NEIGHBORHOOD SELECTION BY NATIVES AND IMMIGRANTS: HOMOPHILY OR LIMITED SPATIAL SEARCH?

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ABSTRACT

Substantial influxes of international immigrants during recent decades have transformed metropolitan housing markets across Europe, North America, and Australia. Where and under what physical and sociodemographic conditions these new residents and their children live influence their individual life chances as well as societal inequalities and cohesion. Using population register data, we estimate conditional logit models of neighborhood selections jointly stratified by immigrant and income for nine types of Oslo region families making "child-salient," inter-neighborhood moves. We find that although homophily is an important driver of residential selection for both native and non-Western immigrant families, its significance pales in comparison to proximate, sectoral constraints in the spatial patterning of housing search. Study findings enhance our understanding of segregation processes and offer new perspectives on social mix housing policies. Social mix should attempt to enhance diversity at the larger spatial scales primarily by improving information about and enhancing access to potentially desirable residential options and countering anti-immigrant perceptions or discriminatory actions by real estate agents or mortgage brokers.

Key Words: intra-urban mobility, residential destinations, conditional logit models, immigrants, residential selection, homophily, housing market search

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1. INTRODUCTION

Substantial influxes of international immigrants during recent decades have transformed metropolitan housing markets across Europe, North America, and Australia. Where and under what physical and sociodemographic conditions these new residents and their children live has been widely recognized as influencing their individual life chances as well as society-wide inequalities and cohesion (Galster, 2019). These geographic dynamics and social issues have great salience in Oslo, Norway.

Rapid shifts in the sociodemographic characteristics of the Oslo region over the past several decades—now over a quarter of its population is foreign-born (Statistics Norway, 2021)—have led to changing patterns of residential segregation based on income and national origin (Wessel, 2016). This has prompted concerns about the extent to which the residential choices of some families are constrained (Galster & Magnusson Turner, 2019) as well as their enduring effects on the opportunities and life chances available throughout the life course (Toft & Ljunggren, 2016; Toft, 2018; Wessel & Nordvik, 2019).

Despite their acknowledged significance for urban housing markets and broader issues of segregation, opportunity, and social inequality, the factors influencing the residential destinations of immigrant families and how they might differ from native families' have rarely been quantified (e.g., Hedman, 2013). In this paper, we use population register data to estimate conditional logit models (CLMs) of neighborhood selection for nine types of Oslo families with children distinguished jointly by three income and three national-origin groups. We focus on modeling "child-salient" inter-neighborhood moves -- those we think most likely motivated by parents' desires to attain the best feasible development context for their children. Our approach is distinguished by its use of stratification by income group and controls for the non-random spatial pattern of search, so that differences in native and

immigrant preferences can be more clearly discerned from ability-to-pay and information constraints. We identify distinct residential selection patterns among income and national-origin groups across five dimensions of the neighborhood environment—demographic composition, socioeconomic status, Western and non-Western immigrant composition, housing stock characteristics, and geographic characteristics. We find that while homophily is an important driver of residential selection for both native and non-Western immigrant families, its significance pales in comparison to proximate, sectoral constraints.

2. SELECTING A NEIGHBORHOOD: THEORY AND EVIDENCE

2.1. Theory

Explanations of neighborhood residential selection processes that produce segregation of racial, ethnic or immigrant groups have traditionally focused on how household decisions are shaped by economics, ethnic preferences, and discriminatory practices (Charles, 2003; Crowder & Krysan, 2016; Krysan & Crowder, 2017).[1] The economics perspective argues that housing markets are spatially segmented by affordability and thus all but the best-off groups will be constrained to live in a limited number of places based on their ability-to-pay. Insofar as there are substantial differences in the distributions of income and wealth among racial, ethnic or immigrant groups, economics will produce correspondingly different sets of neighborhoods selected such that segregation of these groups is produced (Cheshire, 2007). This dynamic undergirds the well-known spatial assimilation model (Massey & Denton, 1985; Logan & Alba, 1993). As minority or immigrant groups improve their human capital through higher levels of educational attainment thereby increasing their income and wealth,

[1] Given space limitations, here we consider only theories related to neighborhood selection, not those regarding why households move out of a neighborhood. See Galster and Magnusson Turner (2017) for a review of that literature.

they should experience expanded access to a wider array of neighborhood choices that include more advantaged neighborhoods (Crowder, South, & Chavez, 2006).

The ethnic preferences model underscores the role that homophily—the desire to reside in neighborhoods predominantly occupied by other members of one's own economic, racial, ethnic and/or immigrant group—plays in shaping residential selection (Boschman & van Ham, 2015; Wessel & Nordvik, 2019). Recent work has suggested that homophily desires extend into other sociocultural attributes of neighborhoods as well (van Gent, Das, & Musterd, 2019; Boterman, Musterd, & Manting, 2021).

The discriminatory perspective, often called place stratification theory (Charles, 2003; Krysan & Crowder, 2017), contends that the dominant income, native and/or ethnic group's aversion to sharing residential space with groups identified as "inferior other" buttresses discriminatory practices by individuals and institutions in the housing and mortgage lending markets. It is argued that these constraints foreclose many residential options for minority households that their incomes and preferences would otherwise lead them to select, thereby creating artificially segregated residential spaces.

A fourth theoretical perspective on residential selection has less frequently been brought to bear in studies of residential selection and segregation: housing search (e.g., Farley, Danziger, & Holzer, 2000; Bader & Krysan, 2015). Households typically build their active housing market searches upon passively acquired information gleaned from routine activity spaces, thereby creating a geography of search that is sectoral and focused nearer to one's current residence (Bruch & Swait, 2019; Galster, 2019: ch. 5). This implies that moving households will fail to consider many potential neighborhood destinations about which they have little if any information, and thus "self-constrain" their options in ways that generate "spatial fixity" of residence (Maclennan & O'Sullivan, 2012).

Increasingly, studies of residential selection have examined how individual lives unfold over the life course and within the larger contexts of trends and events that transpire over time and space (Elder, Johnson, & Crosnoe, 2003). Integration of this temporal dimension to theories of residential selection deepens understanding of how such decisions are influenced by the linked and parallel trajectories of parents' and children's housing, education, and labor market careers over the life course (van Ham & Manley, 2012; Coulter, van Ham, & Findlay, 2015; de Vuijst, van Ham, & Kleinhans, 2016; van Ham & Tammaru, 2016).

2.2. Empirical Literature

Previous empirical research in the United States and Western Europe on households' preferences for and selection of neighborhoods has taken four broad analytical approaches. The first employs opinion polls or equivalent methods to query individuals about the neighborhood attributes they like and dislike, their relative salience, and what neighborhoods they would choose in hypothetical scenarios (e.g., van der Laan Bouma-Doff, 2007; Bolt, van Kempen, & van Ham, 2008; Ibraimovic & Masiero, 2014). A second analyzes actual household moves between neighborhoods and contrasts the origins and destinations to discern "revealed preferences" (e.g., Bailey & Livingston, 2008; Doff & Kleinhans, 2011). The third explores revealed preferences by estimating statistical models of how household characteristics predict an attribute of interest (such as mean income or immigrant percentage) of the selected neighborhood (e.g., Zorlu & Latten, 2009; Clark, van Ham, & Coulter, 2014). The fourth approach uses discrete choice (typically, conditional logit) models (CLMs) to investigate how a neighborhood's attributes affect its probability of being selected by households when they move (e.g., Ioannides & Zabel, 2008; Galster & Magnusson Turner, 2019; Bruch & Swait, 2019; Bakens & Pryce, 2019). Each of these four approaches has well-

known limitations (Bruch & Mare 2012; Quillian, 2015); for a detailed methodological critique, see the online Supplemental File.

Though the range of studies in these realms is vast, a common theme emerging is that "birds of a feather flock together." Most studies of native (white) households conclude that both ethnic and income homophily are powerful determinants of their residential flows. White and higher-income households generally are attracted to neighborhoods where their own racial/ethnic and socioeconomic status group predominate. Homophily patterns are also manifested across Western Europe when it comes to natives' avoidance of neighborhoods with larger shares of immigrants; see, e.g., van der Laan Bouma-Doff (2007); Bolt, van Kempen, and van Ham (2008); Hedman, van Ham, and Manley (2011); Hedman (2013); Ibraimovic and Masiero (2014); Ibraimovic and Hess (2018); and Galster and Magnusson Turner (2019). Recent work also has demonstrated that households move in ways that the existing population is replicated in many dimensions, not just the traditional ones of race/ethnicity, income, and national origin (van Gent, Das, & Musterd, 2019; Boterman, Musterd, & Manting, 2021) and that homophily at small spatial scales is especially important (Bakens & Pryce, 2019).

Less attention has been given to analyzing residential selection by immigrant households. Doff and Kleinhans (2011) and Ibraimovic and Masiero (2014) observe homophily preferences among immigrants. Hedman, van Ham, and Manley (2011) and Boschman and van Ham (2015) find that immigrants are more likely to select a neighborhood the higher its share of immigrants. Importantly, other works have detected heterogeneity in these preferences depending on the income class of the immigrant (Ibraimovic & Hess, 2018) and whether immigrants came from Western or non-Western nations (van Ham, Boschman, & Vogel, 2018).

Remarkably, only two studies have directly contrasted the selections of neighborhoods by natives and immigrants in the same dataset. Hedman (2013) and van Ham, Boschman, and Vogel (2018) identify numerous distinctions in the power of many demographic, housing, and geographic characteristics to predict neighborhoods into which households differentiated by native, Western immigrant, and non-Western immigrant status move, though own-group attraction emerges again as a common theme.

The fundamental challenge of all strands of the revealed preference approach to residential selection is distinguishing the effects of preferences vs. constraints (Bruch & Mare, 2012; Quillian, 2015). Do the observed residential selections primarily reflect household preferences for population composition and other characteristics of neighborhood or, rather, three categories of constraints described in the theory section: limited ability-to-pay, housing or mortgage lending discrimination based on racial, ethnic or immigrant status, or spatially circumscribed information due to incomplete housing market search? When focusing on comparing neighborhood selections of immigrants and natives as we are, this question assumes salience because, in aggregate, households in these two groups are likely to face very different sets of constraints in all dimensions.

Our empirical strategy attempts to overcome the challenge of distinguishing the effects of preferences vs. constraints in two ways. First, we estimate CLMs *jointly stratified by immigrant status and income*,[2] as recommended by Schachner & Sampson (2020: p. 700), which allows us to hold constant the constraint of ability-to-pay while simultaneously allowing preferences to vary across these dimensions. Second, we introduce controls for the likely geographic pattern of housing search. These innovations allow us to draw much more precise and valid inferences about differences in preferences between native and immigrant

[2] Few analysts have estimated stratified CLMs. They stratified by ethnic minority groups (Hedman, 2013; Boschman & van Ham, 2015); income groups (Hedman, 2013; Galster & Magnusson Turner, 2019) and education/income groups (Schachner & Sampson, 2020). None have *jointly* stratified by income and immigrant status, as we do here.

groups than hitherto; for a more detailed discussion of the advantages of our method, see the online Supplemental File.

2.3 Gaps in the Literature and Our Contribution

In sum, the international empirical literature on neighborhood selection paints a consistent portrait that highlights own-group preferences as a common and powerful force guiding residential selection and that, by implication, much of observed ethnic segregation is voluntary. Despite this seeming consensus, significant gaps remain in our understanding about the degree to which these putative homophily preferences are: (1) based more on social class than ethnic or immigrant status; (2) important attributes compared to other aspects of neighborhoods; (3) consistent across income and immigrant status groups; and (4) sensitive to the specification of housing search geography.

Our study aims to fill these four gaps by investigating drivers of neighborhood selection for families in different immigrant- and income-status groups residing in the Oslo region. Our primary contributions to the literature on residential selection and ethnic segregation are two-fold: methodological and substantive. Methodologically, we obtain a far clearer portrait of families' preferences for demographic, income, immigrant, housing, and geographic neighborhood characteristics because we control for two of the main constraints on mobility that have confounded the interpretation of prior studies' findings—ability-to-pay and limited information. In particular, ours is the first study to estimate CLMs: (1) stratified jointly into nine family groups (native/Western immigrant/non-Western immigrant by three income classes); and (2) with geographic sectors of the regional housing market and inter-neighborhood distance controlling for the spatial pattern of search. By comparing across immigrant-status groups within the same income stratum using a model with geographic search controls we control for differences in both ability-to-pay and information.

Substantively, we are the first study to directly compare how natives and immigrants of similar income status differentially select neighborhoods, thus advancing our understanding of what groups are the primary drivers of their residential segregation.

Specifically, we address the following research questions:

1. Does the influence of own-group (class and immigrant status) neighborhood composition on residential selection differ between native Norwegian, Western immigrant, and non-Western immigrant families? To what extent are these differences consistent across low-, middle- and high-status families?
2. Do the influences of other aspects of neighborhood besides population composition on residential selection differ between native Norwegian, Western immigrant, and non-Western immigrant families? To what extent are these differences consistent across low-, middle- and high-status families?
3. To what extent do the answers to the above change when we control for spatially selective housing market search behaviors?

3. DATA AND EMPIRICAL APPROACH

3.1. Overview

We consider intra-urban residential mobility by the families of children born in the Oslo region between 1989 and 1994, analyzing the neighborhood selections made during one move per child that we identify as "salient" (the one that most likely reflects child-centric decision-making, as detailed below). We match each of 21,036 salient moves observed during the years 1990 through 2008 with a time-appropriate set of characteristics for all 1,103 neighborhoods comprising the choice set, as well as the 18,083 families in question, based on annual population register data. We answer our research questions by employing CLMs to estimate average marginal effects of neighborhood attributes on probability of selection for

family samples stratified by nine income and immigrant status categories, adding sequentially different sets of neighborhood attributes and proxies for housing search geography.

3.2. Data

The annual, longitudinal data for our study is extracted from a larger dataset that includes information about more than seven million individuals who since January 1, 1960 resided in Norway for some time and were registered in the Norwegian social security system. This dataset combines personal information (including neighborhood code) from several national population registers managed by the Norwegian Labour and Welfare Administration (NAV), Directorate of Taxes (Skatteetaten), Statistics Norway (Statistisk sentralbyrå), and other national authorities. A family consists of persons residing in the same dwelling and related to each other as spouse, registered partner, cohabitant, and/or parent and child (regardless of the child's age) (Statistics Norway, 2021)[3].

3.3. Study Region and Neighborhood Designations

We analyze residential mobility among neighborhoods represented in the Oslo Travel-To-Work-Area ("Oslo" hereafter), a region of approximately one million inhabitants comprising about a fifth of the nation's population. Our rules for delimiting this territory are based on work commuting flows and correspond to those used in prior Norwegian research (e.g., Wessel & Nordvik, 2019; Galster & Magnusson Turner, 2019). Specifically, we include in the Oslo region: Oslo and 10 surrounding municipalities where at least 39% (or more than 9,000) of the working-age (20-66 years) population commute to Oslo; see Appendix Figure 1 (online Supplemental File). We believe that this area corresponds well to the notion of a

[3] Note that a single parent is defined as a family. We have chosen the person registered as contact person (i.e., the oldest) to represent the family and for measuring attributes like highest education attained.

metropolitan housing market that constitutes the choice set of neighborhoods for households contemplating a move.

Norwegian geographic research has typically used the census tract to measure neighborhood, and we follow this convention.[4] Tract boundaries are designed in Norway to encompass roughly similar groups of roughly one thousand inhabitants each, on average. In our Oslo region, 1,490 tracts are designated, but some have so few dwellings and people that we deemed it inappropriate to include them in our neighborhood choice set. We therefore combined any tract with fewer than 50 households with its nearest neighbor(s), until at least 50 households resided in the area.[5] The final number of neighborhoods in our analysis is 1,103, with an average size of 325 families during our study period.[6]

3.4. Child-Family Sample and the Salient Move

We consider here the youngest six birth cohorts appearing in our register data for whom we have information about residential moves, 1989 to 1994, and impose several other geographic restrictions so we have both tractable choice sets for their childhood moves and consistent labor market contexts for their adult experiences during their late 20s.[7] Specifically, we identify 30,279 children born in Norway 1989-1994 to native-born, Western-origin immigrant, and non-Western-origin immigrant parents[8] who continuously resided in

[4] See, e.g., Wessel (2016); Toft & Ljunggren (2016); Galster & Magnusson Turner (2019); Toft (2018); Wessel & Nordvik (2019).
[5] Our CLM analyses use families because our data set does not contain households until 2004.
[6] Due to the peripheral development of Oslo over the last three decades, five 2018 census tracts did not exist during 1990 to 2008, and about 100 did not exist before 1997. We employed mean substitution for such tracts based on the characteristics of extant tracts during the given year.
[7] We impose this second criterion because the current paper is part of a larger investigation of neighborhood effects on young adult economic outcomes for children of native and immigrant parentage. To avoid the complications arising from well-documented variations in returns to education and experience across different levels of urbanization we will consider only those young adults who have begun their careers in Oslo.
[8] The Western and non-Western categorization of immigrants into northern Europe is conventional; see: Hedman (2013); Boschman & van Ham (2015). It would be desirable to disaggregate immigrant groups further. Unfortunately, given that the key component of our strategy is stratifying by income status, we have insufficient observations of any single national origin group among immigrants to do

Oslo from the ages of 1-18 years *and* between the ages 25-30 (though not necessarily during ages 19-24).[9] These children come from 25,035 families.[10] Our analysis sample of children is further reduced to 22,047 when we exclude those who did not move from the year they were born through age 18.

There is widespread and consistent evidence that parents with co-resident non-adult children employ different criteria when choosing a new neighborhood than households without resident children (e.g., Hedman, van Ham, & Manley, 2011; Owens, 2017; van Ham, Boschman, & Vogel, 2018). This comports with conventional wisdom that parents place a great deal of weight on their children's prospective developmental context when they move. We attempt to identify in this research *the* move that most likely reflects this child-centric decision-making, what we call the "salient" move. We rely on previous research by Goyette, Iceland, and Weininger (2014), who find that families with children under six years of age are particularly sensitive to neighborhood conditions (especially racial/ethnic mix) and are especially motivated to start their children off in a "good neighborhood with good schools."[11] For each sample child we therefore define the salient move as follows: (1) if *any* moves occur before age 6 (including birth year)[12], that move closest to age 6 is salient; (2) if *only* moves occur after age 5 but before age 15, that move closest to age 15 is salient; (3) if *only* moves occur age 15 or older, the child does not appear as an observation in our model. Applying this

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so and retain statistical power. Children of mixed native-Non-Western immigrant or native-Western immigrant parentage are excluded since their numbers are insufficient for analysis.

[9] We permit this gap in residence in Oslo since many young adults attend university and/or complete their military service during these ages.

[10] 80% of these families had only one child from this cohort, and 19% had two.

[11] We note that there is a strong connection in Norway between place of residence and school attended. According to Education Act § 8-1, para 1 (commonly known as the local school principle), all children who live in a municipality have the right to attend the school that is closest to their home or one that is located in their municipality of residence. We therefore do not consider any intra-neighborhood moves as salient as they might relate to altering school choices.

[12] It would have been desirable to consider as potential salient moves those occurring when the mother was pregnant. Unfortunately, this is not possible for those born in 1989 and 1990 because there is no Norwegian census information on neighborhood characteristics prior to 1990.

last criterion meant that our final sample size for analysis was 21,036 children from 18,083 families. In practice, the first criterion dominated our choice of salient move: with one exception, two-thirds or more occurred during this age range for each income/immigrant status group; see Appendix Table 1 (online Supplemental File).[13] In this study, we only consider inter-neighborhood moves within Oslo —defined formally as a change of census tract associated with addresses recorded in the register on the first day of January in consecutive years—as candidates for salient moves.

While these rules for defining salient moves may seem arbitrary, in practice they affect only the 32% of our sample: those who moved at least once both before and after age 6 (51% of the sample moved only once during childhood; details are provided in Appendix Table 2, online Supplemental File). Moreover, we conducted robustness tests to ascertain if the power of neighborhood attributes in predicting moving destinations differed between salient moves occurring before and after age 6. We found that the estimated parameters driving our main conclusions were not sensitive to the age specified for salient move.

Descriptive statistics for the children and families in our analysis sample, distinguished by income and immigrant status and measured on January 1 of the salient move year, are presented in Appendix Table 3 (online Supplemental File). The only variable requiring elaboration is income class. The only income measure for individuals we have available for the entire analysis period 1990-2008 is earnings from wages and self-employment, which we sum across the family head and partner (if any) to estimate income for *all* families and unrelated individuals (not just movers) in the Oslo region in each year. We use this aggregate income distribution to compute the individual family's status position

[13] See Appendix Figure 2 (online Supplemental File) for a frequency distribution of salient years, by income and immigrant status.

during year of salient move: “low status” is income in the lowest-three deciles; “high status” is income in the highest-three deciles; “middle status” is income in the middle four deciles.

As shown in online Appendix Table 3, approximately 52% of the children in the sample were male. The average number of siblings ranged from .8 to 2.2 and was higher in non-Western immigrant families. Nearly three quarters of all children (73.1%) lived in two parent families although this varied considerably by income and immigration status. Approximately 39% of family heads had university degrees, again with considerable variation across groups. The majority of salient moves occurred before age 6; the average age ranged between 2 and 6 years across groups. Finally, children in middle and lower status families experienced more moves (range 2.1-2.5) between the ages of 0 and 14 years than higher status families (range 1.5-1.7 moves).

3.5. Operationalizing Neighborhood Characteristics

We employ a rich set of attributes of the neighborhoods that have proven powerful predictors in prior CLM-based studies, categorized by demographic, income, immigrant, housing, and geographic characteristics. All attributes are measured as of January 1 of each year, so they precede any move into the neighborhood observed during the next 365 days.

In the demographic category, we measure the proportions of the population who are children aged 0-6 years and those aged 25-66 years who have earned a bachelor’s degree or higher. We would predict that neighborhoods with larger shares of young children would be perceived by families as both an amenity and as a signal of the overall “child-friendliness” of the area. We see shares of university-educated adults as a marker of occupational prestige and would expect higher-status and native families to find this a much more desirable attribute than other families (Toft, 2018).

In the income category, we measure the proportions of all families and unrelated individuals (not just those in our analysis sample) whose current income places them in the low-status (lowest three deciles of Oslo), high-status (highest three deciles) or middle-status (middle four deciles) classifications. To designate immigrant composition, we measure the proportions in the total population of native Norwegians and those who immigrated or have immigrant parents, distinguished by Western and non-Western national origins. Hereafter, when we use the term "own immigrant-status group" we mean the proportion of the neighborhood population in the one of these three groups corresponding to the family in question. We recognize that these groupings obscure considerable internal diversity, especially immigrants from different national origins.[14] Nevertheless, our need to preserve sufficient sample sizes after stratification by income status necessitates this categorization. Given the empirical work emphasizing the importance of homophily in driving residential choices, we would predict that each status group would be most attracted to neighborhoods where their own group comprised the predominant share. What is less predictable, however, is the degree to which natives may be differentially averse to neighborhoods with sizable shares of Western or non-Western immigrants, and own-group preferences based on income or immigrant status prove equally powerful across groups.

Housing attributes include the proportions of dwellings in multifamily structures and in the rental stock.[15] We would expect, all else equal, that native families would prefer to owner-occupy (relatively scarce) single-family detached dwellings if feasible (or at least reside in neighborhoods where such tenure is common), but immigrants may have different

[14] See online Appendix Table 4 for a breakdown of Oslo immigrant-status groups by national origin.
[15] In Norway, multifamily is defined as "apartment block, tenement or other residential housing with three floors or more." We do not have information for all years that distinguished private and social rental dwellings. For estimating housing market information in the years between the Censuses of 2001 and 2010 we employ linear interpolation. Since Census 1990 was a survey including about 28 percent of households in Oslo, it was not possible to use it for such a low geographical level as census tract. We thus estimated pre-2000 housing characteristics by 2001 figures.

norms. We also specify the total number of dwellings in the neighborhood as a scaling factor for the baseline probability of selection in our models, following convention.[16]

Finally, in the geographic category we employ three variables. One we consider a pure amenity measure: distance from the Oslo central business district—an area of concentrated offices, stores, restaurants, theaters and multifamily residential quarters—and the neighborhood being considered.[17] It is uncertain how proximity to the CBD might affect probability of selection, since it may be associated with a contradictory bundle of attributes: noisier, crowded environs on the one hand; access to cultural/entertainment options and job concentrations on the other. We consider our other geographic variables proxies for housing search areas, i.e., potential information about residential alternatives. One is distance between the family's current neighborhood centroid and that of each particular neighborhood in the choice set, which we would expect to be inversely related to the amount of information gained about and thus the odds of moving to that place. The second is four broad spatial sectors corresponding to inner-city/suburb and east/west geography (see online Appendix Figure 1) that are conventionally perceived as distinct housing stock/income/immigrant status territories by Oslo households and the real estate industry (Magnusson Turner & Wessel, 2013). Indeed, these perceptions are confirmed by data in Appendix Table 5 (online Supplemental File). They indicate a pattern familiar in many metropolitan housing markets: suburban areas have substantially larger average shares of children, higher-income families, natives, and owner-occupied, lower-density housing, albeit with distinct east (less-affluent)/west (more affluent) differentiation. Given what we know about how housing search builds upon routine activity spaces—which are themselves circumscribed by income and nativity—we would predict that

[16] We have no data on vacant units or turnover rates, which would provide a superior measure of opportunities for home seekers to move in; cf. Galster & Magnusson Turner (2019).
[17] We use the Norwegian Parliament as the centroid of the CBD, and compute Euclidian distances (in kilometers) between it and the centroids of each neighborhood; see online Appendix Figure 1. The centroid coordinates were supplied by Kartverket, the Norwegian Mapping Authority.

the sector in which a neighborhood is located will strongly affect its probability of being selected conditioned on the family's income and immigration status, independent of the neighborhood's particular characteristics.

Note that we do *not* include an oft-used measure of median housing price in our neighborhood choice set, due both to theoretical and empirical rationales. First, median price is a weak proxy for the desired measure of what is financially feasible for the family to choose, which is the neighborhood's number of dwellings offered for sale or rent during the year in the particular range of values appropriate for the given family's disposable income. Second, there is a conceptual problem in including *any* housing price measure because it is endogenous and redundant with other attributes, i.e., housing prices capitalize the market's overall evaluation of the bundle of neighborhood characteristics present, many of which are already measured in the choice set. Third, we already obtain a broad control for the financial feasibility of selecting neighborhood attributes by stratifying by family income. Fourth, no neighborhood-specific housing price information is available for the historical span during which our analysis sample moved.

In our study, we employ the universe of 1,103 Oslo neighborhoods as the choice set for each family's salient move. This a superior method than the commonly used random sample of destinations as choice set, as argued by Hedman (2013); Boschman & van Ham (2015), and van Ham, Boschman, & Vogel (2018). Even though we lack direct indicators of the affordability of each neighborhood's housing, other information indicates that virtually all our neighborhoods have at least some dwellings affordable to even low-income families because we observe some moving there.[18] We are thus justified in including all neighborhoods in our choice sets for all family strata in the CML.

[18] Specifically, as of 2014, low-status households actually moved into 85% of neighborhoods in the choice set, and roughly three-quarters of neighborhoods had at least one in-mover from all three income strata.

Descriptive statistics of attributes of neighborhoods comprising Oslo, measured over the 1990-2008 period during which we observe salient moves, are presented in Appendix Table 6 (online Supplemental File). On average, Oslo neighborhoods during these 19 years were comprised of 325 families (ranging from 50 to 2,883). Approximately 8% of neighborhood residents were children aged 6 or under. Nearly four out of ten adults in the neighborhood held university degrees. Approximately 87% of neighborhood residents were native Norwegians, 6% were Western immigrants, and 7% were non-Western immigrants. Neighborhood median family income was 245,400 NOK, although this ranged from 68,000 to 613,300 NOK. The typical neighborhood was comprised of approximately 28% low-status families, 38% middle-status families, and 33% high-status families. On average, Oslo neighborhoods had 3,810 dwelling units, of which nearly 40% were in multi-family buildings and almost one-quarter were rental units. The average distance of a neighborhood from the Oslo CBD was 10 km. Approximately 10.5% of Oslo residents resided in inner city east, 8% in inner city west, 42.9% in outer city east, and 38.6% in outer city west. The average distance between the origin and destination neighborhoods of movers was 15 km.

3.6. Model and Empirical Strategy

The conditional logit model (CLM) is written symbolically:

$$P_{ij}(N_j, C_{(i)}) = \sum_{k=1}^{K} \frac{\exp(\beta N_j)}{\exp(\beta N_k)} \qquad (1)$$

where P_{ij} denotes the probability that family i will select particular neighborhood j from choice set ($C_{(i)}$), based on its (N_j) characteristics compared to those in all other neighborhoods (N_k). We estimate family group-specific parameters through stratifying samples by nine immigrant/income groups because characteristics of family i will not vary across ($C_{(i)}$) during the year of measurement.

We answer our first two research questions by comparing average marginal effects estimated by CLM across the nine strata.[19] We answer our third research question by estimating (1) with only neighborhoods' population characteristics, then sequentially adding housing characteristics and controls for housing market search area and observe how the parameters of immigrant and income status attributes change for each stratum.[20]

A well-known assumption of CLMs is the independence of irrelevant alternatives. We tested the validity of this assumption by re-estimating (1) several times with randomly selected 50% samples of the full neighborhood choice set. None of our primary conclusions were altered.

4. RESULTS

4.1. Intergroup Differences in Locational Attainment

Appendix Table 6 (online Supplemental File) presents descriptive statistics for neighborhood attributes selected by families in different income- and immigrant-status groups when they made salient moves in Oslo during the 1990-2008 period. The intergroup differences are dramatic, as would be expected. Middle- and lower-income status groups and non-Western immigrants regardless of income status moved into neighborhoods with lower median incomes and higher proportions of lower-status residents. Although all groups tended to move to neighborhoods with higher shares of in-group members, native Norwegians and Western immigrants moved to neighborhoods that were similar in their compositions. In contrast, non-Western immigrants from all income groups moved into neighborhoods with

[19] Mood (2010) and Kuha and Mills (2020) argue that comparing coefficients across logistic models is legitimate, especially when the same variables appear in all models and average marginal effects are compared, as when we address the first two research questions.

[20] There is some controversy regarding the validity of comparing logit parameters expressed as coefficients or odds ratios across models with different explanatory variables. We employ the strategy proposed by Mood (2010) of contrasting average marginal effects, which are not subject to unobserved heterogeneity bias.

considerably lower fractions of native Norwegian neighbors. Non-Western immigrants also disproportionately moved to neighborhoods located in the inner city east and outer city east sectors and where dwellings were predominately in multifamily buildings. Native Norwegians moved furthest between origin and destination neighborhoods, on average. The salient questions are which of these attributes were the main drivers of such distinctive differences in locational attainment, and were these attributes different among the groups?

4.2. CLM Estimates of Neighborhood Selection

Tables 1, 2 and 3 present average marginal effects (AMEs) of neighborhood characteristics on the probability of selection estimated for high-, middle- and low-status families, respectively. Each table, in turn, is subdivided by native, Western immigrant, and non-Western immigrant families, as well as three variants of CLM (1). Model I only includes population characteristics, distance to CBD and the scaling variable (number of dwellings). Model II adds local housing stock characteristics. Model III adds our proxies for housing search geography: distance from origin neighborhood and Oslo sector. We use the results from Model III for answering our first two research questions and compare models in answering our third question. Overall, Model III performs well across all strata, with pseudo R-square values in the range of 0.15 to 0.24. There are no substantial differences in explanatory power across immigrant-status groups, though models for high-status families evince consistently higher pseudo R-squares. As expected, our proxy for available dwellings in a neighborhood proves powerfully predictive for all strata. Given the complexity of results and richness of multiple comparisons across Tables 1-3, we focus on broader patterns and cite details selectively as illustration.

[Tables 1, 2, 3 about here]

4.2.1. Selecting on Income, Immigrant, and Demographic Characteristics.

Our CLMs reveal dramatic differences across immigrant-status groups in the power of population composition characteristics to draw them into neighborhoods, with less substantial differences among income-status groups with a given immigrant category. Considering first income composition, non-Western immigrant families of all incomes find larger shares of high-status (compared to middle-status) residents a much more attractive feature of a potential neighborhood (AMEs from .51 to .59) compared to native Norwegians (AMEs from zero to .08), and Western immigrants are not affected.

Surprisingly, no groups seemed strongly disinclined to neighborhoods with higher shares of low- (compared to middle-) status residents. On the contrary, low-status native and (especially) non-Western immigrant families find this a strongly attractive attribute (AMEs of .25, .38, respectively. Again, Western immigrants appear indifferent to this aspect of income composition.

The proportion of non-Western immigrants proves a strong, equally attractive attribute for own-group families of all incomes (AMEs from .35 to .45), but has the opposite, if considerably weaker, impact on native families (AMEs from -.14 to -.24) and has no effect on Western immigrant families' selections (regardless of income). These relationships are portrayed graphically in Figure 1 for the range of non-Western immigrant percentages observed across our analysis neighborhood. All groups seem unaffected by the relative shares of Western immigrants vs. natives, however.

[Figure 1 about here]

As for the two demographic characteristics, the proportion of young children in the population proves to be an equivalently powerful attractor to a neighborhood across all three immigrant-status categories for middle- and lower-status groups (AMEs from .98 to 1.46). In the case of high-status families, only natives find this attribute modestly attractive. By contrast, the share of adult residents who hold university degrees proves unrelated to neighborhood

selection for most groups; for middle-status natives it is mildly attractive and for middle-status, non-Western immigrants it is mildly unattractive.

4.2.2. Selecting on Housing Characteristics.

Results in Tables 1, 2, and 3, Model III make it clear that both native and Western immigrant families are equally less likely to select neighborhoods with higher proportions of either renter-occupied or multifamily buildings. Surprisingly, the magnitude of the renter negative effect appears inversely related to income (AMEs from -.06 to -.07 for high-status, -.10 to -.22 for low-status), whereas the multifamily negative effect is directly related to income (AMEs from -.10 to -.11 for high-status, zero to -.07 for low-status). By contrast, non-Western immigrants are typically not deterred by rental housing and are attracted to places with more multifamily housing, especially if they are less well-off (AMEs of .09 for high-status, .20 for low-status). This finding may not be as indicative of a "preference" as much as that it is the residual housing available after natives and higher-status groups have made their choices, or perhaps because they may need to make tradeoffs between accessibility to work and multifamily rental housing.

4.2.3. Selecting on Geographic Characteristics.

Distance between origin and potential destination neighborhood is a consistently strong deterrent to selection. Across all nine groups, the effect is statistically significant and remarkably similar in magnitude, with AMEs varying only between -.03 and -.05. This differs from Hedman (2013), who found that non-Western immigrants in Uppsala were less deterred by distance from origin than natives.

A very different pattern characterizes sectoral selections, with non-Western immigrant families distinguishing themselves across all income groups. They are much less likely than other families to move to Inner West (AMEs from -.35 for high-status to -.15 for low-status) or

Outer West (AMEs from -.12 to -.14 for all statuses), compared to Outer East Oslo. High-status native and Western immigrant families are less likely to select Inner East and Inner West (AMEs from -.04 to -.16) but moves by other income levels within these categories are not distinctly sectoral in nature.

4.2.4. The Sensitivity of Apparent Selection on Population Characteristics.

The CLM results reported above focused on the fully controlled Model III, but our third research question asks us to compare how the results for population characteristics change (from Model I) as we add housing (Model II) and then geographic characteristics (Model III). The short answer: adding the former does little but adding the latter substantively erodes the explanatory power of all population characteristics for virtually all groups. More specifically, controlling for distance between origin and destination and Oslo sector reduces the size of AMEs for all the income, immigrant, and demographic variables, with the reduction proportional to the size of the original parameter estimated in Model I. Many estimates—especially those related to income composition—are reduced to statistical insignificance.[21]

4.2.5. Robustness and Heterogeneity Tests.

Although in our CLMs we have tried to control for differences in the ability to pay for housing and preferences by stratifying by income and immigration status, we recognize that our results may not be robust if substantial unobserved heterogeneity of preferences remains within these strata. To explore this, we employ the oft-used approach of adding to our CLMs for natives (since they had adequate sample sizes) interactions between neighborhood attributes and

[21] The exception is non-Western immigrants of middle- and low-status: adding geographic controls increases the magnitude and statistical significance of the income composition variables. In particular, what appeared in Model I to be a broad indifference morphed in Model III into apparently strong attractions to neighborhoods with higher shares of either high- or low-status residents, compared to middle-status ones.

three characteristics of families that theoretically might align with distinct preferences for these attributes. These family characteristics are: (1) university degree holder (vs. less education); (2) more than one child in the family at time of salient move; and (3) salient move occurred when child was younger than six years old. Results of these tests are reported in Appendix Table 7 (online Supplemental File). Overall, few interactions prove significant—especially regarding income and immigrant characteristics—and the explanatory power of the CLMs are not enhanced. The results are fully consistent with our core findings above but offer a few additional insights. For example, though shares of university-educated adults are not a general predictor of neighborhood selection, it is an extremely important draw for native, middle- and low-status families with similarly educated heads. This provides support for the thesis that education is another important dimension of homophily (van Gent, Das, & Musterd, 2019; Boterman, Musterd, & Manting, 2021). Higher shares of high-status neighbors appear particularly attractive to native families moving with more than one child, adding to the literature that more privileged parents in Oslo move in ways to enhance exposure to their own group (Toft, 2018; Wessel & Nordvik, 2019).

5. DISCUSSION

Growing residential segregation of immigrants has been a widespread concern internationally and a longstanding object of investigation in housing studies. In our research on neighborhood selection, we have observed that non-Western immigrant families with children move into distinctly different—and by many measures less-attractive—neighborhoods in Oslo compared to families of native and Western immigrant backgrounds. Though our findings provide support for some conventional wisdoms about the sources of these significant disparities in locational attainment, they uncover a less-recognized source: housing search

geographies. As we discuss below, this not only enhances our understanding of segregation processes but offers new perspectives on social mix housing policies.

5.1 New Perspectives on the Sources of Immigrant Segregation

Our research supports the conventional conclusion that preferences for ethnic homophily play a role in neighborhood selections by white/native and (especially) non-Western immigrant families across the income spectrum, consistent with many studies (van der Laan Bouma-Doff, 2007; Ioannides & Zabel, 2008; Bolt, van Kempen & van Ham, 2008; Zorlu & Latten, 2009; Hedman, van Ham, & Manley, 2011; Bruch & Mare, 2012; Hedman, 2013; Ibraimovic & Masiero, 2014; Clark, van Ham, & Coulter, 2014; Galster & Magnusson Turner, 2019; Bruch & Swait, 2019; Bakens & Pryce, 2019). When confronted with two otherwise-identical neighborhoods with mean characteristics, except one has the mean proportion of non-Western residents and the other a standard deviation above the mean,[22] high-status, native families—who presumably face the fewest economic, informational, and discriminatory constraints on their choices—would have a .007 lower probability of selecting the latter. By contrast, a comparable thought experiment for high-income, non-Western immigrant families predicts a .053 higher probability of selecting the latter. We suspect that had we sufficient sample sizes to model homophily for same national-origin group, even a stronger attraction would have been revealed, as seen in Boschman and van Ham (2015).

A preference for income-status homophily is also supported by our findings, consonant with many other studies (Hedman, van Ham, & Manley, 2011; Hedman, 2013; Boschman & van Ham 2015; Galster & Magnusson Turner, 2019). Both high- and low-status native and non-Western immigrant families are more likely to move to neighborhoods with higher shares

[22] The group-specific means and standard deviations are presented in online Appendix Table 6; AMEs from Tables 1-3.

of their own income group, compared to middle-status families. For example, when comparing two otherwise-identical neighborhoods with mean characteristics, except one has the mean proportion of high-status residents and the other a standard deviation above the mean, high-status, native families will have a .006 greater probability of selecting the latter. In the same situation for high status, non-Western immigrant families, our findings predict a much greater .074 higher probability of selecting the latter. In the same thought experiments for low-status families, the respective native and non-Western immigrant estimates are .017 and .035 higher probabilities of selecting the neighborhood with the larger proportion of low-status residents. This result for low-status households is likely not a pure indicator of homophily preferences, but also unmeasured availability of more-affordable dwelling options (that we could not control statistically) that previously have drawn more of their compatriots. A further complication in interpretation arises here because a neighborhood's housing prices may themselves be reduced as a result of clustering of low-income groups, another one of the many endogenous, mutually reinforcing relationships generating both income and ethnic segregation (Galster, 2019: ch. 7).

Our estimates demonstrate that the shares of own income- and immigrant-status groups provide greater predictive power for which neighborhood is selected for non-Western immigrants than natives, regardless of which income-status group is compared. Some circumspection is required in drawing conclusions here since we have been unable to control for real or perceived discriminatory barriers in the Oslo housing market that may have shaped immigrants' residential choice set (van der Laan Bouma Doff, 2007). We recognize that a fundamental shortcoming of CLM modeling is ambiguity in distinguishing the effects of preferences vs. constraints. We further acknowledge that acts of discrimination aimed at immigrant households have been identified in international case studies (e.g., Beatty & Sommervoll, 2008; Sølholt & Astrup, 2009; Andersson, Jakobsson, & Kotsadam, 2012; MacDonald, Galster, & Dufty-Jones, 2018; Iglesias-Pascual, 2019). Nevertheless, the

implication remains that our results are consistent with the notion that non-Western immigrant families tend to voluntarily self-segregate more strongly than native families. There are a variety of reasons why they might do so, such as easing adaptation to a new milieu, preserving cultural practices, and accessing local ethnic businesses and religious institutions (Ioannides & Zabel, 2008; Hedman, 2013; Søholt & Lynnebakke, 2015; Bakens & Pryce, 2019). Whether clustering ultimately enhances the economic prospects of non-Western immigrants is a matter of considerable controversy but appears to be contingent on its duration and the class composition of the enclave (Musterd et al. 2008; Andersson, Musterd, & Galster, 2014).

While our findings support the claim that native and non-Western immigrant families' preferences for income- and immigrant-status homophily are powerful influences, it is important to recall that their measured marginal effects eroded substantially when we control for implicit housing search patterns. This suggests that the importance of homophily found in prior CLM studies that did not control for location likely was overstated. This implication is consistent with Ibraimovic and Masiero (2014), who found only modest willingness to pay for neighborhood's immigrant composition. Similar to what Bruch and Swait (2019) found in Los Angeles, the common tendency to make short-distance moves within sectors of distinctive, long-standing population and housing stock characteristics results in all types of Oslo families selecting among a limited range of neighborhoods where their own income- and immigrant-status groups are overrepresented. Thus, what might appear to be preferences for homophily at a large spatial scale may largely be attributed instead to the geography of search. While distance appears an important impediment to all nine family types uniformly, moves of non-Western immigrant families are also strongly molded by geographic sector. Indeed, a neighborhood's location is by far the most powerful predictor of this set of families selecting it, compared to its demographic, income, immigrant, or housing characteristics. As illustration, if a high-income, non-Western immigrant family were comparing two identical neighborhoods

with mean characteristics, one located nearby in Outer East Oslo where they currently resided and the other in Inner West, 10 kilometers distant (see online Appendix Figure 1), we estimate that their probability of selecting the proximate one would be a remarkable .85 higher. These findings imply that housing scholars should elevate the theory of segregation based on limited information to a position of greater prominence.

Two complications in interpretation must be acknowledged here. First, one cannot precisely parse neighborhood selection based on homophily vs. location because search and kin/friend geographies are not independent. Search builds upon information about neighborhoods that is passively acquired while one visits or traverses them, and these activity spaces in turn are likely shaped by networks of kin and friends (Galster, 2019: ch. 5; Maclennan & O'Sullivan, 2012). Second, our geographic variables are not only housing search proxies but also may be measuring actual or anticipated discriminatory forces embodied in the place stratification perspective of segregation (Iglesias-Pascual, 2019). Non-Western immigrants may be reluctant to consider distant neighborhoods beyond the Outer East not only because they know little about them but because they fear they will be ostracized or threatened should they move there. Unfortunately, to our knowledge there are no Norwegian studies that illuminate this speculation.

In summary, our findings suggest a more nuanced, multi-, and mutually causal factor model of residential segregation, such as originally conceptualized by Galster (1988). Ability-to-pay, ethnic preferences, socioeconomic and cultural preferences, housing characteristic preferences, discriminatory barriers, and limited housing information are the drivers which, in turn, exhibit multiple endogenous causal relationships amongst themselves.

5.2 Implications for Social Mix Housing Policy

Many nations have attempted to respond to the unequal opportunities spawned by rising segregation through a variety of "social mix" housing policies. A longstanding, unresolved question related to this strategy is the appropriate geographic scale over which mix should be achieved (Galster, 2013). The answer ultimately depends on whether: (1) the context effects shaping life chances of adults and children are more powerful; and (2) families' tolerance for social mix (or conversely, preferences for homophily) are substantially different, between the very localized or broader sectoral levels of geography. Although there seems no consensus about the answer to the former question (Galster, 2012), there is emerging evidence that families primarily care about homophily at small spatial scales (Bakens & Pryce, 2019). We have found that income- and immigrant-status homophily at the scale of about one thousand inhabitants (325 families with children) is an important aspect of neighborhood selection, but not nearly as important as the much broader geographic sector of Oslo.

If these results have more general applicability, they would imply that social mix policies should attempt to enhance diversity at the larger spatial scales primarily by improving information about potentially desirable residential options. Such a strategy would be more likely to achieve stable diversity because local homophily-seeking moves would be less likely to undermine it (Gent, Das, & Musterd, 2019). Efforts to provide families with more information about distant neighborhoods outside of their traditional search sector could be modelled on successful American experiments with expanding the search geographies of low-income apartment-seekers using rental vouchers (Darrah & Deluca, 2014).

5.3 Caveats and Future Research Directions

Although we think that our study provides unique, powerful, and robust findings, we acknowledge several shortcomings that could guide future research. First, some theories of immigrant segregation, like spatial assimilation, cannot be fully tested without a longitudinal

analysis of both out-and in-moving decisions that we do not attempt here. Second, there may be unobserved heterogeneity among Western and non-Western immigrants (Boschman & van Ham, 2015) that we were unable to explore due to limited sample sizes produced by our income-stratified approach. Third, like every CLM study of neighborhood selection, we lack any contemporaneous measure of available housing in price ranges appropriate for the particular income status in question. Fourth, we have no information about potentially important neighborhood characteristics, such as quality schools, public transit access, parks, views, restaurants, or the presence of parents (Hedman, 2013; van Ham, Boschman, & Vogel, 2018). Fifth, there may be other dimensions of homophily driving selection that we did not investigate, such as status discrepancy (Musterd, et al. 2016; Galster & Magnusson Turner, 2017; 2019) or sociocultural (Gent, Das, & Musterd, 2019). Finally, we lack data on some characteristics of families that might be associated with different selection patterns, such as wealth or cognitive skills (Schachner & Sampson, 2020).

6. CONCLUSION

Valuable insights can be gained by our CLM-based analysis of residential selection in Oslo involving model stratification by nine distinct income/immigrant status family groups and controls for spatial patterns of housing search. We find support for the conventional view that preferences for living among those of the same income and immigrant group shape the residential mobility processes of both native Norwegian and non-Western immigrant families across the income spectrum in ways that foster segregation. Demographic features like the share of young children, and housing characteristics like tenure and multifamily dwelling composition, are also influential in neighborhood selection. By far the most important predictor, however, is location. All types of families studied evince a similar aversion to selecting distant neighborhoods. All else equal, high-status families of all immigrant statuses

tend to avoid moving into the Inner East and Inner West sectors of Oslo; non-Western immigrants, regardless of income, are strongly reluctant to move out of the Outer East sector.

Overall, our results provide a different perspective from the simplistic diagnosis of segregation that "birds of a feather flock together." They comport with the more nuanced view that both native Norwegian and non-Western immigrant families effectively confine their search and consideration of neighborhoods to largely non-intersecting spatial realms delimited by distance from current neighborhood and spatial sector of Oslo. Within these distinct subsets of neighborhoods, families apparently make choices to enhance own-group exposure. However, the income- and immigrant-status-based segregation ultimately observed is more a function of the population composition differences *between* these subsets of neighborhoods, and less because families cluster *within* these subsets in a few neighborhoods dominated by "their own kind." Moreover, because these distinctive geographic sectors are highly unequal across multiple dimensions, this ethnically differentiated locational attainment of families in Oslo means that native and non-Western immigrant children will not share similar developmental contexts, even if their parents have similar incomes. As Magnusson Turner and Wessel (2013) summarize, the symbolic value of "East" and "West" Oslo has been reproduced for over a century, and continues to influence place identity, housing market behavior, and life chances.

To gain purchase for formulating a social mix strategy to remedy this inequality of spatial opportunity in Oslo, more research is needed to uncover the source(s) of this spatially constrained, ethnically conditioned process of neighborhood selection. Clearly, a first-level requirement would be to uncover the degree to which this phenomenon is primarily due to "natural" processes of housing search based on routine activity spaces, the distribution of employment, (mis)perceptions about anti-immigrant prejudice in certain locales, or discriminatory actions by real estate agents or mortgage lenders.

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Figure 1. Average Marginal Effects of Proportion Non-Western Immigrants in Neighborhood, by Income and Immigrant Status, with 95% confidence intervals

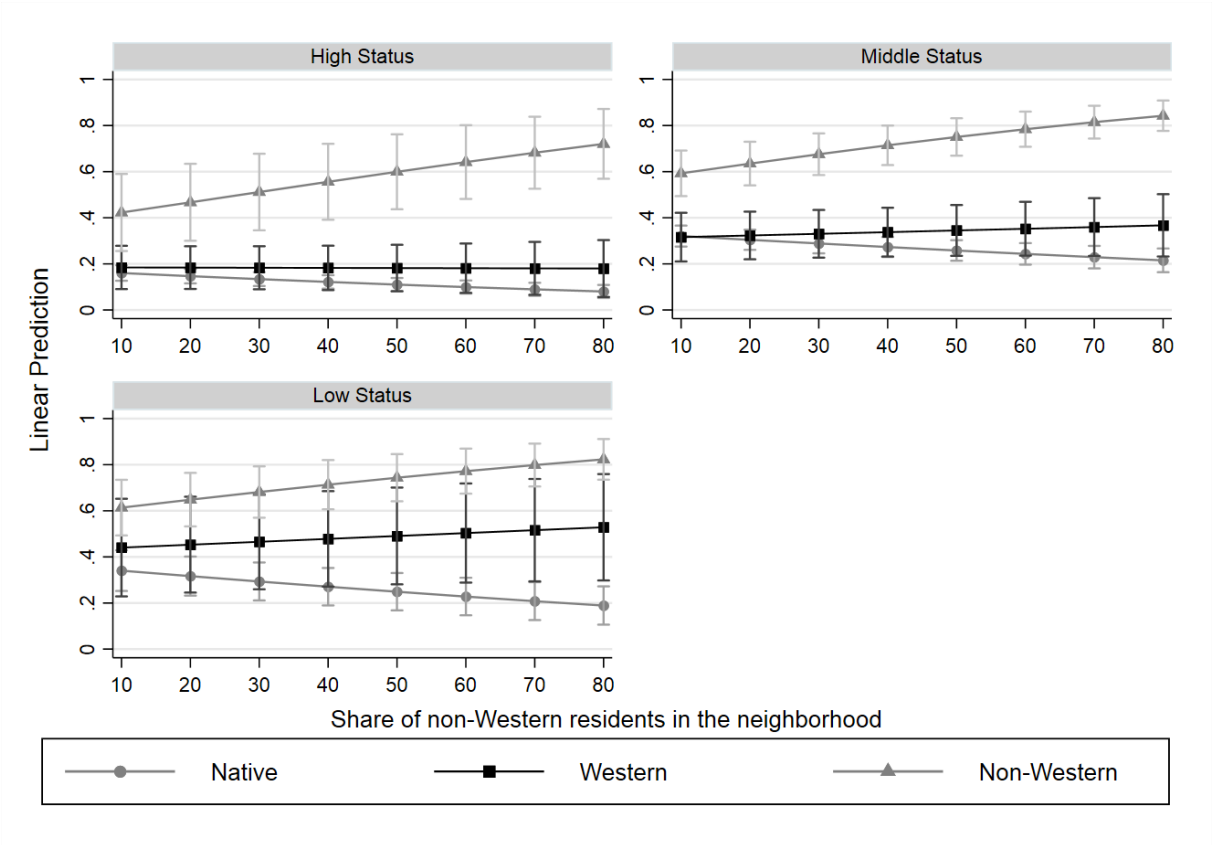

Table 1. Average Marginal Effects of Attributes on Probability of Neighborhood Selection by High-Status Families, by Immigrant Status

	High Status Group								
Attributes	**Native**			**Western Immigrant**			**Non-Western Immigrant**		
(proportions unless noted)	*Model I*	*Model II*	*Model III*	*Model I*	*Model II*	*Model III*	*Model I*	*Model II*	*Model III*
Demographic	Dy/dx	Dy/dx	Dy/dx	Dy/dx	Dy/dx	Dy/dx	Dy/dx	Dy/dx	Dy/dx
Individuals, age 25-66 years with a university degree	-0.030	0.127**	0.016	0.051	0.309***	0.079	-0.784***	-0.701**	0.054
Children age 0-6 years	0.673***	0.891***	0.358***	0.356**	0.526*	0.232	0.030	0.195	0.226
Non-western background	-0.360***	-0.248***	-0.142***	-0.114	0.086	-0.007	1.017***	0.757**	0.427***
Western background	-0.540***	-0.674***	-0.116	-0.140	0.051	0.105	-0.253	-0.212	0.397
Income (Middle-status=ref.)									
Low status families	0.072*	0.039	0.034	0.015	-0.044	-0.028	-0.578**	-0.132	0.040
High status families	0.396***	0.184***	0.053*	0.313***	0.261*	0.103	0.846***	1.094***	0.594***
Housing									
Number of dwellings	0.199***	0.447***	0.161***	0.137**	0.393***	0.166***	0.471***	0.356***	0.180***
Rental dwellings		-0.308***	-0.055***		-0.372***	-0.074*		-0.227	0.002
Dwellings in multi-family buildings		-0.334***	-0.113***		-0.287***	-0.101***		0.158***	0.093**
Geographic									
Distance to Oslo CBD (km)	0.000	-0.002**	0.012***	0.000	-0.003	0.010***	-0.008**	-0.007	0.018***
Distance from origin Nh to destination Nh (km)			-0.030***			-0.031***			-0.046***
Inner city east *(Outer East=ref.)*			-0.090***			-0.164***			-0.122***
Inner city west			-0.042***			-0.129***			-0.352***
Outer west			0.028***			0.021			-0.127***
N of family- neighborhood alternatives	6,475,352	6,475,352	6,475,352	1,090,980	1,090,980	1,090,980	660,098	660,098	660,098
Number of families	4,920	4,920	4,920	811	811	811	489	489	489
-2LL	-40,307.06	-40,015.63	-31,532.98	-6,722.55	-6,722.41	-5,422.54	-3,964.43	-3,950.37	-3,274.19
LR (degrees of freedom)	2,585.31	2,838.88	4,659.05	542.27	548.54	802.00	748.63	734.12	557.46
Pseudo R^2	0.034	0.041	0.244	0.039	0.046	0.230	0.070	0.073	0.232

Estimates from CLM; * p<.05; ** p<.01; *** p<.001 based on robust standard errors adjusted for clustering by family

Dy/dx = Average Marginal Effects (AME)

Table 2. Average Marginal Effects of Attributes on Probability of Neighborhood Selection by Middle-Status Families, by Immigrant Status

	Middle Status Group								
Attributes	**Native**			**Western Immigrant**			**Non-Western Immigrant**		
(proportions unless noted)	*Model I*	*Model II*	*Model III*	*Model I*	*Model II*	*Model III*	*Model I*	*Model II*	*Model III*
Demographic	Dy/dx	Dy/dx	Dy/dx	Dy/dx	Dy/dx	Dy/dx	Dy/dx	Dy/dx	Dy/dx
Individuals, age 25-66 years with a university degree	-0.076**	-0.027	0.063*	0.075	0.163*	0.098	-0.774***	-0.448***	-0.143*
Children age 0-6 years	1.246***	1.431***	1.071***	1.169***	1.336***	1.161***	1.244***	0.831***	0.976***
Non-western background	-0.278***	-0.205***	-0.164***	0.039	0.124	0.071	0.861***	0.385***	0.425***
Western background	-0.376**	-0.345*	0.099	0.065	0.221	0.290	-0.281	-0.159	0.289
Income (Middle-status=ref.)									
Low status families	-0.030	-0.069	0.049	-0.091	-0.060	-0.019	-0.021	0.254***	0.356***
High status families	0.272***	0.101*	0.077*	0.137**	0.026	0.001	0.204*	0.524***	0.560***
Housing									
Number of dwellings	0.311***	0.434***	0.280***	0.278***	0.348***	0.257***	0.436***	0.198***	0.215***
Rental dwellings		-0.115***	-0.058**		-0.187**	-0.116**		-0.093**	-0.081*
Dwellings in multi-family buildings		-0.137***	-0.100***		-0.058	-0.058**		0.179***	0.189***
Geographic									
Distance to Oslo CBD (km)	-0.001*	-0.003***	0.017***	-0.002	-0.003	0.015***	-0.010***	-0.005**	0.013***
Distance from origin Nh to destination Nh (km)			-0.040***			-0.040***			-0.038***
Inner city east *(Outer east=ref.)*			-0.039***			-0.039			-0.013
Inner city west			-0.014			-0.001			-0.233***
Outer west			0.003			0.007			-0.139***
N of family- neighborhood alternatives	7,503,518	7,503,518	7,503,518	1,374,194	1,374,194	1,374,194	2,048,618	2,048,618	2,048,618
Number of families	6,136	6,136	6,136	1,126	1,126	1,126	1,482	1,482	1,482
-2LL	-46,775.20	-46,691.47	-4,0352.82	-8,543.80	-8,535.63	-7,425.44	-11,771.56	-11,674.30	-10,453.27
LR (degrees of freedom)	2,982.06	3,146.46	5,934.83	622.99	635.33	1,219.36	3,557.98	3,460.06	3,286.13
Pseudo R^2	0.027	0.028	0.160	0.029	0.030	0.156	0.110	0.118	0.210

Estimates from CLM; * p<.05; ** p<.01; *** p<.001 based on robust standard errors adjusted for clustering by family

Dy/dx = Average Marginal Effects (AME)

Table 3. Average Marginal Effects of Attributes on Probability of Neighborhood Selection by Low-Status Families, by Immigrant Status

	Low Status Group								
Attributes	**Native**			**Western Immigrant**			**Non-Western Immigrant**		
(proportions unless noted)	*Model I*	*Model II*	*Model III*	*Model I*	*Model II*	*Model III*	*Model I*	*Model II*	*Model III*
Demographic	Dy/dx	Dy/dx	Dy/dx	Dy/dx	Dy/dx	Dy/dx	Dy/dx	Dy/dx	Dy/dx
Individuals, age 25-66 years with a university degree	-0.148**	-0.129*	0.018	-0.057	-0.008	-0.041	-0.601***	-0.392**	-0.083
Children age 0-6 years	1.169***	1.353***	1.163***	0.897**	0.853*	1.122***	1.720***	1.238***	1.457***
Non-western background	-0.280***	-0.276***	-0.244***	0.161	0.177	0.125	0.710***	0.315**	0.348***
Western background	-0.543*	-0.554*	-0.073	-0.181	-0.053	0.158	-0.861**	-0.524*	-0.171
Income (Middle-status=ref.)									
Low status families	0.147**	0.234**	0.245**	0.100	0.266*	0.342	0.011	0.239***	0.377***
High status families	0.240***	0.148*	0.099	0.220**	0.204*	0.236	-0.001	0.473***	0.505***
Housing									
Number of dwellings	0.280***	0.362***	0.260***	0.259**	0.246*	0.258***	0.402***	0.197***	0.199***
Rental dwellings		-0.152**	-0.099**		-0.209	-0.215*		-0.041	-0.037
Dwellings in multi-family buildings		-0.075**	-0.071***		-0.002	-0.017		0.206***	0.204***
Geographic									
Distance to Oslo CBD (km)	0.001	0.000	0.018***	-0.002	-0.002**	0.019***	-0.014***	-0.007**	0.008***
Distance from origin Nh to destination Nh (km)			-0.041***			-0.046***			-0.036***
Inner city east *(Outer East=ref.)*			-0.014			0.021			-0.027
Inner city west			-0.006			0.044			-0.152***
Outer west			0.000			0.046			-0.119***
N of family- neighborhood alternatives	2,207,306	2,207,306	2,207,306	444,106	444,106	444,106	1,376,398	1,376,398	1,376,398
Number of families	1,782	1,782	1,782	357	357	357	980	980	980
-2LL	-13,767.47	-13,756.49	-11,634.28	-2,744.67	-2,739.64	-2,345.45	-7,753.81	-7,683.25	-6,938.83
LR (degrees of freedom)	977.52	1,014.43	1,678.87	257.21	276.65	446.81	2,803.79	2,602.52	2,086.27
Pseudo R^2	0.027	0.028	0.178	0.037	0.039	0.177	0.130	0.137	0.221

Estimates from CLM; * p<.05; ** p<.01; *** p<.001 based on robust standard errors adjusted for clustering by family.

Dy/dx = Average Marginal Effect (AME)