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Initial residential patterns of immigrants across the urban hierarchy in Sweden: The role of education

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Abstract

While a rich body of literature has examined the role of regional attributes in the initial sorting of immigrants, only a handful of studies have investigated the diverging residential patterns differentiated by immigrants' characteristics, mostly due to a scarcity of such data shortly after immigrants' arrival. With the availability of Swedish register data containing information about immigrants' educational level and other socioeconomic and demographic variables upon their arrival, this paper examines and characterises the initial sorting patterns of migrants who arrived in Sweden in the period 2000-2014 based on their personal characteristics. Employing multinomial logistic regression, the results indicate different settlement patterns depending on immigrants' educational level, region of origin, purpose of migration, age, and family composition. Highly educated immigrants mainly reside in metropolitan areas, whereas rural and sparsely populated areas are the main destinations of lower educated newly arrived immigrants. Nordic and African immigrants, quota refugees, older immigrants and families with younger children are among the groups of immigrants who are most pronounced in sparsely populated areas. The rural settlement of some groups of immigrants has significant socioeconomic and demographic policy implications.

Keywords: Initial settlement pattern, residential sorting, migrants' educational level, Swedish register data

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1. INTRODUCTION

Historically, international migration has been an urban phenomenon and immigrants tend to live in large cities to benefit from pools of jobs, educational institutions, public services, cultural and leisure facilities (Buch et al. 2014; Glaeser et al. 2001). Nevertheless, recent groups of migrants have shown different residential patterns shaped out of traditional metropolitan cities (Collantes et al., 2014 in Spain; Fonseca, 2008 in Portugal; Hedberg and Haandrikman, 2014 and Hedlund et al., 2017 in Sweden; Hugo and Morén-Alegret, 2008 review for OECD countries; Janská et al., 2014 in the Czech Republic; Kandel and Parrado, 2005 in US). According to a study by Malmberg et al. (2018), recently an increasing proportion of non-European migrants have been living in small and large cities, and compared to other groups of migrants, rural settlement is more common among refugees. The recent settlement pattern of migrants questions the narrative of international migrants as being entirely urbanised.

Delving into the residential settlement of migrants, a wealth of studies has been conducted to identify locational factors that underlie migrants' initial settlement in different contexts such as the US (Bartel, 1989; Huang and Newbold, 2017; Jaeger, 2007; Scott et al., 2005; Zavodny, 1999), Canada (McDonald, 2004), Sweden (Åslund, 2005), Denmark (Damm, 2009), UK (Lymperopoulou, 2012), Germany (Tanis, 2018) and the Netherlands (Zorlu and Mulder, 2008). These studies, based on locational choice models (e.g., Greenwood, 1997; McFadden, 1978), have demonstrated that labour markets and co-ethnic networks are the most important factors shaping migrants' preferences for initial settlement. Yet the major limitation associated with most of these studies is that they do not examine the role of migrants' educational attainment on their locational preference, mainly due to the lack of such data about immigrants' characteristics shortly after they arrive in the host country (e.g., Zorlu and Mulder, 2008; Zavodny, 1991).

From this body of studies, it is less clear whether all these factors are valued similarly for residential choice of all migrants and whether the preferences for initial residence vary by migrant groups. Additionally, these studies mostly address one specific category of migrants (e.g., EU migrants in the study by Tanis, 2018 or labour migrants in the study by Scott et al., 2005). Moreover, the settlement patterns of migrants are not always a matter of preference and choice, and as argued by the place stratification theory (Logan and Alba, 1993), on the basis of barriers such as lacking local knowledge or discrimination, some migrants are constrained in their residential choice.

Few studies have shown that migrants' educational level affects their initial and subsequent locational choice (see Åslund, 2005; Bartel, 1989; Huang and Newbold, 2017; McDonald, 2004). These studies found that less educated migrants are more dependent on their co-ethnics in their initial settlement, and mostly reside in areas with a great proportion of other migrants and co-ethnics. In addition, residential patterns may vary depending on migrants' origin and purpose of migration, as different origins and purposes of migration may be associated with a varying level of resources. Family migrants tend to join their settled family, while the settlement behaviour of other groups is affected by other economic opportunities, settlement policy, housing market, and the presence of other migrants (Huang and Newbold, 2017; Jaeger, 2007; Lymperopoulou, 2012; Zorlu and Mulder, 2008; Scott et al., 2005). Moreover, migrants with different ages (Hjort and Malmberg, 2006; Lundholm et al., 2004; Westlund, 2002) and different family structures (Kulu and Vikat, 2007; Westlund, 2002) have different preferences about their place of residence, resulting in varying residential patterns.

In this paper, I aim to contribute to existing streams of studies in two ways. First, I intend to identify and characterise immigrants' initial settlement patterns by their educational level as compared to other demographic characteristics. Second, I am interested in the diversity of immigrants and do not limit my study to a particular group of migrants. This paper uses full

population register data containing immigrants' educational attainment and other demographic and socioeconomic variables upon immigrants' arrival since the early 2000s, thereby offering a unique opportunity to carry out this study. Hence, the following research questions are addressed:

- To what extent are newly arrived migrants sorted by educational attainment?
- How do these sorting patterns vary by purpose of migration and migrants' origin?

2. THEORETICAL BACKGROUND AND LITERATURE REVIEW

2.1. The recent settlement pattern of migrants: new gateways and the role of human capital

Metropolitan areas with their variety of services and facilities tend to attract young, highly educated, and talented individuals (Florida, 2002). Immigrants are no exception, and historically, international migrants tend to reside in large cities and metropolitan areas. However, in recent years an increasing proportion of migrants have bypassed these traditional gateways and more often reside in more sparsely populated areas (Collantes et al., 2014; Fonseca, 2008; Hedberg and Haandrikman, 2014; Hedlund et al., 2017; Hugo and Morén-Alegret, 2008; Janská et al., 2014; Kandel and Parrado, 2005). The recent settlement patterns of migrants, out of metropolitan areas, have resulted in the emergence of new gateways. In Sweden, some rural areas known for their depopulation and ageing population have recently received heterogeneous groups of international migrants (Hedberg and Haandrikman, 2014).

Kandel and Parrado (2005) found that Hispanic migrants living in non-metropolitan areas in the US, compared to immigrants who live in metropolitan areas, mainly consist of recently arrived and poorly educated migrants. In Sweden, Hedlund et al. (2017) examined changes in characteristics of migrants living in rural versus urban areas in the time period 1990-2010. They showed an increase in the proportion of migrants from Asia, Western Europe, Africa, the

Middle East, and Eastern Europe moving to rural areas that were previously dominated by Nordic migrants. In contrast, urban areas experienced a decline in the proportion of migrants from Western and Nordic countries, while the proportion of immigrants from Africa and the Middle East has grown fast in urban areas. They also showed that migrants living in urban areas are more highly educated than their counterparts in rural areas. In another study, Hedberg and Haandrikman (2014) found that most rural migrants are older, of Nordic or European origin and are lower educated.

The emergence of these recent patterns can be explained to some extent by human capital theory (Becker, 1964), which contends that individuals' educational level is an essential component of their labour market integration. Linking this theory to thick labour markets and a variety of consumption opportunities offered by large cities (Buch et al. 2014; Glaeser et al. 2001), it may be concluded that highly educated migrants are most likely to reside in metropolitan areas and larger cities, where they may find employment in highly skilled and specialised jobs that match their educational level. On the other hand, lower educated migrants may choose to live in rural and less populated areas, and work in low-skilled and labour-intensive jobs. This results in a settlement pattern of migrants stratified by educational composition.

2.2.The role of migrants' characteristics in their initial residential choice

Economic models of utility maximisation and locational choice argue that individuals choose to live in locations that maximise their utility given the attributes of the location, their preferences, and different types of restrictions (e.g., Greenwood, 1997; McFadden, 1984). Based on such models, studies have examined the locational choice of migrants to identify what matters in the settlement of immigrants (Åslund, 2005; Bartel, 1989; Damm, 2009; Huang and Newbold, 2017; Jaeger, 2007; Lymperopoulou, 2012; McDonald, 2004; Scott

et al., 2005; Tanis, 2018; Zavodny, 1999; Zorlu and Mulder, 2008). Researchers have generally found that the presence of an immigrant population, particularly co-ethnics, and labour market conditions are the main determinants of migrants' initial place of residence as well as their subsequent mobility. In Sweden, Åslund (2005), focusing on the migrant cohort of 1981–1983, found that the presence of people from the same country of origin plays a salient role in the locational choice of migrants. Similarly, Zorlu and Mulder (2008) found that non-Western migrants in the Netherlands are more likely to reside in places with a large proportion of co-ethnics.

Labour market conditions have also been found to impact migrants' locational choice. Tanis (2018) documented that EU immigrants in Germany are more attracted to regions with a good labour market, whereas the presence of co-ethnics plays a minor role in residential choice. Bartel (1989), Zavodny (1999), and Åslund (2005) also found that local labour market conditions represent an important factor determining migrants' residential settlement.

The tenor of these studies is that immigrants respond to these factors differently due to their heterogeneous characteristics, particularly their educational attainment. Whereas less educated migrants are mostly concentrated in areas with a greater presence of other migrants and co-ethnics, for higher educated migrants, labour market conditions matter more. Bartel (1989), showed that the locational choice of highly educated migrants is relatively opposite to the rest of the migrant population, as they tend to live away from large migrant communities and are less dependent on their co-ethnics than the lower educated migrants. In a similar vein, Huang and Newbold (2017) and Izyumov et al. (2002) revealed that co-ethnic communities play a more important role in the residential choice of lower educated migrants. However, as many studies lack proper information on migrants' educational level shortly after arrival (e.g., Zorlu and Mulder, 2008; Zavodny, 1991), such effects have not been thoroughly examined.

Migrants' purpose of migration also affects initial settlement patterns. According to Zorlu and Mulder (2008), the locational choice of family reunifying migrants is less determined by the presence of co-ethnics and other migrants as they follow their established family residential behaviour. On the other hand, labour migrants who are mostly tied to their place of work, have more freedom about their place of residence and they mainly choose to live in areas where their utility is maximised by labour market, wages, the private rental sector, local amenities, and public goods (Jaeger, 2007; Niedomysl and Hansen, 2010; Scott et al., 2005; Zorlu and Mulder, 2008).

For refugees, who do not have prior connections in the labour market upon arrival, residential settlement is mainly defined by settlement policies. Proietti and Veneri (2019) revealed that refugees, compared to other immigrants, are less concentrated in urban areas. Åslund (2005) showed that refugees' locational choice in Sweden is mainly determined by the presence of other migrants, particularly co-ethnics. In Denmark, Damm (2009) reached a similar conclusion and showed that the availability of social housing and the presence of co-ethnics and other migrants are important factors determining refugees' locational choice.

Finally, migrants' origin also leads to variation in locational preferences. Lymperopoulou (2012) discovered that compared with the other groups, EU Accession nationals and Africans in the UK more often live in deprived neighbourhoods, with a higher availability of social housing. Zorlu and Mulder (2008) also revealed that the locational settlement of non-Western migrants in the Netherlands differs from Western migrants, with the former more likely to live in ethnically dense areas. Cultural and religious distance between non-Western migrants and Dutch society was stated as a reason for these patterns.

Stage in the life course and family composition may also affect migrants' locational preferences and therefore migrants' residential patterns. In Sweden, studies have revealed that younger people are more prone to move to metropolitan areas, while rural migrants are more

often middle-aged or elderly (Hjort and Malmberg, 2006; Lundholm et al., 2004; Westlund, 2002). Additionally, rural and peripheral areas, by having more spacious houses, are more attractive places for families with younger children (Kulu and Vikat, 2007).

Summarising, the locational preferences of migrants are expected to vary depending on the migrants' level of education, the purpose of migration, and region of origin, which subsequently results in diverging settlement patterns. Nevertheless, migrants' residential settlement is not always a matter of choice, and in some cases, structural barriers such as cultural prejudice, discrimination, and other barriers in housing markets prevent some groups of immigrants from actualising their housing preferences, which recalls the place stratification theory of Logan and Alba (1993). Different discriminatory actions posed by the state, government, real estate agents, rental housing companies and private landlords have been stated as potential examples of discrimination faced by some groups of migrants. In Sweden, evidence has been found for discriminatory attitudes against immigrant applicants that constrain the housing choices available to them (Ahmed and Hammarstedt 2008). A bank or financial institution may also engage in discriminatory practices when providing financing to purchase a house (Skifter Andersen et al., 2016). However, this is less important for newly arrived migrants, who are mostly dependent on rental housing upon arrival (Abramsson et al., 2002).

In addition to discrimination, other barriers, including a lack of economic, political, social, and cognitive resources (Abramsson et al., 2002; Skifter Andersen et al., 2016), may also adversely affect migrants' accessibility to housing options. Newly arrived migrants who lack information about rules and regulations on the housing market in the destination country, as well as information about potential economic support, allegedly experience more difficulty acquiring available housing options. Furthermore, having good contacts with the person or institution in charge of private rentals may constrain migrants' position in the housing market

as they may not speak the local language and have reduced social networks, especially shorty after arrival (Skifter Andersen et al., 2016). All these types of barriers, in the form of discrimination and a lack of resources, may prevent some migrants from living where they wish. Beside discrimination, for refugees, their residential settlement is involuntary, determined by settlement policy. In Sweden, different settlement policies have evolved, which have led to different settlement patterns for refugees, which are discussed in the following.

2.3.Swedish settlement policies

To counteract the increasing level of ethnic segregation, several settlement policies have evolved over the years, which mainly target refugees and asylum seekers. From the mid-1980s to the mid-1990s, a dispersal policy—the so-called 'Sweden-wide strategy' ('Hela Sverige strategin') was implemented, to disperse the increasing flow of refugees across Swedish municipalities (Andersson and Solid 2003). All refugees, except those who came to join their family members, were allocated geographically by the Swedish Migration Agency ("anläggningsboende", ABO). The integration of refugees into education and the labour market was taken into account when they were settled across municipalities. However, later on, with housing shortages in certain municipalities, housing availability became the main criterion in displacing refugees, regardless of the refugees' preference to live in metropolitan areas (Åslund et al., 2009; Dahlberg, Valeyatheepillay, 2018). Despite the main purpose of this strategy, many refugees moved away from their initial allocated municipalities to large and metropolitan cities (Andersson and Solid, 2003).

Since 1994, unlike the previous policy (ABO), refugees were given the freedom to choose their place of residence, under the "Lagen om Eget Boende" (EBO) legislation. Refugees' settlement patterns, therefore, differ based on which alternative they choose. While ABO refugees are mostly assigned to smaller municipalities and rural areas, the EBO refugees, who choose their place of residence, mainly tend to reside in metropolitan cities, with their relatives and

acquaintances (Andersson and Solid 2003; Andersson et.al., 2010). Studies show that the popularity of EBO did not decrease even though, by arranging their own housing, refugees were no longer entitled to a housing allowance (Esaiasson & Sohlberg, 2018).

3. DATA AND METHODS

The empirical analysis in this paper is based on Swedish register data compiled by Statistics Sweden, accessed through Statistics Sweden's system of Micro-Online Access (MONA). Register data contain the longitudinal and annually updated variables on a wide range of demographic, socioeconomic, housing, and geographic domains on the individual level. All individuals are assigned an anonymised ID, which enables the merging of different datasets.

Educational attainment is central to this study. Register data contains different educational variables, namely the highest completed level of education (Sun2000niva), the source of educational information (Källkod), the field of study (Sun2000Irn), and educational enrolment (StudDelt). Despite the availability of educational attainment in register data, a recent study by Khaef (2022) shows that the educational attainment for more than half of immigrants in the year of arrival is missing, which is mainly due to the lag in registration time. Since migrants' educational attainment upon arrival is characterised by a substantial proportion of missing data, and measurement two years after arrival leads to a considerable reduction in missing educational data (Khaef, 2022), the current study uses the educational levels of immigrants two years after arrival. Throughout this paper, the educational categories are defined as low (Primary and lower secondary), medium (Upper secondary) or high (Tertiary), based on the highest level of completed education.

To examine the spatial sorting patterns of migrants across Sweden, the classification used by the Swedish Association of Local Authorities and Region (2011) is employed to characterise the degree of urbanisation of different areas. According to this classification, all 290

municipalities in Sweden are categorised into nine groups, on the basis of population size, urban function, economic activities, and commuting pattern. In this paper these nine categories are regrouped into four broad groups: (1) Metropolitan areas including suburbs; (2) Larger cities including suburbs; (3) Towns; and (4) and Sparsely populated areas. Since migrants tend to move a lot between unstable and temporary accommodation in the first year after arrival, this paper examines migrants' initial settlement two years after registration.

The analyses are carried out for large cohorts of immigrants, defined as all foreign-born individuals, who entered Sweden in the period 2000–2014, and who had a registered educational level two years after arrival. Immigrants who were aged 25 and older at immigration were included in analysis, since many of those younger than 25 may still pursue their education.

A multinomial logistic regression model (MNL) was used to examine the spatial sorting of migrants across the urban hierarchy. Migrants' characteristics which are included as independent variables pertain to educational level, purpose of migration, and region of origin. Year of arrival, age, and family composition have been used as control variables. Table 1 shows when different variables are measured in the analysis.

Table 1: Measurement time for variables used in the analysis

Variables used	**Year of measurement**
Dependent variable	
The initial place of residence	T+2
Independent variables	
The highest educational level	T+2
Purpose of immigration to Sweden	T
Region of origin	T
Control variables	
Year of arrival in Sweden	T
Age at arrival	T
Family composition	T

Using the migrants' purpose of migration variable, I distinguish among labour migrants, refugees, students, family migrants and other migrants. Among refugees, based on their settlement pattern, three categories are distinguished: refugees with assigned housing (ABO), refugees with self-arranged housing (EBO), and quota refugees, who did not arrive in Sweden by their own means, and were resettled by the UN refugee agency (Swedish Migration Agency, 2020). Migrants from either EU or non-EU countries who did not require a residence permit were categorised as *others*. Region of origin was classified as Africa, Asia, EU, Nordic countries[1], and a remaining category comprising all other countries including America, Australia, and Oceania. Family composition was included as single[2], a couple without children living at home, a couple with at least one child under the age of 18 living at home, a couple with the youngest child living at home and older than 18, a single parent with at least one child under the age of 18 living at home, a single parent with the youngest child living at home and older than 18.

Table 2 shows the descriptive statistics on migrants arriving in Sweden in the period 2000-2014. During this period, 500,387 migrants arrived in Sweden of which 71,307 (14.3%) had missing educational level two years after arrival. As we see from Table 2, missing educational information is more common among migrants without a residence permit, and for EU and Asian migrants. Additionally, migrants with missing education are more prevalent in metropolitan areas. Given that missing educational information may refer to any level of education (Khaef, 2022), all immigrants with a missing value on educational attainment after two years (71,307 migrants) were removed from further analysis[3].

[1] Including Finland, Norway, Denmark, and Iceland.
[2] These may include unmarried cohabitants without child/ren.
[3] Student migrants, 23,123, are not included in this study as their settlement patterns are predominantly determined by the location of their university and dormitory.

Table 2: Descriptive statistics of immigrants arriving in Sweden in the period 2000- 2014

	With registered education 2-years after arrival		Without registered education 2-years after arrival	
	N	**%**	**N**	**%**
Purpose of migration to Sweden				
Family migrants	177405	43.7	11478	17.1
Other migrants (without permit)	110783	27.3	35697	53.1
Refugees				
ABO	19044	4.7	972	1.5
EBO	44557	11	3584	5.3
Quota	8626	2.1	659	1.0
Labor migrants	45542	11.2	14853	22.1
Region of settlement				
Metropolitan areas	182367	44.9	35395	52.6
Larger cities	119506	29.4	15341	22.8
Towns	89452	22.0	13930	20.7
Rural and sparsely populated areas	14632	3.6	2577	3.8
Highest completed educational level				
Lower educated	97044	23.9	-	-
Medium educated	100908	24.9	-	-
Highly educated	208005	51.2	-	-
Region of origin				
Asia	183158	45.1	19712	29.3
Europe	119191	29.4	27206	40.5
Africa	54122	13.3	4978	7.4
America, Australia, Oceania	26092	6.4	3403	5.1
Nordic	23394	5.8	11944	17.8
Age				
25-30	145197	33.8	19067	26.7
30-35	106054	24.7	13714	19.2
35-45	117084	27.3	15118	21.2
45-55	45436	10.6	7156	10.0
Above 55	15309	3.6	16252	22.8
Total	429,080	100.0	71307	100

A population of 429,080 immigrants who had a registered education two years after arrival formed the population of the study. This group of migrants came from different corners of the world, with a large majority coming from Asia, Europe, and Africa (45.1, 29.4 and 13.3 percent respectively). Around half of this migrant group were family migrants, followed by migrants

without a residence permit, refugees, and labour migrants. Geographically, nearly half of these group resided in metropolitan cities two years after arrival. More than half were highly educated, while almost an equal proportion of them were educated to a medium or low degree.

4. RESULTS

4.1.The spatial sorting of migrants across the urban hierarchy in Sweden

The variation in migrants' initial settlement patterns by their educational attainment, along with purpose of migration and origin, is estimated empirically by a multinomial logit model (MNL). Table 1 in the appendix shows the odds ratios from a regression analysis of international migrants living across the urban hierarchy (compared to the reference category: small town) as the dependent variable. To determine the extent to which educational attainment and the other independent variables contribute to the spatial sorting of migrants, the analyses were carried out in different models in a stepwise manner. The first model includes migrants' educational level only (Model A), while Model B adds the region of origin, Model C adds the purpose of migration, and Model D includes all variables: education, origin, purpose of migration, and controls for age, family structure and year of arrival.

The result of the overall model fit of all models, displayed in Table 2 in the appendix, shows that the final model exhibits a significant increase in chi-square and the likelihood ratio and thus fits the data best. For easier interpretation, the average marginal effects are calculated for each model and the results are presented in figures 1a, b, c, and d.

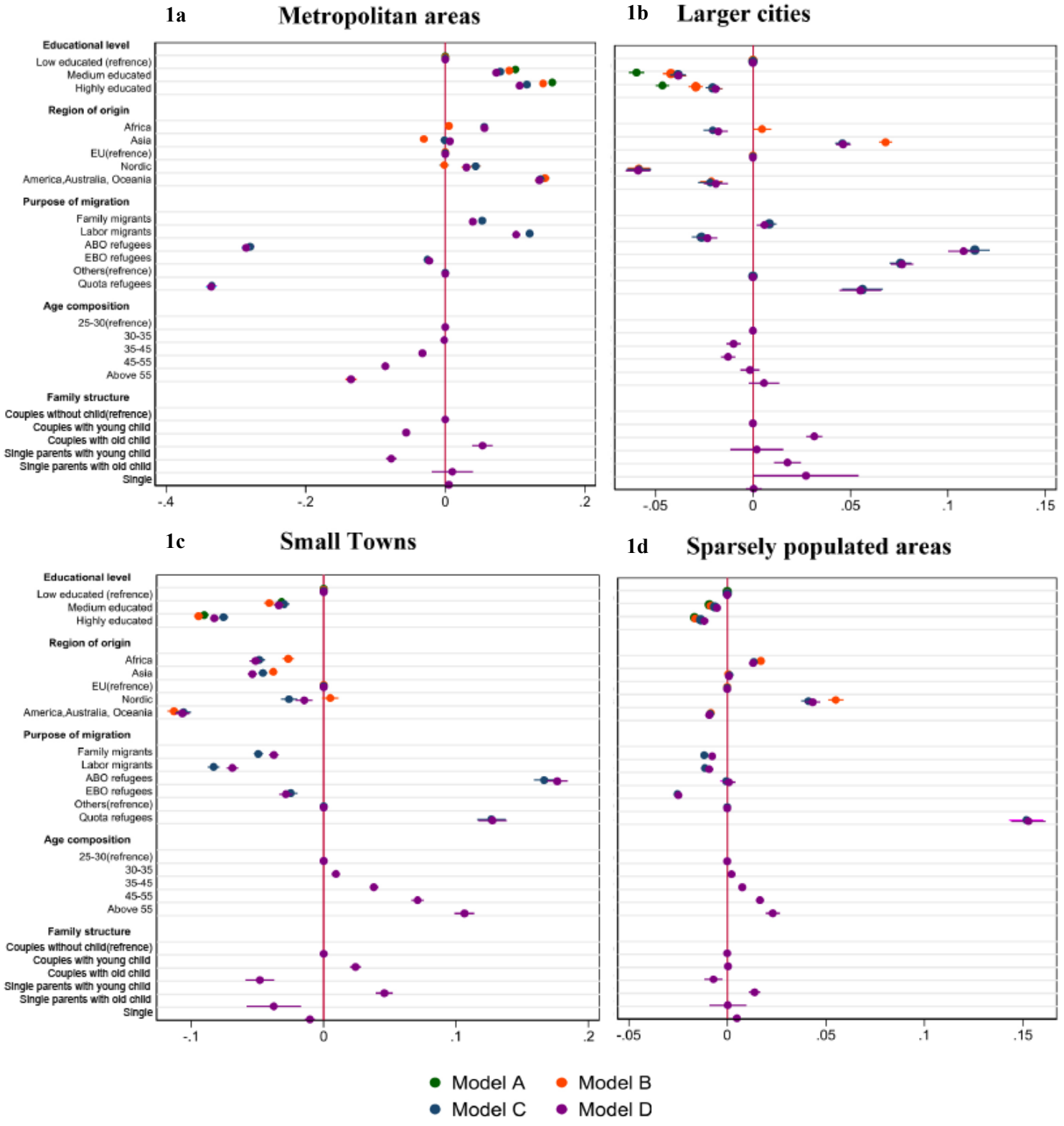

Figure 1. Coefficient plots of average marginal effects of residential sorting of migrants across the urban hierarchy. a Metropolitan areas including suburbs. b Larger cities including suburbs. c Small towns. d Sparsely populated and rural areas

Model A explains the spatial sorting of migrants when only migrants' educational level is taken into account. Based on this model, higher educated migrants are 15% more likely than lower educated migrants to live in metropolitan areas (figure 1a), while the probability of living across other urban hierarchies in figures 1b, 1c, and 1d is negative, implying that higher educated migrants are less likely to live outside metropolitan areas. In Models B, C, and D, other explanatory variables are added to explain migrants' spatial sorting. The results show that although the estimates for migrants' education level slightly alter when adding the region of origin, the purpose of migration, and control variables, the direction of associations remains the same, indicating that educational attainment is an important determinant of migrants' residential sorting, independent of other factors.

The general trend, consistent with other studies (Åslund, 2005; Bartel, 1989; Huang & Newbold, 2017; McDonald, 2004) is that migrants sort differently depending on their educational level, and that higher educated migrants tend to live in metropolitan areas more often than lower educated migrants. Therefore, the spatial sorting of highly educated migrants is a *metropolitanised* issue.

Interpreting the results of the final model, the estimates for region of origin imply that Nordic migrants, as opposed to EU migrants, are more likely to reside in metropolitan areas and in sparsely populated areas. The latter pattern, the rural settlement of Nordic migrants, has been evidenced in earlier studies by Hedlund et al. (2017) and Hedberg and Haandrikman (2014). African migrants have also been found to be more likely to live in metropolitan areas and in sparsely populated regions than elsewhere (figure 1a and 1d), which is in contrast with Asian migrants, who are more concentrated in larger cities (figure 1b). This variation in the sorting of different migrant groups by region of origin may be explained by the presence of co-ethnic populations, which have been extensively discussed in the literature. Figure 1 in the appendix presents the proportion of different migrant groups already settled across Swedish

regions. From this figure it is observed that between 2000 and 2014, the proportion of African migrants in metropolitan areas was higher than elsewhere in Sweden. In addition, the proportion of Africans in rural areas has increased from 2010. Asian migrants are more prevalent in large cities, followed by metropolitan areas. Nordic migrants, unlike other groups, are substantially prominent in rural areas and small towns. Thus, the reason why Nordic and African migrants tend to live in rural and metropolitan areas may be because these areas have a greater proportion of their co-ethnics, while Asian migrants are more likely to reside in larger cities because there are higher proportions of the already settled Asian population.

Figure 1d shows that quota refugees are the only migrant group who, as opposed to other migrants (those without a residence permit) have a high probability of living in rural areas. Refugees who were assigned accommodation (ABO refugees) are more likely to live in small towns and larger cities, rather than metropolitan areas. These two groups of refugees are less likely to live in metropolitan areas (figure 1a). On the other hand, refugees who arrange accommodation by themselves, the so-called EBO refugees, are less likely to reside in small towns and rural areas but more often reside in large cities, which has also been found by Statistics Sweden (2016). Given that ABO and quota refugees' settlement is a matter of policy, it can be concluded that to achieve more dispersal across Swedish municipalities (Andersson and Solid 2003), they are mostly assigned outside metropolitan areas and large cities areas, and from figures 1c and 1d, we can see that the probability of residing in small towns and rural areas for these groups of refugees is very high.

Labour migrants, consistent with previous studies (Scott et al., 2005), are more likely to live in metropolitan areas, which may stem from the greater economic and job opportunities in these areas (Buch et al. 2014; Glaeser et al. 2001). Summarising the results, consistent with other studies (e.g., Jaeger, 2007; Lymperopoulou, 2013; Scott et al., 2005; Zorlu & Mulder,

2008), migrants with different purposes of migration and region of origin have different patterns of settlement.

Stage in the life course and family composition also matter for place of residence, which is in line with other studies (Hjort & Malmberg, 2006; Kulu and Vikat 2007; Lundholm et al., 2004; Westlund, 2002). Older migrants are more likely to live in rural areas and small towns, while the likelihood of living in metropolitan areas decreases with age. With respect to family composition, parents with older children and singles are more likely to live in metropolitan areas and larger cities, while parents with younger children are more likely to live in small towns and sparsely populated regions, which may be due to from differences in housing preferences (Kulu and Vikat 2007).

5. CONCLUDING REMARKS

Migration is no longer an entirely urban phenomenon, and with the increasing diversification among recent immigrants, new patterns of residential settlement are expected. In this field, studies have mainly investigated the residential sorting of migrants, focusing on the locational attributes that attract migrants, rather than on how immigrants' socioeconomic and demographic backgrounds affect their residential settlement which is mostly due to the scarcity of data about immigrants' characteristics shortly after migrants' arrival. The current paper takes advantage of full population Swedish register data covering educational attainment as well as other relevant migrant characteristics upon arrival to Sweden. It attempts to fill this research gap by examining the initial settlement patterns of migrants by educational attainment, region of origin, and purpose of migration. In doing so, three findings of this study are of particular interest.

First, the key finding of the current study is that migrants' educational composition is a strong feature of initial residential patterns. Highly educated migrants are the main dwellers in

metropolitan areas, in contrast to lower educated migrants, who mainly reside in rural and sparsely populated areas. Such diverging patterns by educational composition of migrants may be explained by the location of specialised job sectors in cities (Buch et al. 2014; Glaeser et al. 2001). In 2018, in the metropolitan areas of Stockholm, Malmö, and Gothenburg, almost 50 percent of all occupations were categorised as managerial, academic, and professional (Statistics Sweden, 2018), which demand high educational and skill levels, while low-skilled and less specialised jobs were mostly located in rural areas and small towns. As evidenced in other studies, (Hedberg and Haandrikman, 2014; Hedlund et al., 2017; Kandel and Parrado, 2005), rural areas and small towns are more appealing to lower educated migrants whereas highly educated migrants mostly tend to live in metropolitan areas to reap the benefits of their education. Thus, migrants' educational attainment influences their settlement patterns. These identified patterns differentiated by migrants' educational level are similar to residential patterns of Swedish-born individuals. Nielsen and Hennerdal (2019) provided evidence that the highest concentration of highly educated Swedish-born is found in metropolitan areas. Similar to their findings, this paper showed that, shortly after arrival, migrants sort differently by educational level, with higher educated migrants mostly living in metropolitan areas, which leads to two conclusions. First, the pull factors for residential settlement for highly educated Swedish-born may resemble highly educated migrants. Second, the stock of human capital in itself may be a pull factor for migrants, and may function as a self-propelling process, affecting the settlement pattern of migrants. Areas with a high proportion of highly educated individuals attract highly educated migrants, while areas with low levels of higher educated individuals are less attractive for high educated migrants, causing a further agglomeration of human capital in some areas, and a lack of human capital in others.

Second, the results indicate that quota and assigned refugees, consistent with refugee dispersal policy, are more prevalent in small towns and sparsely populated areas (Andersson

and Solid 2003), while refugees who choose their own accommodation tend to reside in larger cities more often. When the region of origin is considered, we find that the rural settlement of Nordic migrants is quite evident. Although at substantially lower levels than Nordic migrants, African migrants are also more likely to live in rural areas, and in metropolitan areas, whereas Asian migrants are more concentrated in larger cities. Variations in the distribution of different ethnic groups across Sweden may account for the diverging residential settlement among different migrant groups. Thereby, consistent with other studies (Jaeger, 2007; Lymperopoulou, 2012; Niedomysl and Hansen, 2010; Scott et al., 2005; Zorlu and Mulder, 2008), this study finds that immigrants with different purposes of migration and region of origin have different residential patterns.

The third finding confirms the emergence of new gateways as a result of rural settlement of newly arrived migrants. This paper demonstrates that some groups of immigrants, mostly lower educated migrants, quota refugees, Nordic and African immigrants, immigrants with younger children, and older immigrants, initially live in rural and less populated areas.

6. POLICY IMPLICATIONS AND FUTURE RESEARCH

This study has illustrated that some migrant groups initially reside in rural and sparsely populated areas. Such rural settlement has important socioeconomic and demographic consequences, and also has some policy implications.

In Sweden, as in many other countries, rural areas are suffering from depopulation, ageing and declining employment in manufacturing industries. As evidenced in earlier studies (Hedberg and Haandrikman, 2014, Tønnessen et al., 2021), the residential settlement of migrants in these areas is seen as a potential way to rejuvenate ageing rural communities. The establishment of migrant-oriented services, such as mosques, in rural and peripheral areas (Stenbacka, 2013), may attract and facilitate the further reception of other migrants, which may

lead to more social and demographic viability in these areas and may combat trends of depopulation. From an economic point of view, migrants in rural areas can engage in job sectors with a shortage of labour, such as tourism industries or care sector, that have actively attracted immigrants. Working in this sector requires less education, lower skills, and is subject to seasonal variations (Lundmark et al., 2012), and thereby may be a good starting point for newly arrived migrants, particularly those with lower education.

Regarding the integration of rural immigrants, two opposite pictures are envisaged. First, since rural areas are smaller, the visibility of migrants may be larger (Hedberg and Haandrikman, 2014), and therefore migrants are expected to have less difficulty being accepted by the local society and may integrate faster. On the other hand, as these areas are less experienced with migrant populations (Jentsch and Simard, 2009; McAreavey, 2018), immigrants may be less welcoming in these areas, and therefore they may face more rather than fewer integration difficulties.

The present study has limitations that set the groundwork for further studies. This paper has addressed residential patterns of migrants shortly after arrival. However, migrants may experience upward socioeconomic mobility, or for other reasons may move away from their initial place of residence, affecting migrants' residential patterns. Thus, I aim to further this research by conducting a study on migrants' subsequent mobility and the extent to which it differs from the initial residential pattern. This is an important aspect to assess the longevity of immigrants' socioeconomic contributions in rural areas. Another direction for further research relates to using smaller scale neighbourhoods to examine whether small-scale variations exist within regional settlement patterns. Given the intercity variations, understanding spatial sorting at the neighbourhood scale and across different types of neighbourhoods may help to further our understanding of migrants' settlement patterns.

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Notes

1. In order to test whether or not the identified patterns were particular to students, as students are a substantially highly educated group, a sensitivity analysis including student migrants was conducted. The results indicated that although the estimates changed in size, they had the same direction compared to the main analysis without students. The identified patterns are therefore not particular to students.
2. Other models including interactions between educational attainment and other explanatory variables were conducted, but did not produce any interesting results.

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Appendix

Table 1: Multinomial logistic regression analysis of residential sorting across the urban hierarchy in Sweden; small towns are reference category (odds ratios)

	Model A			Model B			Model C			Model D		
	Metropolitan areas	Larger cities	Sparsely populated areas	Metropolitan areas	Larger cities	Sparsely populated areas	Metropolitan areas	Larger cities	Sparsely populated areas	Metropolitan areas	Larger cities	Sparsely populated areas
Education												
lower educated (ref)												
Medium education	1.460***	0.928***	0.911***	1.480***	1.019	0.959	1.409***	1.008	0.972	1.373***	0.996	0.985
Highly education	2.150***	1.282***	0.959**	2.120***	1.376***	0.979	1.947***	1.358***	0.990	1.859***	1.332***	1.009
Region of origin												
EU migrants (ref)												
Africa				1.134***	1.141***	1.739***	1.414***	1.150***	1.771***	1.439***	1.178***	1.773***
Asia				1.101***	1.481***	1.204***	1.221***	1.421***	1.260***	1.297***	1.480***	1.293***
Nordic countries				0.974***	0.765***	2.730***	1.231***	0.882***	2.617***	1.135***	0.835***	2.568***
America, Australia, Oceania				2.445***	1.699***	1.335***	2.345***	1.598***	1.210***	2.369***	1.624***	1.188***
Purpose of migration												
Others (ref)												
Family migrants							1.415***	1.296***	0.900***	1.307***	1.220***	0.958
Labor migrants							1.961***	1.380***	1.103**	1.770***	1.307***	1.084*
ABO refugees							0.207***	0.829***	0.584***	0.193***	0.775***	0.582***
EBO refugees							1.049**	1.419***	0.434***	1.082***	1.454***	0.422***
Quota refugees							0.148***	0.778***	3.087***	0.148***	0.750***	3.196***

	Model A			Model B			Model C			Model D		
	Metropolitan areas	Larger cities	Sparsely populated areas	Metropolitan areas	Larger cities	Sparsely populated areas	Metropolitan areas	Larger cities	Sparsely populated areas	Metropolitan areas	Larger cities	Sparsely populated areas
Family structure												
Couples without children (ref)												
Couples with younger children										0.778***	0.993	0.913**
Couples with older children										1.472***	1.313***	1.005
Single parents with younger children										0.668***	0.865***	1.183***
Single parents with older children										1.250**	1.336***	1.219
Single										1.064***	1.053***	1.208***
Year of arrival												
2000 (ref)												
2001										0.892***	0.919**	1.019
2002										0.773***	0.890***	1.219**
2003										0.788***	0.859***	1.206**
2004										0.713***	0.761***	1.131
2005										0.730***	0.776***	1.111
2006										0.798***	0.873***	1.076
2007										0.804***	0.870***	1.194**
2008										0.717***	0.815***	1.157*
2009										0.784***	0.815***	1.173*
2010										0.753***	0.782***	1.138*
2011										0.803***	0.856***	1.131
2012										0.722***	0.801***	1.164*
2013										0.543***	0.688***	1.071
2014										0.444***	0.557***	1.103

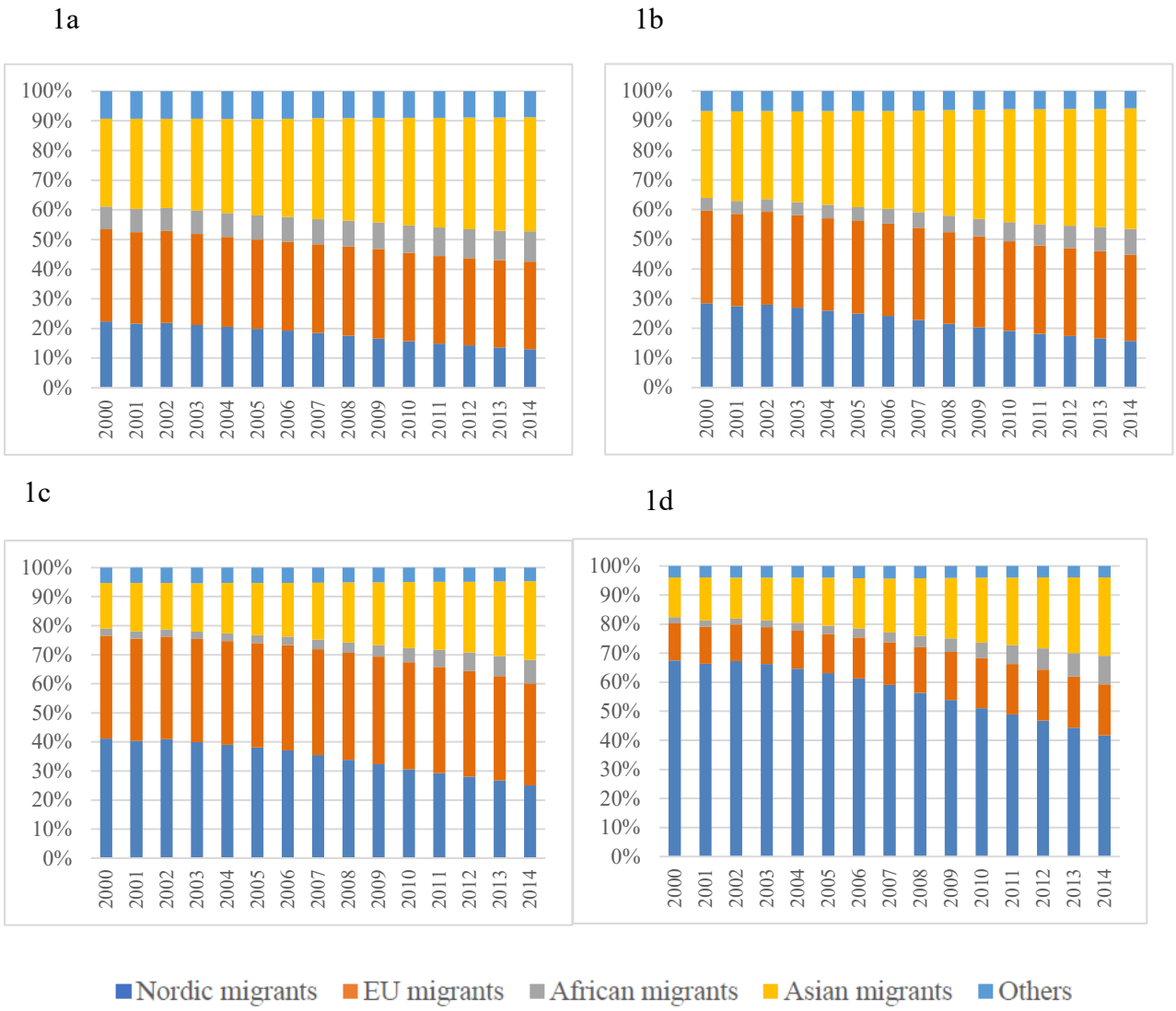
	Model A			Model B			Model C			Model D		
	Metropolitan areas	Larger cities	Sparsely populated areas	Metropolitan areas	Larger cities	Sparsely populated areas	Metropolitan areas	Larger cities	Sparsely populated areas	Metropolitan areas	Larger cities	Sparsely populated areas
Age												
25–30 (ref)												
30–35										0.949***	0.921***	1.022
34–45										0.767***	0.796***	1.053*
45–55										0.580***	0.719***	1.145***
Above 55										0.440***	0.645***	1.156***
Constant	1.259***	1.213***	0.171***	1.133	0.925	0.127	0.960**	0.810***	0.131***	1.843***	1.216***	0.099

*** p<0.001, ** p<0.01, * p<0.5

Table 2: Overall goodness of fit statistics for different models

	Model A	Model B	Model C	Model D
Overall model fit and Chi square				
Log likelihood (LR)	-472237.04	-468843.69	-459129.35	-455143.35
Chi square	7524.45	14311.13	33739.83	41711.83
Change from Model A				
Log likelihood (LR)	-	-3393.35	-13107.69	-17093.69
Chi square	-	-6786.68	-26215.38	-34187.38
Model A: Including education Model B: Including education, region of origin Model C: Including education, region of origin, purpose of migration Model D: Including education, region of origin, purpose of migration and control variables				

Figure A1: Share of different groups of settled migrant population across urban hierarchy in Sweden, 2000-2014. **a** Metropolitan areas. **b** Larger cities. **c** Small towns. **d** Rural areas.



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