

Immigrant Intergenerational Mobility: A Focus on Childhood Environment*

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Abstract

We study how immigrant children integrate economically into a new society. Using administrative data from Sweden, we show that immigrant children who grow up in the 20th income percentile have incomes in adulthood that are about 12% lower than those of native children of similarly low-income parents. This income gap cannot be explained by differences in parent education levels, family structure, or municipality of residence. The gap can, however, be explained by differences in immediate, 100 × 100 square meter neighborhoods. Low-income immigrant children grow up in relatively denser neighborhoods with fewer high-earning and native-born neighbors. Administrative data from Stockholm suggest that immigrant neighborhoods are also less desirable than the ones where low-income natives live and have worse schools. While we cannot rule out selection as a driving force for these results, our evidence suggests that urban planning decisions, especially ones that limit access to housing, can be significant barriers to immigrant intergenerational mobility.

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1 Introduction

How well do the children of immigrants integrate into a new society? The economic, social, and political facets of this question loom large in the minds of citizens and policymakers (e.g., OECD, 2017a, Onishi and Meheut, 2021). We concentrate here on the economic facet of this question.

Our focus is on Sweden, a country that has welcomed a large number of immigrants from all over the world since the Second World War. Swedish register data allow for an in-depth study of the economic integration of children who are born between 1974 and 1984 and who live in Sweden between 1990 and 2014. We find that over 60% of the immigrant families in our data start off low-income, in the bottom 20% of the income distribution. By the time children in these families reach their 30s, however, only about 30% of them are low-income.

Though this kind of intergenerational mobility suggests that immigrant children generally integrate well economically, the intergenerational mobility of native-born children is nonetheless higher than that of immigrant children. More concretely, the average immigrant child who grows up in the 20th income percentile in Sweden achieves income in adulthood that is 3 percentage points lower than the income achieved by a native-born child with similarly low-income parents. The 3 percentage point difference is equivalent to 12 percent lower intergenerational income growth for low-income immigrants than for low-income natives.

What explains this gap in intergenerational income growth? Like Abramitzky et al. (2021), which focuses on the U.S., we find that differences in parent educational backgrounds or in family structures do not appear to be playing a role in generating the gap. Unlike in the U.S., however, the environment that explains the gap in Sweden is not the county or the municipality, but the immediate, 100×100 square meter neighborhood in which a child grows up. Our geographically-detailed data offer a unique opportunity to zoom in on the characteristics of these neighborhoods, essentially one city block-by-one city block, and to demonstrate how significantly they differ for natives and immigrants. On average, low-income immigrant children grow up in neighborhoods with 130 more people living in the 100×100 square meter area, with 20% fewer high-earning neighbors, with 37.5% fewer native-born neighbors, with worse schools, and with less desirable housing than low-income native children.

Numerous studies have found that where a child grows up can have large consequences for his or her outcomes later in life (e.g., Chetty et al., 2014, Chetty et al., 2016, Chetty and Hendren, 2018, List et al., 2020, Abramitzky et al., 2021). In addition to studies that have shown how childhood environment matters, work by Bergman et al. (2019) demonstrates that barriers to housing search are a significant reason for residential segregation by income in the U.S. What is different in our setting, however, is that substantial

residential differences persist for immigrant and native-born children even when we condition on parental income. Relatedly, Ganong and Shoag (2017) has traced the decline in American geographic mobility to low housing stock and high housing prices in places with economic opportunities. Hsieh and Moretti (2019) finds that the misallocation of labor across U.S. cities due to restrictions on housing supply lowered aggregate U.S. growth by 36 percent from 1964 to 2009. The role that neighborhoods are playing in the intergenerational mobility differences between native and immigrant children, combined with a Swedish housing market that makes choosing where one lives difficult, suggests that housing market frictions are important impediments to opportunity and growth in Sweden as well.

After the Second World War and through the 1950s, Sweden went through large-scale urbanization, which, coupled with an increasing immigrant population and rising birth rates, led to severe housing shortages (Turner Center, 2017). In order to meet growing housing demand, the country built large apartment buildings between 1965 and 1974 as part of its Million Homes Programme (Turner Center, 2017). While the quality of these public housing units is generally considered to be high by international standards, the result over time has been effective segregation between immigrant and native neighborhoods (Lindén and Lindberg, 1991 and Andersson et al., 2010). In our sample, 48.7% of low-income immigrants live in public housing, compared to 18.3% of low-income natives.¹ Though new housing construction has stalled since the Million Homes Programme, immigrant inflows have continued, resulting in overcrowding in public apartment buildings and additional pressure on an already constrained housing system (Scanlon et al., 2014). The mismatch in supply and demand for housing, with urban areas experiencing high demand while excess housing supply sits unused in the countryside, has also been part of the problem (Turner Center, 2017).

Differences in housing endowments are crucial in Sweden, since the housing market is heavily regulated with the aim of ensuring unit affordability. These market controls, however, have the unintended consequence of notoriously-long waiting lists for apartment rentals: in 2012, for example, only 12% of tenants who moved into a Stockholm apartment that year had waited fewer than four years on the Stockholm Housing Agency’s waiting list (Scanlon et al., 2014). In 2016, average wait times were nine years in Stockholm as a whole and up to 16 years in the most desirable neighborhoods (Turner Center, 2017). The abundance of rules around housing allocation disadvantages new immigrants, as does the fact that rental contracts can be exchanged: social capital and personal connections, which new immigrants generally lack relative to natives, can help one land an apartment outside of the municipal waiting list structure.

Still, we find that low-income immigrant parents are almost 2 times as likely to move

¹About 20% of Swedish housing stock is public housing, compared with less than 1% in the U.S. (Turner Center, 2017)

to a different neighborhood with their school-age child than low-income native parents. Movers, especially immigrants, appear to be moving away from communities with a declining share of high-earners and into communities that are experiencing a growing share of college educated residents. Nonetheless, likely due to housing market constraints that amplify the importance of initial endowments, immigrant movers are not able to close many gaps in neighborhood characteristics.

Though we cannot rule out that immigrant families self-select into areas with lower intergenerational mobility for reasons other than housing constraints, such a conclusion would be at odds with prior research (e.g., Abramitzky et al., 2021). Our evidence suggests that increasing intergenerational mobility in immigrant neighborhoods might not be just about improving services, like schools, in and around these neighborhoods, but also about increasing native-immigrant interactions and thus immigrant social capital. As a result, a less constrained housing market that does not disadvantage newcomers, coupled with policies that invest in today’s least desirable neighborhoods, has the potential to help immigrant children close the income gap with their native-born counterparts.

In the section that follows we provide background on immigration to Sweden and the country’s housing market. In Section 3, we explain how we selected our sample for analysis, lay out key variables, and provide information on the data we use. Section 4 shows the intergenerational mobility differences between low-income immigrant and native children and offers evidence that childhood neighborhoods can explain these differences. It also illustrates differences across immigrant and native neighborhoods and the clues they provide to understanding intergenerational mobility differences. Section 5 concludes.

2 Background

2.1 Immigrants in Sweden

Sweden has for decades been a destination for large numbers of immigrants with widely different backgrounds. Since World War II, when Sweden became a net immigrant-receiving country, numerous immigration waves have occurred. The 1950s and 1960s were dominated by labor immigration, primarily from other Nordic countries like Finland, but also from Mediterranean countries like Greece, Italy, and Yugoslavia (Hammarstedt and Palme, 2012).

Labor immigration from non-Nordic countries came to a halt in the early 1970s, but immigration continued in the form of family reunification and refugee immigration.² Refugees from Chile arrived predominantly in the 1970s; from Iran, Iraq, and Lebanon in the 1980s; from Somalia, Eritrea, and Former Yugoslavia in the 1990s. The timing of

²Nordic labor immigration continued, primarily from Finland, as the 1954 Nordic Agreement allowed free movement for citizens of the Nordic countries.

refugee arrivals has mirrored the timing of conflicts around the world. Given the volume of these refugee waves, 1970 marked a shift in Sweden towards mostly non-European immigration.

Our sample shows about 35% of immigrant children with at least one refugee parent. As of 2016, about 17% of the Swedish population was foreign-born, compared to less than 7% in 1970. By comparison, the share of foreign-born in the United States has had a similar trajectory, rising to over 13% in 2013 from a low below 5% in 1970 (OECD, 2017b).

2.2 The Swedish Housing Market

In Sweden, a person can rent, be a tenant-owner, or an owner-occupier.³ The rental market is characterized by rent setting, whereby rents are negotiated between landlord and tenant associations (Sodini et al., 2016). In order to have access to a first-hand contract, one generally has to join a housing queue. The longer one spends in the queue, the higher the probability of finding an apartment to rent. More desirable housing also requires more time in the queue than less desirable housing. Housing companies can be public - owned by municipalities - or private. Public housing in Sweden differs from social housing in countries like the U.S. in that access to it is not means tested. Public housing is, however, generally less desirable and vulnerable families (such as low-earners, single-parent families, and immigrants) are overrepresented in this tenure type, especially in the largest cities (see, e.g. Magnusson and Turner, 2008). Public rental housing makes up about 19% of the Swedish housing stock, with private rental housing making up about 18% (Terner Center, 2017).

If a person is a tenant-owner, they live in an apartment that they have purchased the right to use. In practical terms, that means that the owner purchased a share in the association of tenant-owners who own the building together (also called a cooperative). A tenant-owner needs the approval of the cooperative before renting out the apartment, but they can usually sell their dwelling on the market at will. About 23% of the Swedish housing stock is cooperative housing (Terner Center, 2017). An owner-occupier owns their house and has the right to use it. Owner-occupied dwellings are usually restricted to detached houses and very rarely refer to apartments in multi-dwelling buildings. Owner-occupied houses make up about 41% of the Swedish housing stock (Terner Center, 2017).

³In our data, we can infer the tenure type using information on the type of housing (e.g., detached house, multi-dwelling building, etc.) and the legal form of ownership. See Blind (2015, p. 138) for details on how this is achieved.

3 Data

3.1 The Sample

We use Swedish register data from the GeoSweden database, which covers all individuals with a permanent residence permit valid for at least one year for the 1990-2014 period.⁴ The data contain variables from several different registers, including the education, income, and employment registers. Parent identifiers for each individual are available, provided the parents have also registered in Sweden (either as a resident or as a citizen) at some point between 1990 and 2014.

In order to construct our sample, we first identify all parents of children born between 1974 and 1984 for whom we have information in the population and employment registers. We then identify the children born in the 1974-1984 cohorts who can be found in the population and employment registers when they are 30 years old.

We focus on two groups: the native children in our analysis are children born in Sweden to Swedish-born parents. The immigrant children are born abroad or in Sweden to foreign-born parents. This implies that we exclude children born abroad to Swedish parents and children born to one Swedish parent and one foreign parent, regardless of the place of birth. We choose this restriction to simplify the interpretation of our comparisons throughout the paper. For immigrant children born abroad, we impose the restriction that they arrive before the age of 16.

As Table 1 shows, we have information on both parents for 97% of native children in our data.⁵ In comparison, 82% of the immigrant children in our sample have both parents in the register. The majority of those who have only one parent in the register are in Sweden with their mothers. A parent could be missing in the register if he or she is deceased, has only a temporary residence permit - which allows for less than one year of residence in Sweden - or lives abroad permanently.

Mothers and fathers in the native sample are of comparable age (in their mid-to-late 40s) to mothers and fathers in the immigrant sample when we measure family income (Table 1). Native parents are considerably more likely than immigrant parents (42.9% vs. 28.7%) to have a college or above level of education. Almost 35% of the immigrant children have at least one parent who is a refugee and the average age at arrival for an immigrant child born abroad is 8.9 years.

While detailed and expansive, our data require us to make certain calls about the

⁴GeoSweden is administered by the Institute for Housing and Urban Research at Uppsala University. The data are collected and anonymized by Statistics Sweden.

⁵We restrict our attention to whether parents are present in the register during the period in which we are interested in measuring parental outcomes - when the child is between 15 and 19 years old. This means that we include children who either had only one parent or both parents in the register *throughout the entire 5-year period*. A further implication is that we are not capturing those children whose parents migrate in and out of Sweden during that time.

composition of the sample that we ultimately analyze. We have also worked with alternative samples, including ones that allow us to measure parental outcomes over different time frames and children’s outcomes after age 30, and obtained similar results. We would be happy to provide them upon request.

Table 1: Summary Statistics

	Mean	Std. dev.	No. of obs.
Panel A: Natives			
Age mother when child 15-19	44.57	4.88	814,610
Age father when child 15-19	47.17	5.35	800,860
At least one parent with college or above	42.92	n/a	818,014
Both parents in the register	97.15	n/a	819,422
Only mother in the register	2.27	n/a	819,422
Number of unique mothers	544,578		
Number of unique fathers	534,948		
Panel B: Immigrants			
Age mother when child 15-19	43.03	5.49	100,533
Age father when child 15-19	47.15	6.42	87,725
At least one parent with college or above	28.71	n/a	100,270
Both parents in the register	82.31	n/a	103,265
Only mother in the register	15.05	n/a	103,265
At least one parent refugee	34.49	n/a	103,265
Average age at arrival	8.87	4.05	54,849
Number of unique mothers	67,091		
Number of unique fathers	57,063		

Notes: This table reports summary statistics for natives and immigrants, respectively. Children are born between 1974 and 1984. A college degree corresponds to having at least a post-secondary education that takes fewer than 3 years to complete. We classify a child as a refugee if at least one of his or her parents is classified as a refugee in our data. Where standard deviations are not reported, the Mean column shows shares.

3.2 Key Variables

We calculate *family income* as the average combined income⁶ of the parents in the register during the years when the child is 15 to 19 years old.⁷ Measuring family income in this time frame allows us to work with a large sample of parents, including those who arrive in Sweden with teenage children. It also allows us to measure family income at a time when the children are likely still dependents and when immigrant parents have spent a

⁶Our income variable includes income from employment and self-employment. Using only labor income gives similar results, which are available upon request.

⁷When the child has only one parent in the register, we measure family income as the average income of the existing parent during the years when the child is 15 to 19 years old. For the 1974 cohort, we measure family income when the child is between 16 and 20, because our income data start in 1990.

considerable amount of time in Sweden. We include families with zero income. We follow Chetty et al. 2014 and define the family’s *percentile rank* based on its position in the national distribution of incomes relative to all parents with children in the same birth cohort, regardless of immigrant status.

We measure *child income* as the individual income the child earns when he or she is 30 years old. Just as for the parents, we define the child’s percentile rank based on his or her position in the national distribution of incomes relative to all children in the same birth cohort.

Both income variables are measured in 2014 SEK, adjusting for inflation using Statistics Sweden’s Consumer Price Index.

We define *parental education* as the maximum level of education observed throughout the time the parent is in the register, so as to reduce the number of missing values for immigrant parents in their first years in Sweden.⁸ We categorize families based on whether neither or at least one parent has a college degree or above.⁹ In our data, this corresponds to having at least a post-secondary education that takes fewer than 3 years to complete.

Similarly, we measure whether the child has a *college degree or above* when he or she is 30 years old.

We use two measures to capture childhood environment: i) *childhood municipality*, defined as the municipality where the child has spent the most time between the ages of 6 and 16¹⁰ and ii) *childhood neighborhood*, given by the 100 × 100-meter geocoded square where the child has spent the most time between the ages of 6 and 16.¹¹

3.3 Stockholm Housing Queue Data

In order to access a first-hand rental contract in Sweden, an individual has to join a housing queue and often spend years before they are offered an apartment. We have access to data from the Stockholm Housing Agency (SHA), which manages the queue in Stockholm County. The data contain information from 2000 to 2017 on the universe of apartments

⁸Immigrant parents might see their skills and degrees obtained abroad recognized some time after arrival.

⁹We do so only for families where both parents have non-missing education information when both parents are in the register (or the one existing parent has non-missing information when only one parent is in the register). However, if we assign families the level of education from just one parent when only one parent has non-missing information, the average share of families with college or above changes only slightly, from 42.92% to 42.89% for natives and from 28.71% to 28.27% for immigrants.

¹⁰To be more precise, the municipality of residence is given by the municipality where the mother lived when the child was between 6 and 16, when the mother is in the register (or by the father’s municipality when only the father is in the register). Individuals do not enter the register themselves until they are 16 years of age. There are 290 municipalities in Sweden.

¹¹Given that our data starts in 1990 and the cohorts in our sample are born between 1974 and 1984, we cannot use the same number of observations to compute the modal location during the 6-16 age range for all cohorts.

that have been rented through the queue system.¹² About 10% of the Swedish population lives in Stockholm, so while the Stockholm housing market is likely not representative of Sweden as a whole, it does cover a significant segment of the population.

The apartments that are in the queue can be either apartments owned by municipal housing agencies, or apartments owned by private landlords. The SHA handles all municipal-owned apartments, but only a proportion of the private-owned apartments. Private landlords may choose to be a part of a landlord association, which then makes recommendations to their members on how many apartments should be brokered by the SHA. Companies that do not rent out (all) their apartments via the SHA often have their own queue-based tenant selection system. A substantial number of available (first-hand) rentals in the Stockholm area is therefore captured by our dataset. Municipal housing companies own half the rental stock at the national level (SABO, 2013).

For each apartment rented via the queuing system, we have the following information: address, geographic location given by coordinates, number of rooms, area, floor, monthly rent, landlord, whether the apartment is new or special (e.g., student housing, housing for the elderly, etc.), the queue start date for the household that moved in, the move-in date, and the start and end dates of the ad.

We use these data to characterize childhood neighborhoods in terms of desirability, as proxied by the average time spent in the queue. The Stockholm data are at the apartment level, whereas the register data are at the 100×100 - square meter level. We therefore create a mapping between these two levels so as to obtain average wait time at the childhood neighborhood level. For details on how we accomplish this, see Appendix A.1.

3.4 SALSA School Quality Data

To study how school quality differs across neighborhoods we turn to a database built by the Swedish National Agency for Education (NEA), the country’s administrative authority for the public school system. The publicly-available SALSA database reports data on student performance in all counties, but we focus on Stockholm County. The metrics that we focus on are the share of students who pass their final compulsory year (Grade 9) of education and an average school grade value measure for every school that offers Grade 9 instruction and has at least 15 students. There are 336 schools in our dataset.

The NEA creates school value-added measures based on these two metrics, ones that takes into account parents’ education levels, the native-immigrant composition of the school, and the gender distribution of the students, among other factors. The difference between the school’s actual grade value or share of students passing and the same model-calculated metric is the school’s residual, or value-added. Since schooling quality is crucial

¹²We are grateful to Alvin Lindstam for scraping these data and making them available online.

to human capital accumulation and lifetime earnings, these two value-added measures can help us understand one potential channel through which local neighborhoods can shape intergenerational mobility.

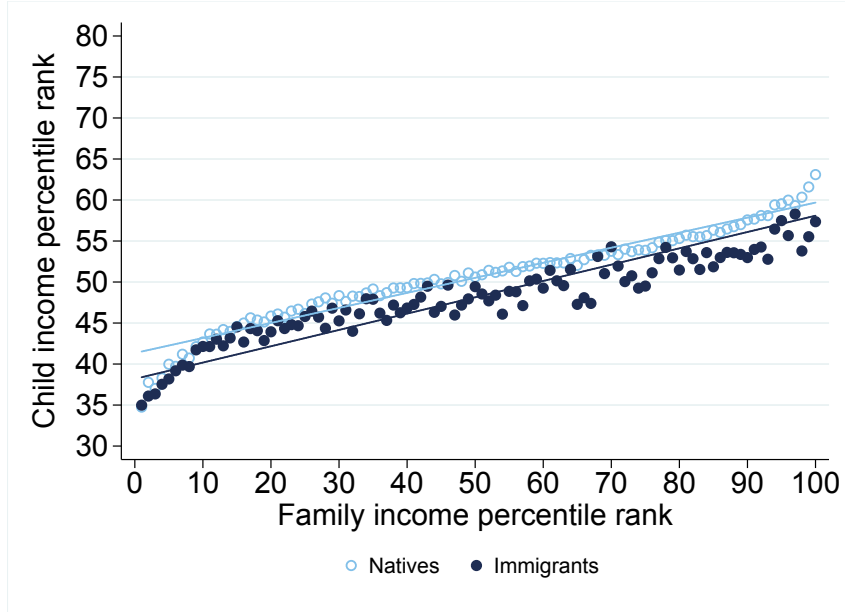
Similarly as with the housing data, we use this data to characterize childhood neighborhoods in terms of school quality. In order to do so, we match schools to the childhood neighborhoods in the register data and average over the value-added measures of all schools matched to a location. We describe this procedure in detail in Appendix A.2.

4 Results

4.1 Intergenerational Mobility of Immigrants and Natives

The intergenerational mobility of immigrant and native children is similar across the family income distribution. Figure 1 shows the average child income percentile ranks for children growing up in each family income percentile in Sweden. With each dot representing an equally-sized bin, the higher concentration of data on the left side of Figure 1 suggests that immigrant families are concentrated more heavily in the bottom of Sweden’s family income distribution.

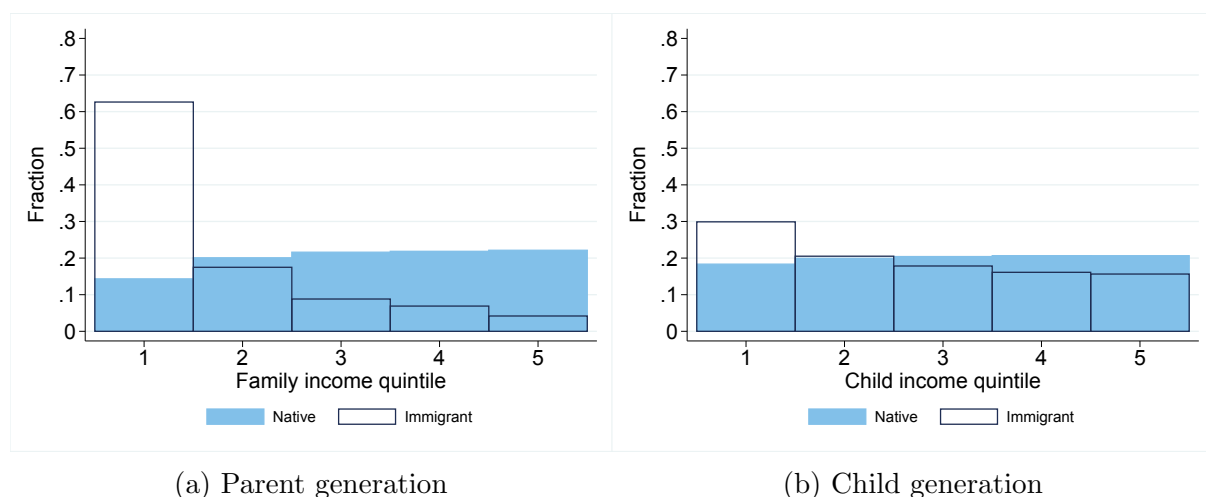
Figure 1: Intergenerational Mobility, Immigrants and Natives



Notes: The chart shows average child income percentile ranks for children growing up in each family income percentile rank in Sweden. Outcomes for children born in Sweden to Swedish-born parents (Natives) are reported separately from outcomes for children of immigrants. Here immigrant children are those who are born inside or outside of Sweden to foreign-born parents. Child income is measured at age 30, family income is measured as an average over the time period when the child is 15 to 19 years old. We rank children relative to all other children in their birth cohort. We rank parents relative to all other parents of children in the same birth cohort.

Figure 2a confirms this observation, revealing that more than 60% of immigrant parents are ranked in the bottom quintile of the national income distribution, compared to about 15% of native parents. Figure 2b, however, illustrates the economic mobility of the children: only about 30% of immigrant children earn incomes that place them in the bottom of the income distribution at age 30. In contrast, about 20% of native children, a higher share than the share of native parents, are in the bottom of the income distribution at age 30. We will focus on the children who grow up low-income, in the bottom income quintile, for the rest of the paper. We do so to focus our analyses on the group of highest concern for citizens and policymakers when it comes to questions of economic integration in society.

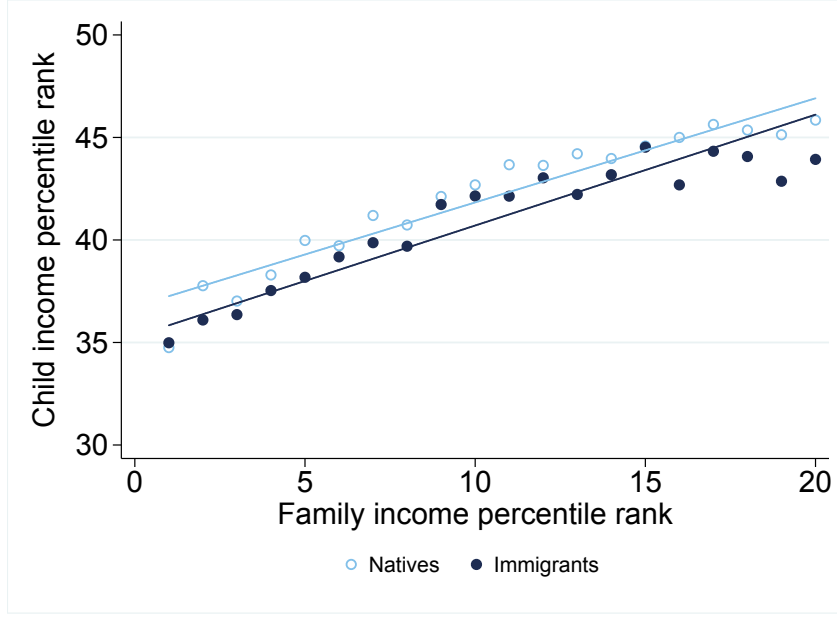
Figure 2: Income Distributions, Families and their Children



Notes: Figure 2a and 2b present histograms of the fraction of natives and immigrants in our sample that fall in each family income quintile in Sweden. Figure 2a shows the distribution for parents when their children are between the ages of 15 and 19. Figure 2b shows the distribution for the children of these parents, when the children are at age 30.

Figure 3 zooms into the group of immigrants and natives who grow up low-income and shows where children place in the income distribution in adulthood on average, conditional on where their parents started. By this measure, native children are generally doing better than immigrant children throughout the bottom income quintile. The following sections explore reasons behind this income gap.

Figure 3: Intergenerational Mobility in the Bottom Income Quintile



Notes: Figure 3 plots the percentile income rank of children in the 1974-1984 birth cohorts at age 30 against the percentile rank of their parents for natives and immigrants, respectively, for children born in the bottom quintile. Family income is the average family income over the period when the child is between 15 and 19 (between 16 and 20 for the 1974 cohort). We rank children relative to all other children in their birth cohort. We rank parents relative to all other parents of children in the same birth cohort.

4.2 Explaining the Income Gap with Childhood Environment

To understand what drives the differences in income that we observe between immigrant and native children, we estimate regressions of the following type:

$$y_{ic} = \alpha + \beta_p y_{ip} + \beta_{im} immigrant_i + \beta_{imp} immigrant_i \times y_{ip} + \gamma X_i + \varepsilon_i \quad (1)$$

where y_{ic} is the child's income rank at age 30, y_{ip} is the family income rank, $immigrant_i$ is a dummy that indicates immigrant status and X_i is a vector of controls. We are interested in the intergenerational gap in income at a given parental income rank \bar{p} and how it changes with X_i . The gap is given by $\beta_{im} + \beta_{imp}\bar{p}$.

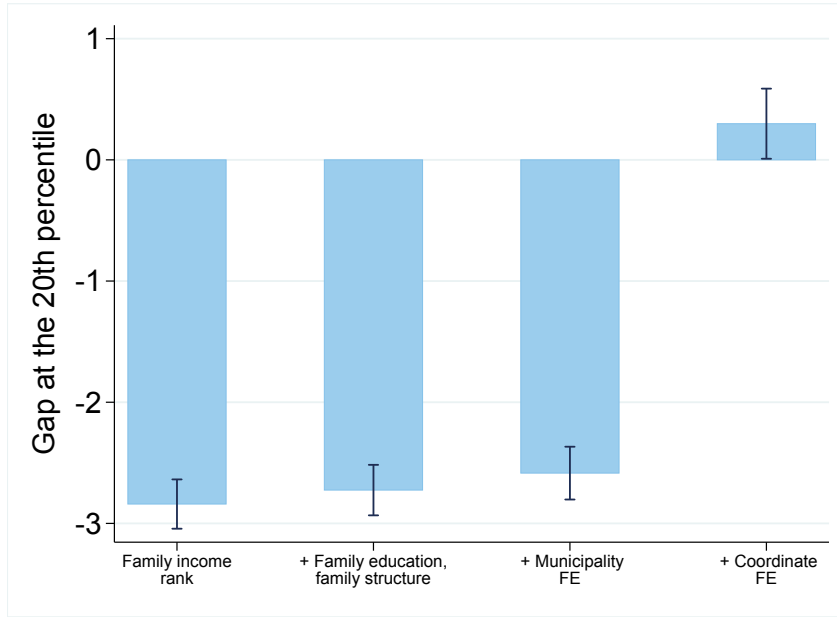
We plot the predicted gap for children born in families at the 20th percentile in Figure 4. The first group of bars in each panel shows the immigrant-native gap, conditional on family income rank. Family education, defined as above, and family structure, given by the number of siblings, and a dummy for whether both parents are in the register, do not significantly alter the gap.

We next check how controlling for childhood municipality affects the income gap. The results change little with the addition of this variable. However, when we instead narrow in and define location at the neighborhood level, we see the gap disappear. Controlling for the immediate neighborhood in which a child grows up not only erases the gap between

immigrant and native children, it reveals that immigrants fare better, on average, than natives who grow up in the same environment.

The gap at the 20th percentile, as shown in Figure 4, is measured in percentage points. Since both the immigrant and native children start at the same family income and native children achieve an income percentile rank of about 45 in adulthood (Figure 3), the 3 percentage point gap we see is equivalent to about a $3/(45-20) = 12\%$ difference in income growth. Differences in the immediate surroundings of low-income immigrant and native children during childhood in Sweden explain this difference in income growth.

Figure 4: Predicted Income Gap in Adulthood for Children Born at the 20th Percentile



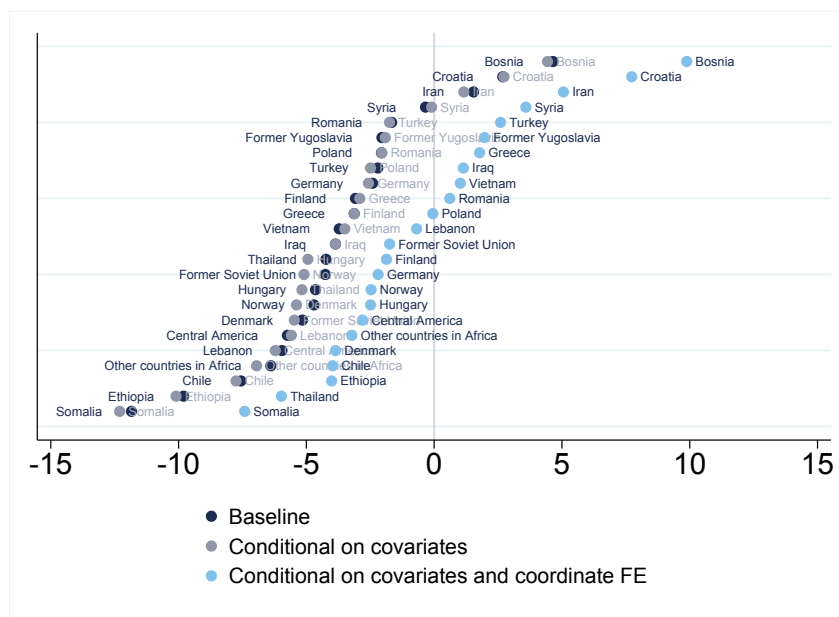
Notes: The gap at the 20th percentile is measured as the percentage point difference between immigrant and native child income ranks in adulthood. Only children whose parents earn at the 20th income percentile are included in the analyses. Each estimate is produced using the specification in Equation 1. The first column includes no controls aside from family income rank. The second column includes controls for family education and family structure, where family structure is the number of siblings a child has. The third column also includes a fixed effect for the Swedish municipality in which the child resides between the ages of 6 and 16. The fourth column adds a fixed effect for the 100×100 square meter area of residence for the child when he or she is between the ages of 6 and 16. Standard error bars on the gap estimates are reported in each column.

Previous work shows there are significant differences in how well children of immigrants from different countries do in adulthood (e.g., Hammarstedt and Palme, 2012). Since the gap we report in Figure 4 is an average, we dig deeper into these country-level differences in Figure 5.

We focus on countries of origin that correspond to at least 500 immigrant children in our sample, to make sure that our country-level analyses are not driven by outliers. We run equation 1 for each country of origin separately, thus comparing immigrants from each country of origin to natives.

The black dots in Figure 5 report the gaps in income at the 20th percentile, just as in Figure 4, but now for each country of origin. The figure reveals substantial differences across countries, with immigrant children from Bosnia and Iran doing up to 5 percentage points better than native children, while immigrant children from Ethiopia and Somalia do worse in adulthood by 10 or more percentage points. As before, controlling for family education levels, family structure, and childhood municipality (grey dots) does little to explain these gaps. Coordinate fixed effects, however, move the needle substantially. As the light blue dots illustrate, immigrant children from Poland, Romania, Vietnam, Iraq, the Former Yugoslavia, Iran, Syria, and Bosnia would all be earning more in adulthood than their native counterparts if they had grown up in the same 100 × 100 - meter areas.¹³ More than half of the gap for immigrant children from Somalia and Ethiopia would be erased as well.

Figure 5: Predicted Income Gap in Adulthood for Children Born at the 20th Percentile, by Country of Origin



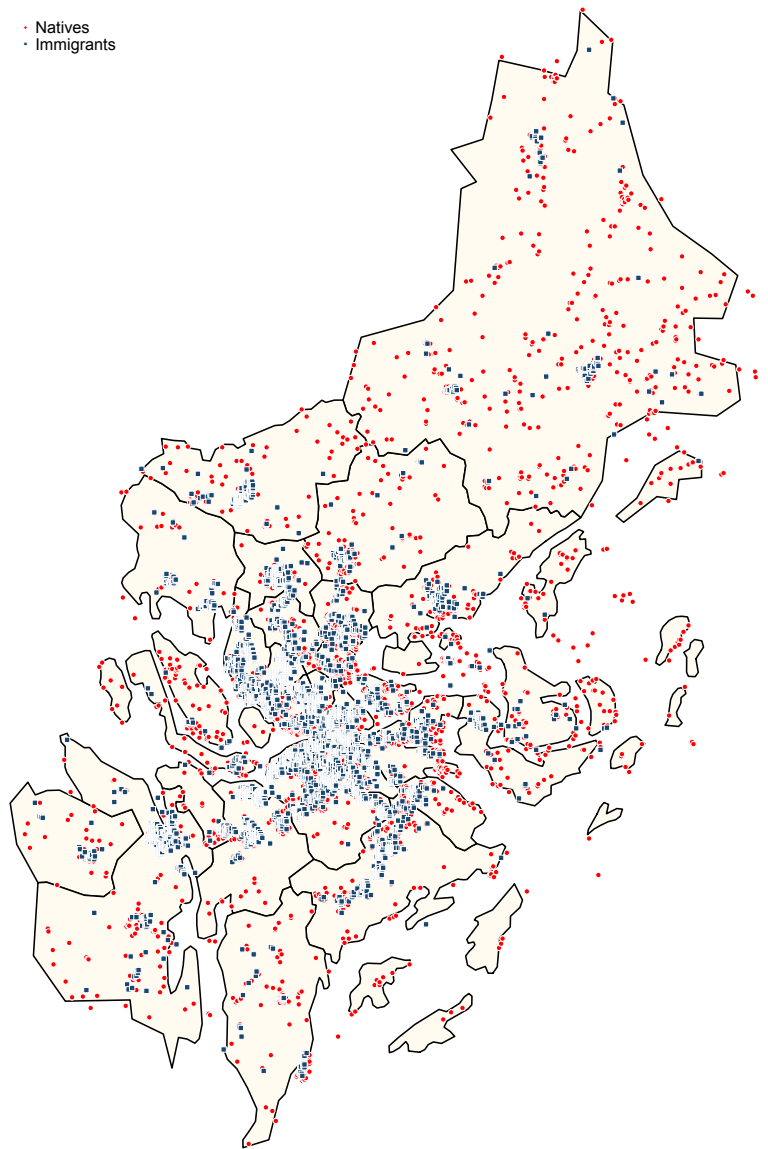
Notes: The gap at the 20th percentile is measured as the percentage point difference between immigrant and native child income ranks in adulthood. Only children whose parents earn at the 20th income percentile are included in the analyses. Each estimate is produced using the specification in Equation 1, but limiting the sample to native children and immigrant children from each country of origin. The black dots report gap estimates made using the specification of Equation 1 without any controls. The grey dots include controls for family education and family structure, where family structure is the number of siblings a child has. The light blue dots also include a fixed effect for the 100 × 100 square meter area of residence for the child when he or she is between the ages of 6 and 10.

¹³Immigrants from Former Yugoslavia are those who immigrated to Sweden before the country dissolved in 1992. Immigrants from Bosnia are those who immigrated after Yugoslavia dissolved.

4.3 How Do Childhood Environments for Low-Income Immigrants & Natives Differ?

We now turn to an investigation of how the childhood neighborhoods of low-income immigrant children differ from the areas where low-income native children grow up. Figure 6, by way of example, zooms into Stockholm County, Sweden's most populous county. 29.9% of low-income immigrant children and 11% of low-income native children in our sample grow up in Stockholm County, so this figure is visualizing a sizable share of our data. Each dot on the map represents the location where a low-income child spent most of his or her time between the ages of 6 and 16.

Figure 6: Where Low-Income Children Reside, Stockholm County



Note: Each dot represents the location where a low-income child lived the longest between the ages of 6 and 16. Blue dots represent immigrant children and red dots represent native children. Low-income is defined as having parents whose income is in the bottom quintile of the Swedish income distribution.

While low-income native children are spread out widely across the county, low-income immigrant children are heavily clustered.¹⁴ This suggests that low-income native families are more likely to be surrounded by higher income families, whereas areas where low-income immigrants reside have a higher concentration of low-income residents.

Looking at a range of descriptive statistics across immigrant and native places of residence confirms that these areas are significantly different. For this analysis, we focus on children who do not move during the ages of 6 to 16 and characterize their childhood neighborhood along the following dimensions: share of native residents, share of high-earning residents (defined as individuals earning above the municipality median income), share of highly-educated residents (defined as those with a college or above degree), and population density.

Table 2: Differences in Low-Income Immigrant and Native Neighborhoods

	Natives	High-earners	Highly-educated	Density
Panel A: Stayers				
Natives	0.787	0.504	0.139	55.850
Immigrants	0.529	0.441	0.143	175.640
<i>t</i> -statistic	189.896	43.110	-3.475	-140.308
Panel B: Movers: origin				
Natives	0.752	0.488	0.152	89.568
Immigrants	0.488	0.367	0.141	171.546
<i>t</i> -statistic	126.376	65.818	7.686	-59.137
Panel C: Movers: destination				
Natives	0.767	0.479	0.159	82.541
Immigrants	0.521	0.404	0.161	176.463
<i>t</i> -statistic	126.385	40.076	-1.706	-65.805

*Notes: Panel A shows neighborhood-level characteristics for those that never move from the neighborhood (as measured by 100×100 m coordinates) where they lived at age 6. Panel B shows origin neighborhood-level characteristics for those that move once between the ages of 6 and 16 (measured the year before the move). Panel C shows destination neighborhood-level characteristics for those that move once between the ages of 6 and 16 (measured the year after the move). Natives column shows the share of residents in the neighborhood who are native-born. High-earners column shows the share of residents who earn more than the median Swede. Highly-educated column shows the share of residents who have a college or above level of education. Density shows the average number people living in the neighborhood. *t*-statistic rows report the *t*-statistic from a test of differences of means.*

Panel A in Table 2 reports these descriptive characteristics of the low-income native and immigrant areas, limiting the sample to only those children who do not move between the ages of 6 and 16. 78.7% of the neighbors of low-income native children are native-born themselves. Only 52.9% of the neighbors of low-income immigrant children are

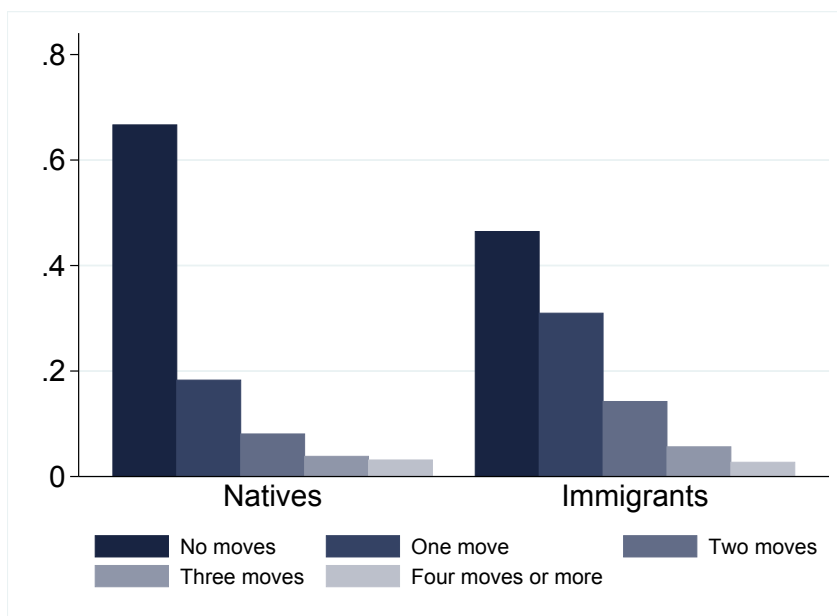
¹⁴Some location dots appear to be “off the map” because the little islands on which those children live are too small to be rendered. Close to 24,000 islands make up the Stockholm Archipelago.

native-born. Immigrant children are also 6 percentage points less likely to have a high-earning neighbor and to live in areas that are more than 3 times as dense as areas where native children live. Both groups of children live in areas where the percentage of college educated neighbors is fairly low, at about 14%, though immigrant children are slightly more likely (14.3%) to have a college educated neighbor than native children (13.9%).

Figure 6 and Table 2 echo what we know about the housing market in Sweden. Immigrant families have relied heavily on large apartment buildings of the kind constructed through the Million Homes Programme for housing. These have led to the emergence of immigrant neighborhoods and to high population density which, as the housing shortage has worsened, has grown into overcrowding (Scanlon et al., 2014). While the exact mechanism through which high population density and lower shares of native and high-earning neighbors could be connected to the intergenerational mobility gap is not clear, these neighborhood differences offer useful clues.

Panel B in Table 2 presents characteristics of the neighborhoods that immigrant and native families leave, while Panel C presents characteristics of the destination neighborhoods. These neighborhoods are similar to those where the stayers live, with a few exceptions. There are fewer high-earners and fewer native residents in areas which low-income residents, especially immigrants, leave. The destination areas have more high-earners and native residents, but gaps between the areas where low-income immigrants and natives live persist even for the movers.

Figure 7: Distribution of Number of Times Low-Income Child Moves Neighborhoods

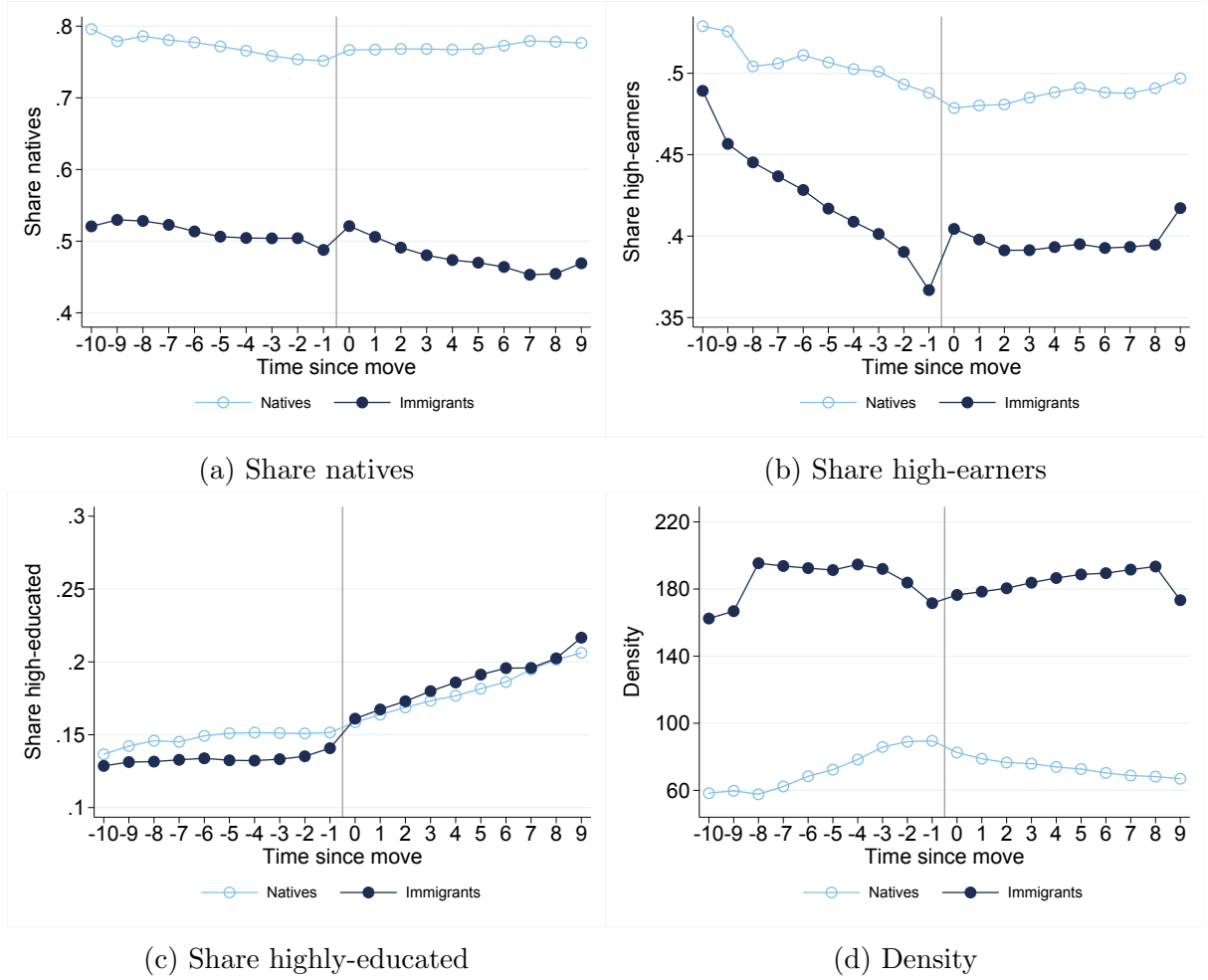


Notes: Moves are counted when children are between the ages of 6 and 16. Y-axis shows the share of native and immigrant children who move a particular number of times.

Figure 7 plots the share of low-income natives and immigrants that either do not

move or move at least once throughout their childhood (ages 6 to 16). More than 60% of natives never move throughout this time period, compared to 40% of immigrants. This can likely be explained by the fact that low-income natives are more likely to be home owners rather than renters: 18.3% of them rent public housing, compared to 48.7% of low-income immigrants.¹⁵

Figure 8: Neighborhood Characteristics of Low-Income Children Who Move Once



Notes: Analysis focuses on children who move once between the ages of 6 and 16. X-axis shows the number of years since the move. Y-axis in panels a), b), and c) shows shares in the origin and destination neighborhoods, while the y-axis in panel d) shows the number of people in the origin and destination neighborhoods.

Figure 8 focuses on children who move once between the ages of 6 and 16 to capture neighborhood characteristics in event study form. We see that neighborhoods that immigrants and natives leave are those that experience significant declines in the share of high-earners prior to the move. This is especially true for immigrant movers. The desti-

¹⁵These numbers are calculated as the modal housing tenure type during the 6-16 age range. We do not have data on housing tenure type for years 1991-1994, so we do not use the same number of observations for all cohorts to calculate these statistics. We also, thus, do not observe all cohorts at all ages of the 6-16 age range in the housing tenure type data.

nation neighborhoods are those that appear to stabilize the decline in share high-earners, but at lower levels than the origin neighborhoods were experiencing several years prior to the move. Destination neighborhoods are also notable for their increasing share of highly-educated residents, both for immigrants and for natives.¹⁶

We measure two additional dimensions that we think are important to understanding how childhood environment can affect income later in life: general neighborhood desirability and the quality of neighborhood schools. The length of the housing queue in a neighborhood can capture its desirability, as well as the level of difficulty of moving into that area. The longer the queue—the more desirable the area and the harder it is to move into it—the more important the initial housing endowment could be for a child’s later life outcomes. If the initial housing endowment of new arrivals into the country is worse than that of low-income natives, this could explain the intergenerational mobility gap. If school quality is a dimension along which low-income natives live in better areas, higher human capital acquisition through this channel could be a direct reason for the intergenerational mobility gap.

We calculate the queue wait time for each housing unit u in the following way:

$$wait_time_u = queue_start_date_u - end_date_ad_u$$

Then, to get at a measure of wait time that takes into account unit characteristics and time effects, we run the following regression:

$$\ln(wait_time)_{uct} = \lambda_u + \lambda_c + \lambda_t + \varepsilon_{uct} \quad (2)$$

where λ_u are unit characteristic fixed effects (number of rooms-by-area-by-floor-by-new construction), λ_c are coordinate fixed effects, and λ_t are time dummies. We thus have a measure of unit desirability out of which we want to derive a measure of neighborhood desirability. Using our matching algorithm, we link the Stockholm County housing queue data with the neighborhood data. Then, we use the empirical distribution of the λ_c coordinate fixed effects to construct an average measure of area desirability at the neighborhood level: we take the average of the λ_c ’s over all the points in the housing queue data that are matched to each 100×100 - square meter box. For comparison, we also construct a more basic measure that is simply the average wait time (in days) over all the points in the housing queue data that match to each neighborhood.

Finally, we merge the neighborhood-level measure to the individual-level data, and obtain a dataset of natives and immigrants, their own and their parents’ characteristics,

¹⁶Figure 8 is based on an unbalanced sample, due to the fact that we observe individuals in different cohorts for different amounts of time during the 6-16 age window. Balancing the sample so that we have, for example, three pre- and post-move observations entails dropping a significant number of observations. Nonetheless, when we do that, the results are very similar. They are available upon request.

their locations in childhood, and a measure of how desirable those locations are. We are able to match 16,319 immigrants and 22,188 natives.

Table 3 reports differences in native and immigrant neighborhood quality using housing queue data. Panel A focuses on neighborhoods where those children who never move between the ages of 6 and 16 live, Panel B shows the characteristics of the origin neighborhoods for the movers, and Panel C shows the characteristics of the destination neighborhoods for the movers. The first column shows the average wait times, in days, for an apartment in the neighborhood while the second column shows the neighborhood fixed effect in the log wait time regression above.

Low-income native neighborhoods have wait times that are about two years longer for an apartment, on average, than low-income immigrant neighborhoods, reflecting their higher desirability. This pattern also comes through when we look at the fixed effects, which condition on year and a range of apartment characteristics. Differences persist when we focus on the movers and the desirability of origin and destination neighborhoods looks similar. Movers thus do not move to neighborhoods that are significantly better along the housing desirability dimension.

Table 3: Differences in Housing Quality, Native vs. Immigrant Neighborhoods

	Queue wait time	Obs.	Neighborhood fixed effects	Obs.
Panel A: Stayers				
Natives	3,054.246	2,728	0.123	2,346
Immigrants	2,284.834	5,785	-0.199	5,336
<i>t</i> -statistic	22.867		25.050	
Panel B: Movers: origin				
Natives	2,716.779	587	0.065	522
Immigrants	2,134.615	2,077	-0.222	1,981
<i>t</i> -statistic	10.215		12.528	
Panel C: Movers: destination				
Natives	3,010.222	588	0.135	523
Immigrants	2,194.226	2,084	-0.192	1,968
<i>t</i> -statistic	13.923		13.451	

*Notes: Panel A shows neighborhood quality statistics for those children that never move from the neighborhood (as measured by 100×100 m coordinates) where they live at age 6. Panel B shows origin neighborhood-level statistics for those that move once between the ages of 6 and 16 (measured the year before the move). Panel C shows destination neighborhood-level statistics for those that move once between the ages of 6 and 16 (measured the year after the move). Housing queue wait times are reported in days in the first column and neighborhood fixed effects, derived from an estimation that conditions on apartment characteristics, are reported in the second column. *T*-statistics of *t*-tests of mean differences are also reported.*

Lastly, we analyze differences in low-income immigrant and native neighborhoods by studying school quality. To do so, we use school value-added residuals for schools in Stockholm County, as made publicly available through the SALSA database. Table 4

reports the results. Although low-income immigrant children appear to live near schools that are worse than those near low-income native children, the difference is generally not statistically significant. For the stayers, the GPA value-added of the native neighborhood schools is statistically significantly higher than of the immigrant neighborhood schools. Differences in school quality, in the way that they can generate differences in human capital acquisition and income in adulthood, can thus plausibly be behind the 12% gap in income growth between low-income immigrant and native children.

Table 4: Differences in School Quality, Native vs. Immigrant Neighborhoods

	Average GPA residual	Share passed residual	Observations
Panel A: Stayers			
Natives	6.440	-0.533	1,343
Immigrants	4.226	-0.765	2,505
<i>t</i> -statistic	4.025	0.876	
Panel B: Movers: origin			
Natives	5.908	-1.483	136
Immigrants	5.134	-0.551	461
<i>t</i> -statistic	0.473	-1.181	
Panel C: Movers: destination			
Natives	6.664	-0.314	136
Immigrants	4.886	-0.795	461
<i>t</i> -statistic	1.077	0.628	

*Notes: Panel A shows school quality statistics for those that never move from the neighborhood (as measured by 100×100 m coordinates) where they live at age 6. Panel B shows origin neighborhood-level school quality statistics for those that move once between the ages of 6 and 16 (measured the year before the move). Panel C shows destination neighborhood-level school quality statistics for those that move once between the ages of 6 and 16 (measured the year after the move). Grade value is the residual between a school's grade value and the SALSA model-predicted grade value. Share passing Grade 9 is the residual between a school's share of students passing Grade 9 and the share predicted by the SALSA model. Table reports average residuals for each group of low-income children, as well as the *t*-statistics of a *t*-test of mean differences.*

5 Conclusion

We study the intergenerational mobility of low-income native and immigrant children using several different sources of Swedish administrative data. By focusing on low-income families, we investigate a specific concern often voiced in public debates on immigration: namely, whether low-income immigrants remain stuck in their economic conditions or whether they progress over generations up the economic ladder.

We find that immigrant children who grow up in the 20th income percentile have incomes in adulthood that are about 12% lower than those of native children of similarly low-income parents. We cannot explain this income gap with differences in native and

immigrant families through parent education levels, family structure, or municipality of residence. The gap can, however, be explained by differences in immediate, 100×100 square meter neighborhoods. We present evidence that low-income immigrant children generally grow up in less desirable, denser neighborhoods, with fewer high-earning and native-born neighbors and with worse schools. When we compare low-income immigrant and native children with similar family structures and educational backgrounds who grow up in the same neighborhoods, however, we see the immigrant children with slightly better economic outcomes in adulthood.

Given how little control immigrants have over their initial housing choices in Sweden's highly constrained market, our leading hypothesis for why we see low-income immigrant and native children generally living in different environments is housing. Other forces could be at play, but the fact that low-income immigrant families are more likely to move than native ones suggests that they are less content with their existing living environment. Improved urban planning and service provision to low-income immigrant neighborhoods is thus likely to help, along with housing market reforms that increase housing supply in more desirable neighborhoods. In general, any urban policies that limit mobility and neighborhood access are likely creating impediments to intergenerational mobility.

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A Appendix

A.1 Linking Stockholm Housing Queue Data to Register Data

We start with 121,516 observations. We drop 1,255 observations which correspond to ads for apartments located in Knivsta and Uppsala municipalities, which are not part of Stockholm County. We drop the 30,564 observations that correspond to apartments for special groups (e.g., students or the elderly), 133 observations that have missing information for the end date of the ad, and 7 observations for which the wait time is negative (likely due to data entry error). The data were scraped in May of 2018 and at that time data before 2000 and after 2017 were incomplete, so we limit our sample to observations between 2000 and 2017. 2,016 observations do not have coordinates, so we do the geo-coding ourselves using the addresses provided and R's ggmap package. Our final sample has 88,372 observations.

The coordinates in the Stockholm housing queue data are for a given building. The register data contain coordinates for centroids of 100×100 square meter boxes. We therefore first reconstruct the boxes starting from the centroids, then use an algorithm that checks which points from the Stockholm housing data intersect with these boxes. Note that intersection here means either being contained within the box, or touching the box (e.g., the residence lies on one edge of the box).

Using information on the queue start date and the end date of the ad, we can calculate wait times – the time spent in the queue for the person who ends up renting an apartment. We use the wait times that characterize apartments to characterize the 100×100 square meter boxes. We start with 88,372 apartments, which are located in 17,831 unique coordinates. We are able to match 10,955 of the 17,831 points to the 100×100 square meter boxes in the register data. Though a rare occurrence, multiple points can be matched to one single box (106 points are found in two boxes, and 1 point is found in three boxes). Not all boxes will contain points from the housing data. This may happen if, for example, the Stockholm neighborhood is in an area where single-family homes predominate, as these tend to be exclusively owner-occupied.

A.2 Linking Salsa School Quality Data to Register Data

We first geo-code the sample of 336 schools using Google's API, manually check inconsistencies, and impute coordinates for two schools that the API cannot geo-code. We then attempt, as with housing data, to match schools to 100×100 square meter boxes that identify childhood neighborhoods. However, doing so allows us to match only 62 coordinates (of the 336 unique ones) to register boxes. We posit that this is likely because schools are located some distance away from purely residential areas. We thus allow the box we recreate to have a 250 meter radius, instead of a 50 meter radius. We are then

able to match 302 unique school locations to at least one register box. Overall, we have 2,866 school location-register box pairs, since some school locations are in multiple boxes and some boxes are matched to multiple schools.

For each 100×100 square meter box, we calculate average school quality by taking the mean of the (1) grade value residual and (2) share passing Grade 9 residual.