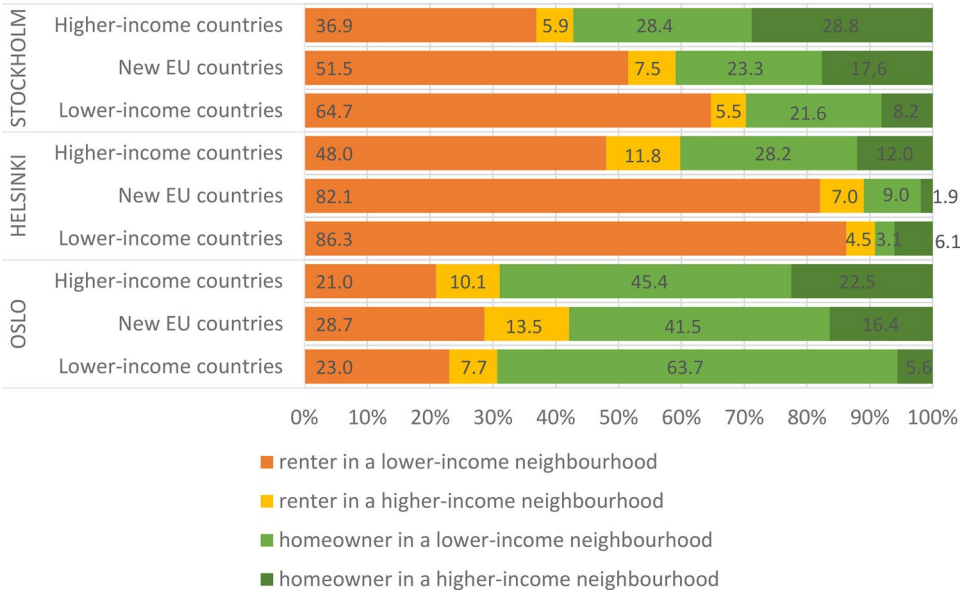

Figure 3. The distribution of the research population across housing tenure and neighbourhood affluence types at the end of the study period (2017).

Most migrants in Helsinki still live as renters in lower-income neighbourhoods at the end of the study period. This is especially common among migrants who come from lower-income countries and also those from the new EU countries. Only among migrants who have arrived from higher-income countries do we find a significant portion of homeowners (forty percent of them). Helsinki is therefore very different from Oslo in terms of immediate post-arrival assimilation pathways, and there also exist major differences between immigrant-origin groups. Stockholm falls between Oslo and Helsinki in terms of the share of migrants living as renters in lower-income neighbourhoods at the end of the study period, but it remains the most common assimilation pathway as in Helsinki. We also find that a higher share of migrants become homeowners and move to higher-income neighbourhoods in Stockholm when compared to the other two Nordic capitals. Differences between migrant origin groups are more systematic in Stockholm, with those who live as renters in lower-income neighbourhoods being the most common among migrants who originate from lower-income countries, and least common among migrants who originate from higher-income countries. More than half of those migrants who come from higher-income countries and who are starting out as renters in lower-income neighbourhoods became homeowners during their first six years in Sweden.

Spatial assimilation pathways as related to migrant incomes in different housing regimes

We proceed with the findings from the regression analysis. Here our main interest is in how residential mobility and tenure transitions vary by income in the three

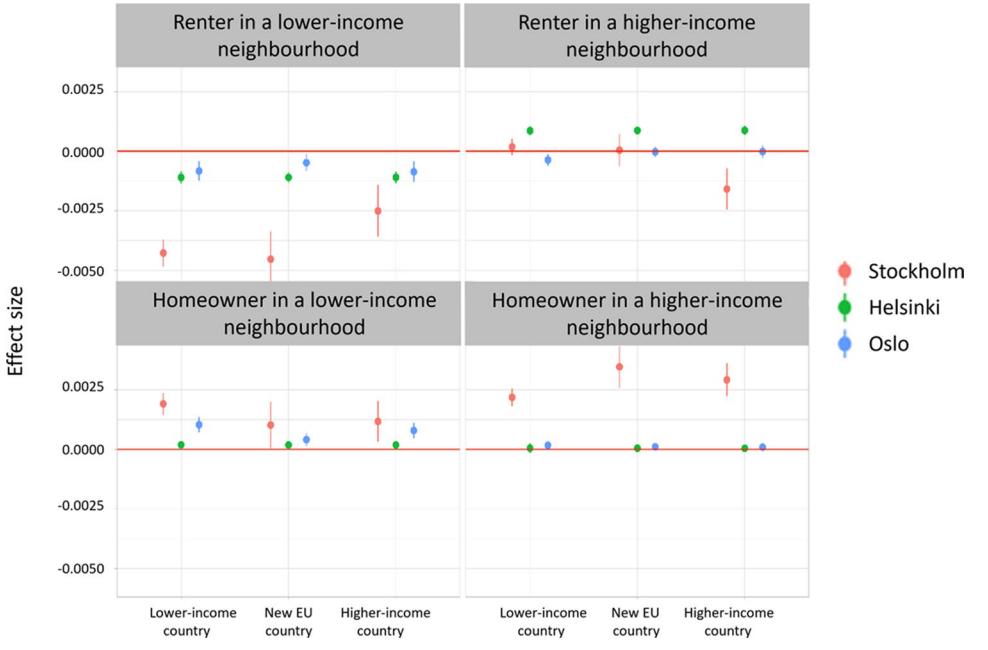

Figure 4. Average marginal effects in terms of annual earnings with different residential outcomes in the Oslo, Helsinki, and Stockholm capital city regions (between 2011–2017). Calculations are based on multinomial logit models fitted onto register data which comes from the Oslo, Helsinki, and Stockholm metropolitan areas (2011–2017).

cities in order to be able to test the expectations behind the spatial assimilation, place stratification, and housing availability frameworks. We also split the models by immigrant origin group, as our descriptive analysis (Figure 3) revealed important differences between migrants who originate from lower-income countries, new European Union member states, and higher-income countries. The modelling results show that the variation between the four residential mobility and tenure transition combinations is much more marked in Stockholm than it is in Helsinki and Oslo (Figure 4) (full estimation tables for the models are provided in Appendix 2). We also find that the combinations of residential mobility across neighbourhoods and tenure transitions in the three cities tends to vary with increased income. The next stage is in considering the findings in greater detail.

The results show that—in all three cities—income is negatively correlated with remaining a renter in a lower-income neighbourhood (Figure 4). Furthermore, this negative correlation also applies to all migrant origin groups. These results are in line with the expectations of the spatial assimilation theory and contradict the place stratification theory. The relationship between higher income and exiting from the status of being a renter in a lower income neighbourhood is particularly pronounced in Stockholm. We also find that the association between income and the three pathways of spatial assimilation differs in the three studied cities as predicted by the housing availability model. In the case of Helsinki, we find that the relationship between income and moving to a higher-income neighbourhood while remaining a renter is positive. As one's income rises, newly arrived migrants are thus more likely

to have that outcome. This applies to migrants in all origin groups (Figure 4). In Oslo, becoming a homeowner in a lower-income neighbourhood is positively correlated with income, especially for migrants who come from lower-income and higher-income countries. In Stockholm, the most demanding spatial assimilation pathway of moving to a higher-income neighbourhood and simultaneously becoming a homeowner is most strongly associated with income.

We also find that higher income is more consistently associated with transition to homeownership than moving to a higher-income neighbourhood in the three Nordic capitals. Most importantly, we can detect that an increase in income is related to a higher probability of becoming a homeowner, but, except for Stockholm, this is often associated with moving into a lower-income neighbourhood. This correlation is observed not only in Oslo, where it is particularly strong, but also in the other two cities and across all migrant origin groups (Figure 4). Furthermore, the positive association between income and becoming a homeowner in a lower-income neighbourhood is stronger in Stockholm compared to Oslo, but much weaker in Helsinki. The positive relationship in Stockholm between becoming a homeowner and moving into a lower-income neighbourhood, along with income rise, is particularly strong among migrants from lower-income countries. Higher income, however, is not systematically related to moving to higher-income neighbourhoods, with many differences between the cities and migrant origin groups.

In summary, there are differences in the spatial assimilation pathways for migrants who are earning higher incomes in the three cities. Firstly, income matters in all three cities when it comes to leaving one's initial situation of being a renter in a lower-income neighbourhood, although the association is stronger in Stockholm compared to the other two cities. Helsinki is a city which has a high share of rental housing stock. Here, higher incomes are strongly associated with moving to a higher-income neighbourhood and remaining a renter, but not with any of the two assimilation pathways which involve homeownership. Oslo is a city which has a high share of homeowners. Here, higher incomes are related to becoming a homeowner in a lower-income neighbourhood, but not with moving into a higher-income neighbourhood, either as a renter or a homeowner. Stockholm has a contracting public housing sector and generally experiences a shortage of rental housing. Higher incomes here are associated with the more financially demanding spatial assimilation pathways which involve becoming a homeowner, both in lower-income and higher-income neighbourhoods.

Discussion and conclusions

Migrants are usually underrepresented among homeowners and those who live in higher-income neighbourhoods. The spatial assimilation theory posits that, as their income increases, migrants tend to move into more affluent neighbourhoods in which the native majority population is overrepresented. However, the theory is vague when it comes to the importance of becoming a homeowner during this process. This study examined how income is associated with post-arrival spatial assimilation pathways, or the moving into higher-income neighbourhoods, becoming a homeowner, or doing both when it comes to those migrants who initially settled

in as renters in lower-income neighbourhoods. We further asked whether the association with income differs by migrant origin groups and housing market contexts in terms of the arrival cities.

Our comparative and longitudinal study was based on three Nordic capital cities which represent social democratic welfare regimes but which have differing housing regimes. We find that migrants experiencing income rise have an elevated probability to exit from the status of being a renter in a lower-income neighbourhood as expected by the spatial assimilation theory (cf. Massey & Denton, 1985). This finding applies to all three cities and to all migrant origin groups. However, the pathways of spatial assimilation vary among the three cities, each representing different housing regimes, which aligns with the expectations of the housing availability model (cf. South *et al.*, 2011). Only in Stockholm did an increase in income relate to higher probabilities of moving to a higher-income neighbourhood and becoming a homeowner, as expected by the original spatial assimilation framework. Helsinki is a city with a substantial rental sector, and there an increase in income was associated with a higher probability of moving to a higher-income neighbourhood while remaining a renter. Homeownership is a key feature of Oslo's housing market, also in the lower income neighbourhoods. Accordingly, an increase in income in such urban context is associated with a higher probability of becoming a homeowner while moving to a lower-income neighbourhood.

The findings are also interesting from the policy perspective. The Finnish housing context provides higher-quality rental opportunities for higher-income migrants in higher-income neighbourhoods, allowing them to move to affluent neighbourhoods without becoming homeowners. However, this advantage comes at the expense of those migrants who fail to gain lifelong wealth, unlike homeowners themselves, thereby perpetuating wealth disparities between migrants and natives. The Norwegian housing context stimulates homeownership while at the same time having a much smaller rental sector. This allows migrants to experience housing-related lifelong wealth gains. However, this comes at the expense of migrants staying in segregated lower-income neighbourhoods, and thereby contributing to the perpetuation of disparities between migrants and natives when it comes to having access to urban opportunities. The mixed housing context in Stockholm allows migrants who have higher incomes to also become homeowners in higher-income neighbourhoods. However, the combination of a chronic housing shortage and the queue-based allocation of housing in the Swedish capital means that a higher income does not necessarily translate into renting in a higher-income neighbourhood.

As with all register-based research, our findings could be enhanced by comparative qualitative studies in order to better understand the mechanisms which underlie these migrant assimilation pathways. It should also be noted that our study captured only the first seven years after migrant arrival, and it may be the case that spatial assimilation pathways change with time. Nevertheless, our findings indicate that the spatial assimilation pathways of migrants are shaped by city-specific housing regimes. Crucially, the relationship between income rise, becoming a homeowner and/or moving to a higher-income neighbourhood differs in cities which have different tenure structures. This implies that the process of theorising and testing the spatial assimilation framework can be enriched by jointly considering residential

mobility across neighbourhoods and tenure transition. Therefore, more studies are needed that cover a longer time span to examine the co-evolution of post-arrival residential mobility and tenure transitions of migrants arriving from different origin regions and settling into cities with diverse housing regimes.

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Appendix 1. The World Bank classification of countries by wealth level and EU membership status

Lower-income countries	Afghanistan, Albania, Algeria, American Samoa, Angola, Argentina, Armenia, Azerbaijan, Bangladesh, Belarus, Belize, Benin, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, Burkina Faso, Burundi, Cabo Verde, Cambodia, Cameroon, Central African Republic, Chad, China, Colombia, Comoros, Congo (Dem Rep), Congo (Rep), Costa Rica, Côte d'Ivoire, Cuba, Djibouti, Dominica, Dominican Republic, Ecuador, Egypt (Arab Rep), El Salvador, Equatorial Guinea, Eritrea, Eswatini, Ethiopia, Fiji, Gabon, Gambia (The), Georgia, Ghana, Grenada, Guatemala, Guinea, Guinea-Bissau, Guyana, Haiti, Honduras, India, Indonesia, Iran (Islamic Rep), Iraq, Jamaica, Jordan, Kazakhstan, Kenya, Kiribati, Korea (Dem Rep), Kosovo, Kyrgyz Republic, Lao PDR, Lebanon, Lesotho, Liberia, Libya, Madagascar, Malawi, Malaysia, Maldives, Mali, Marshall Islands, Mauritania, Mexico, Micronesia (Fed Sts), Moldova, Mongolia, Montenegro, Morocco, Mozambique, Myanmar, Namibia, Nepal, Nicaragua, Niger, Nigeria, North Macedonia, Pakistan, Papua New Guinea, Paraguay, Peru, Philippines, Russian Federation, Rwanda, Samoa, São Tomé and Principe, Senegal, Serbia, Sierra Leone, Solomon Islands, Somalia, South Africa, South Sudan, Sri Lanka, St Lucia, St Vincent and the Grenadines, Sudan, Suriname, Syrian Arab Republic, Tajikistan, Tanzania, Thailand, Timor-Leste, Togo, Tonga, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, Uzbekistan, Vanuatu, Venezuela (RB), Vietnam, West Bank and Gaza, Yemen (Rep), Zambia, Zimbabwe.
New EU countries	Bulgaria, Czechia, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, Slovenia.
Higher-income countries	Andorra, Antigua and Barbuda, Aruba, Australia, Austria, Bahamas (The), Bahrain, Barbados, Belgium, Bermuda, British Virgin Islands, Brunei Darussalam, Canada, Cayman Islands, Channel Islands, Chile, Croatia, Curaçao, Cyprus, Denmark, Faeroe Islands, Finland, France, French Polynesia, Germany, Gibraltar, Greece, Greenland, Guam, Hong Kong SAR (China), Iceland, Ireland, Isle of Man, Israel, Italy, Japan, Korea (Rep), Kuwait, Liechtenstein, Luxembourg, Macao SAR (China), Malta, Mauritius, Monaco, Nauru, Netherlands, New Caledonia, New Zealand, Northern Mariana Islands, Norway, Oman, Palau, Panama, Portugal, Puerto Rico, Qatar, San Marino, Saudi Arabia, Seychelles, Singapore, Sint Maarten (Dutch part), Spain, St Kitts and Nevis, St Martin (French part), Sweden, Switzerland, Taiwan (China), Trinidad and Tobago, Turks and Caicos Islands, United Arab Emirates, United Kingdom, United States, Uruguay, Virgin Islands (USA).

Appendix 2. Multinomial logistic regression tables covering the probability of opting for different residential trajectories in Oslo, helsinki, and Stockholm capital regions

	Stockholm		
Independent variable	Homeowner in a lower-income neighbourhood	Homeowner in a high-income neighbourhood	Renter in a high-income neighbourhood
Age	0.085	0.231***	0.083
Age square	−0.001	−0.003**	−0.001
Sex (ref male)			
Female	0.150**	0.271***	0.231**
Number of moves	0.054	0.203***	0.306***
Family size	−0.136*	−0.318***	−0.329***
Children in family (ref childless)	−0.144*	0.085	0.205*
Family status (ref single)			
Non-native partner	−0.083	−0.099	0.052
Native partner	0.390***	0.611***	0.150
Origin (ref lower-income countries)			
New EU countries	0.374***	0.616***	0.188
High-income countries	0.610***	0.765***	0.890***
Income rank	0.018***	0.025***	0.010***
Origin (ref lower-income countries) x income rank			
New EU countries x income rank	−0.003	0.003	0.001
High-income countries x income rank	−0.007*	−0.004	−0.016***
	Helsinki		
Independent variable	Homeowner in a lower-income neighbourhood	Homeowner in a high-income neighbourhood	Renter in a high-income neighbourhood
Age	0.612	0.121	0.206
Age square	0.000	0.000	−0.000
Sex (ref male)			
Female	0.229	−0.054	0.075
Number of moves	−0.108*	0.180*	0.421*
Family size	−0.027	−0.038	−0.003
Children in family (ref childless)	−1.186	0.065	−0.272
Family status (ref single)			
Non-native partner	0.469	−0.051	−0.211
Native partner	−0.002***	0.003***	−1.287
Origin (ref lower-income countries)			
New EU countries	−0.553	−0.092*	−0.130
High-income countries	0.964	0.370*	0.047
Income rank	0.052***	0.005	0.056***
Origin (ref lower-income countries) x income rank			
New EU countries x income rank	−0.000	−0.000	0.043***
High-income countries x income rank	0.000*	0.002	0.003***

(*Continued*)

	Stockholm		
Independent variable	Homeowner in a lower-income neighbourhood	Homeowner in a high-income neighbourhood	Renter in a high-income neighbourhood
	Oslo		
Independent variable	Homeowner in a lower-income neighbourhood	Homeowner in a high-income neighbourhood	Renter in a high-income neighbourhood
Age	−0.075***	−0.024	0.024
Age square	0.001***	0.000	−0.000
Sex (ref male)			
Female	0.181***	0.356***	−0.168*
Number of moves	−0.123***	0.334***	0.345***
Family size	0.034*	0.071*	0.035
Children in family (ref childless)	0.2934***	0.134	−0.084
Family status (ref single)			
Non-native partner	0.552***	0.411***	−0.094
Native partner	−0.011***	0.090***	0.085***
Origin (ref lower-income countries)			
New EU countries	−0.350***	0.529*	0.051
High-income countries	−0.416***	0.194	−0.121
Income rank	0.016***	0.018***	−0.006*
Origin (ref lower-income countries) x income rank			
New EU countries x income rank	−0.005*	−0.010*	0.005*
High-income countries x income rank	0.004*	0.006	0.011***

Notes: *$p < 0.05$; ***$p < 0.001$. Reference category: renter in a lower-income neighbourhood.