Sibling Correlations and Intergenerational Mobility across Immigrant Groups

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Abstract

We study immigrant assimilation in terms of earnings dynamics and patterns of intergenerational transmission in permanent earnings by immigrant generation and neighborhood segregation levels. We estimate comparable sibling correlations across native and immigrant groups, but these seem to be explained by different factors. As immigrants assimilate, their intergenerational transmission mechanisms also become similar to natives. However, less assimilated immigrants experience weaker earnings transmission, a higher persistence of neighborhood effects, and a slower assimilation trajectory.

Keywords: Immigrant assimilation; Sibling correlation; Intergenerational transmission; Segregation.
JEL codes: J15; J61; J62.

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1 Introduction

Upon arrival in a host country, immigrants typically experience worse economic performance than natives. They often work in low-skill, low-income jobs, reside in socioeconomically or ethnically segregated neighborhoods, and come across learning and language difficulties. These disadvantages tend to be passed upon their offspring (Borjas, 1993; Dustmann, 2008; Liebig & Widmaier, 2009; Algan et al., 2010). Given the substantial and growing proportion of immigrants in many countries, their contribution to the host economy, and the potential challenges they face, it is critical to understand what drives the immigrant-natives gap and its persistence across generations. This is especially important when designing immigration policies that aim at fostering immigrant assimilation in the host country.

The degree of association between the social status of different members of the same household has been extensively used in the literature to investigate the role of family background in the distribution of social and economic outcomes. Following the seminal contribution of Becker & Tomes (1976, 1979), significant attention has been devoted to the analysis of vertical relations. This entails investigating the transmission of social status from parents to offspring, commonly referred to as intergenerational correlation (IGC).

At the same time, several authors have looked at horizontal relationships and, in particular, at sibling correlations. A relevant feature of sibling correlation in income is that, either through its decomposition or estimating it jointly with parental income, it permits to estimate the importance of the intergenerational transmission of permanent income separately from other factors that siblings share but are orthogonal to parental income. Sibling correlation is often described as an omnibus measure of family background (e.g., parental resources, aspirations, and cultural inheritance) and community effects, such as school quality, sibling interactions, and neighborhood and network influences (Björklund et al., 2002; Mazumder, 2011; Jäntti & Jenkins, 2015). The idea is that if family and community background have little effect on economic outcomes, siblings will exhibit roughly the same resemblance as would a randomly drawn pair of individuals from the same birth cohort (Solon, 1999). Thus, if inequalities across groups exist, measuring sibling correlation can help to identify the extent to which these inequalities are perpetuated by differences in family and community characteristics (Solon et al., 1991; Björklund et al., 2004; Jäntti & Jenkins, 2015; Björklund & Jäntti, 2020).

We exploit this approach to study the earnings dynamics and the degree of intergenerational persistence for immigrants. Specifically, we seek to address the following questions: do immigrants exhibit similar levels of sibling correlation to natives, and is their degree of intergenerational mobility comparable? And do patterns of intergenerational transmission evolve across generations? Our results suggest that sibling correlations are similar across groups but this is due to heterogeneous patterns of intergenerational transmission across immigrant groups and across generations, which implies the existence of different assimilation dynamics.

Models estimating the importance of family background typically assume that the intergenerational transmission process is homogeneous across families (e.g., Solon et al., 1991; Björklund et al., 2002, 2009; Levine & Mazumder, 2007; Mazumder, 2008; Björklund et al., 2010). These studies usually find higher levels of sibling correlation in the United States (namely, 0.40–0.50) compared to European Nordic countries (ranging from 0.14 to 0.26), and that family background has limited weight on the sibling correlation. For instance, Björklund & Jäntti (2009) estimate that the intergenerational component accounts for only 6% of the sibling correlation in Denmark. By relaxing such assumption and formalising a heterogeneous intergenerational transmission process, Bingley & Cappellari (2019) recently showed that the role of family background may be more significant than previous studies indicate. Using Danish administrative data, they found a sibling correlation of 0.22, which originates mostly from the intergenerational transmission process (72%).

The use of a more general model, which relaxes the assumption that the intergenerational factor of the sibling effect is not a fixed proportion but varies across families, may better suit immigrant assimilation processes, given the documented role of family-specific factors in intergenerational persistence such as parental age at migration (Bleakley & Chin, 2008), interethnic marriages (van Ours & Veenman, 2010), intention to return to the country of origin (Dustmann, 2008), etc. In addition, ethnic capital might play a role in the persistence of inequalities across multiple generations (Borjas, 1992; Gang & Zimmermann, 2000). In particular, differences in average earnings between groups may persist over several generations because the performance of the offspring will also depend on source-country characteristics (Borjas, 1993). Moreover, the results by Bingley & Cappellari (2019) may imply that some immigrants may take longer to assimilate, as intergenerational mobility may be lower than what is typically believed in the literature.

In this paper, we exploit full-population Dutch administrative data across three generations to estimate sibling correlations in permanent income and to understand the relative weight of the intergenerational and the residual components in the sibling correlation in permanent earnings across different ethnic sub-groups. Our analysis relies on a model assuming a heterogeneous intergenerational income transmission process (Bingley & Cappellari, 2019; Bingley et al., 2021), but we also provide results based on a model assuming homogeneity across families (Solon et al., 1991; Björklund et al., 2010). We then examine differences across immigration cohorts to study whether these change over time depending on the immigrant generation and explore heterogeneities based on income and ethnic segregation in the area of residence.

We consider the native Dutch population and the three largest immigrant groups in the Netherlands, namely, those arriving from or having ancestors in: (*i*) European (EU-15) countries; (*ii*) the former Dutch colonies (Indonesia, Suriname, and the Antilles); (*iii*) Turkey and Morocco.[1] While each of these groups accounts for roughly 5% of the current Dutch population,

[1] EU-15 countries are Belgium, Denmark, Germany, Finland, France, Greece, Ireland, Italy, Luxembourg, Austria, Portugal, Spain, the United Kingdom and Sweden. Turkey and Morocco are source countries of a substantial population of guest workers in the Netherlands.

they differ substantially in terms of immigration history and assimilation process.

We estimate comparable levels of sibling correlation across ethnic groups (0.298–0.315). Moreover, with respect to Dutch natives, immigrants of European and former-colonies origin seem to exhibit a higher degree of intergenerational transmission, while for immigrants from Turkey and Morocco this only accounts for half of the sibling correlation. We find a similar pattern when estimating IGC: while IGC of natives is 0.225, IGC of immigrants from Turkey and Morocco is only 0.163, and IGC of other immigrant groups ranges between 0.250 and 0.232.[2]

Next, we estimate sibling correlation by ethnic group and immigration generation separately, to understand whether the intergenerational transmission mechanism changes across generations, as immigrants become more assimilated to the host country. Indeed, the sibling correlation of first-generation immigrants is slightly lower than natives. Second-generation immigrants, on the other hand, align to natives. As for the role of parental income, we observe lower parental earnings transmission for all first-generation immigrant sub-groups. This gap, however, disappears when second-generation immigrants are compared to Dutch natives, with the sole exception of immigrants from Turkey and Morocco.

Our results provide evidence of an assimilation process in the intergenerational transmission mechanism of immigrants but also highlight the existence of stark heterogeneities across immigrant groups. Thus, we further investigate potential channels to understand whether sibling correlations and the role played by the family component differ across community-specific characteristics. We exploit the richness of our data and compute measures of income and ethnic segregation based on the approach by Chetty et al. (2014) using information about the neighborhood of the parental household when the siblings were growing up. Our evidence implies that the relative importance of the parental component of the income transmission process and the immigrant assimilation dynamics are related to neighborhood characteristics like the degree of income and ethnic segregation. We observe that immigrants whose persistence of neighborhood status across generations is more pronounced follow a slower assimilation trajectory. For them, parental transmission no longer dominates in explaining sibling correlations in earnings, and this occurs especially at high levels of segregation.

With this paper, we show the existence of heterogeneous patterns in the intergenerational transmission of permanent earnings across immigrants. To our knowledge, the only analysis using sibling correlation in the context of the immigrant sub-population is the one by Schnitzlein (2012), which relies on the homogeneity assumption and finds an average sibling correlation of 0.26 among second-generation immigrants in Denmark and of 0.17 among Danish natives. We extend our contribution to analysing sibling correlations following the recent approach by Bingley & Cappellari (2019) and estimate the importance of the intergenerational factors in sibling correlations. We also add to the literature by looking into heterogeneities across immigrant generations and area-specific ethnic and income segregation levels.

[2] Sibling correlations are slightly larger than those estimated by Bingley & Cappellari (2019) in Denmark, but the share explained by parental income is in line with their estimates (between 50 and 90 percent).

The remainder of this paper is structured as follows. In Section 2 we briefly discuss the theoretical models in the literature. In Section 3 we describe the recent immigration history of the Netherlands and the data used in the analysis. Section 4 presents the main results, while Section 5 reports heterogeneous results by immigrant generation and across neighborhood-specific characteristics. Section 6 concludes.

2 Intergenerational transmission processes

Sibling correlations capture the influence of factors that siblings share in their socio-economic status (most often their earnings). These influences originate both from intergenerational factors and other components orthogonal to them. Models of sibling correlations assume log earnings in deviation from the mean (w) at time t for individual i in family j as the sum of a permanent component (y) and an orthogonal, white noise, transitory shock (v):

$$w_{ijt} = y_{ij} + v_{ijt}, \quad v_{ijt} \sim N(0, \sigma_v^2) \tag{1}$$

The permanent component is then divided into two parts: f_j represents the component shared by the siblings and a_{ij} captures the individual-specific deviation from f_j (i.e. a component unique to the individual i):

$$y_{ij} = a_{ij} + f_j, \quad a_{ij} \sim N(0, \sigma_a^2), \quad f_j \sim N(0, \sigma_f^2) \tag{2}$$

Given that the family component f_j and the individual-specific component a_{ij} are orthogonal, in the long run the income variance is the sum of their variances (Solon et al., 1991). Therefore, the sibling correlation can be explained as:

$$r_S = \frac{\sigma_f^2}{\sigma_f^2 + \sigma_a^2}. \tag{3}$$

Here, r_S can be thought of as a comprehensive measure of family background and community effects (Björklund et al., 2002; Mazumder, 2011; Jäntti & Jenkins, 2015). It contains intergenerational components, such as parental income, cultural inheritance, and parental-driven community effects, as well as individual-specific components, e.g., genetic traits not shared by the siblings, time-specific community effects, and differences in parental involvement in the offspring's education. Not all family and community effects are captured by the sibling correlations. Indeed, all factors not shared by the sibling, such as changes across time in school and neighborhood quality, differences in parental involvement in the offspring's education, and idiosyncratic genetic traits are not captured by sibling correlations. Thus, sibling correlations may underestimate the importance of family background and community effect (Björklund & Jäntti, 2020).

Estimating the degree to which r_S is driven by intergenerational components does not only help to understand the channels behind between-family differences but also the role of other factors such as neighborhood and network effects (Benabou, 1994; Durlauf, 1994; Chetty et al., 2014; Chetty & Hendren, 2018a). The intergenerational component is usually estimated either through ANOVA (Solon et al., 1991; Björklund et al., 2002), generalized method of moments (Björklund et al., 2009) or mixed models via restricted maximum likelihood (Levine & Mazumder, 2007; Mazumder, 2008; Björklund et al., 2010).

These models have different underlying assumptions in terms of stationarity and the form of the distribution of the unobserved components. However, they all suggest that parent-to-child transmission is not the main component of the sibling correlation, which is to say that r_S is mostly driven by factors that siblings share other than parental earnings.[3] Further, they all share the underlying idea that the intergenerational transmission process is homogeneous across families. Bingley & Cappellari (2019) relax such homogeneity assumption and argue that the role of the intergenerational component is much higher than what previous studies usually find. Using Danish administrative data, they estimate a sibling correlation of 0.22 and that this is largely explained by the intergenerational transmission process (by 72%). This is in contrast with previous studies, and in particular with the estimates for Denmark by Björklund & Jäntti (2009), where the intergenerational component accounts for only 6% of the sibling correlation.

As in Equation 1, the model of Bingley & Cappellari (2019) assumes that w_{ijt} consist of a permanent and a transitory component, which are orthogonal, such that $E(y_{ij} + v_{ijt}) = 0$. However, instead of assuming that the intergenerational component f_j is homogeneous across families, they allow it to vary across families, so that $f_j = \mu_j^I + \mu_j^R$, where μ_j^I is the family-specific intergenerational component and μ_j^R is the residual component capturing those attributes shared by the siblings which do not depend on fathers' earnings. Therefore, they write Equation 2 as:

$$
\begin{gathered}
y_{ij} = a_{ij} + \mu_j^I + +\mu_j^R, \quad \forall_i : m(i) = S_1, S_2, \\
a_{ij} \sim N(0, \sigma_{am}^2), \quad \mu_j^R \sim N(0, \sigma_{\mu R}^2), \quad \mu_j^I \sim N(0, \sigma_{\mu I}^2)
\end{gathered}
\tag{4}
$$

for the first-born (S_1) and second-born (S_2) sons and as:

$$
y_{ij} = a_{ij} + \mu_j^I, \quad a_{ij} \sim N(0, \sigma_{am}^2), \quad \forall_i : m(i) = F \tag{5}
$$

for the fathers, which do not have any residual sibling component μ_j^R. In both Equations 4 and 5, the variance component allows for family-member m specific distributions of the individual-specific components a_{ij}.

Modeling fathers' earnings jointly with the first- and second-born sons in a Generalized Method of Moments (GMM) system yields the identification of the variances of the shared components through the sibling and intergenerational covariances, which are $\sigma_{\mu I}^2 + \sigma_{\mu R}^2$ and $\sigma_{\mu I}^2$, respectively. This, in turn, yields a sibling correlation of:

[3] See Solon et al. (1991); Björklund et al. (2004) and Jäntti & Jenkins (2015) for a survey on the evidence on sibling correlations.

$$r_S = \frac{\sigma^2_{\mu I} + \sigma^2_{\mu R}}{\sigma^2_{\mu \overline{S}} + \sigma^2_{\mu I} + \sigma^2_{\mu R}} = r_I + r_R, \tag{6}$$

where $\sigma^2_{\mu \overline{S}}$ is the average variance of the sons-specific parameters; $r_I = \sigma^2_{\mu I} / (\sigma^2_{\mu \overline{S}} + \sigma^2_{\mu I} + \sigma^2_{\mu R})$ is the intergenerational components of r_S; and $r_R = \sigma^2_{\mu R} / (\sigma^2_{\mu \overline{S}} + \sigma^2_{\mu I} + \sigma^2_{\mu R})$ is the component of the sibling correlation which does not depend to fathers' earnings. The share of r_S which can be explained by fathers' earnings is therefore given by:

$$\frac{r_I}{r_S} = \frac{\sigma^2_{\mu I}}{\sigma^2_{\mu I} + \sigma^2_{\mu R}}. \tag{7}$$

The difference between the parameterisation of Bingley & Cappellari (2019) and those previously used in the literature is that in Equation 6 the intergenerational component is a linear term. Conversely, the sibling correlation in Equation 3 has usually been estimated as a linear function of the fathers' earnings (e.g., $f_j = \beta y^F_j + \mu^R_j$), which yields a decomposition of the sibling correlation as $r_S = \beta^2 + r_R$. In the latter, the intergenerational component enters quadratically independently of whether the model considers that transitory shocks are uncorrelated (e.g., Corcoran et al., 1990; Solon, 1999) or correlated (e.g., Björklund et al., 2009, 2010). Not surprisingly, Bingley & Cappellari (2019) show that even after relaxing the assumption behind the distribution of the unobserved components (as in, e.g., Levine & Mazumder, 2007; Björklund et al., 2010), the share of the brother correlation assigned to intergenerational factors remains (much) lower in the latter models than in their own.

Building on this, the implied intergenerational correlation (IGC) is defined as:

$$IGC = \frac{\sigma^2_{\mu I}}{\sqrt{\sigma^2_{\mu I} + \sigma^2_{aF}}\sqrt{\sigma^2_{\mu I} + \sigma^2_{\mu R} + 0.5\sigma^2_{aS1} + 0.5\sigma^2_{aS2}}}. \tag{8}$$

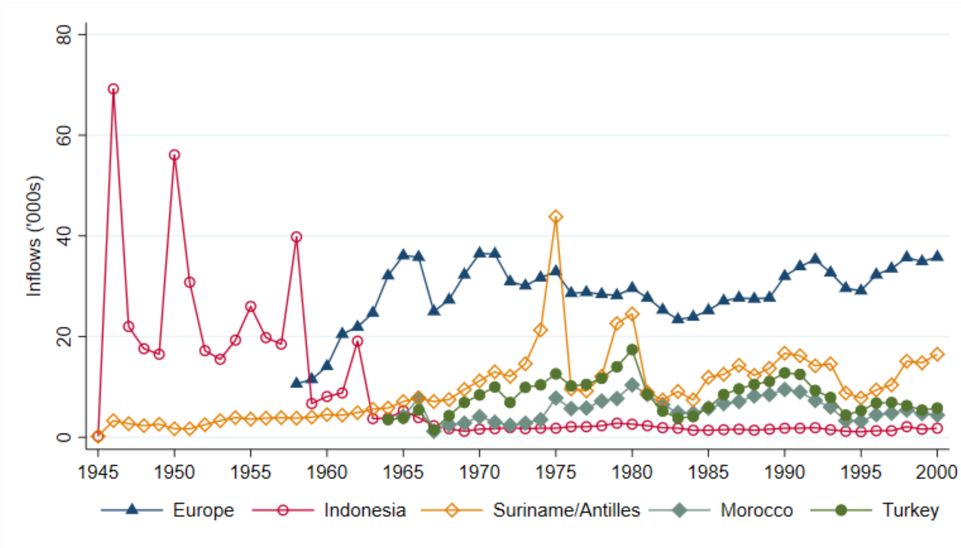
In our main analysis, we study sibling correlations by applying the GMM proposed by Bingley & Cappellari (2019), where transmission is assumed to be heterogeneous. However, we provide and discuss additional results obtained using a well-established model that assumes an intergenerational transmission process homogeneous across families and that is estimated using REstricted Maximum Likelihood (REML) (Levine & Mazumder, 2007; Mazumder, 2008; Björklund et al., 2010).

3 Context and data

3.1 Immigration in the Netherlands

After World War II, the Netherlands experienced three main different immigration waves (Figure 1). During the first wave (1945–1963), Dutch, Indonesian, Mollucans, and Dutch-Indo families emigrated from today's Indonesia to the Netherlands. The highest arrival peaks were registered

Figure 1: Immigration in the Netherlands: 1945–2000



Note: Number of immigrants (in '000s) arriving in the Netherlands, by country of origin and year of first arrival. Data from Statistics Netherlands (CBS).

in 1946, 1950, and the late 1950s, as a result of the struggling recognition of Indonesia's Independence in 1949 and the subsequent nationalisation of Dutch-owned firms. Yet, despite an influx of more than 300,000 people from Indonesia, the Netherlands recorded a negative immigration surplus of about 7,000 individuals per year during the 1945–1963 period.

It was only with the second immigration wave in the early 1960s that the Netherlands became a country of immigration. The continuous, sustained growth of the Dutch economy caused shortages in the labor market (especially in labor-intensive sectors such as textiles and mining), leading Dutch firms to recruit guest workers from Mediterranean countries.[4] Recruitment mainly targeted workers from Italy, Spain, and Portugal, but Turkey and Morocco rapidly became the largest source countries of guest workers. Even after official recruitment schemes were suspended following the 1973 oil crisis, immigrants from Turkey and Morocco continued settling in the Netherlands. New immigrants entered the country either illegally or through chain migration processes, such as formal family reunification or, in the case of second-generation youths, by marrying people residing in their country of origin (Van Meeteren et al., 2013).

The third wave started in the early 1970s and is linked to the Independence of Suriname (1975). Before that, almost all arrivals from Suriname consisted of elite youths who moved to the Netherlands for educational purposes. However, in the early 1970s, political and economic turmoil and ethnic strives pushed the African-Surinamese working class (Creoles) and the offspring of Indian indentured workers (Hindostanis) to leave the country and settle in the Netherlands.

[4] At first, recruitment and settlement processes were managed by private firms. However, the government soon got involved by setting up recruitment agencies and deals with several sending countries. In addition, up to 1973, undocumented immigrants (i.e. "spontaneous guest workers") were generally welcomed (Rath, 2009).

This was an exodus of about 150,000 people, a third of the then-Surinamese population.

Overall, immigrants from the former colonies and from Turkey and Morocco still represent the largest extra-EU immigration groups in the Netherlands. While the two groups are comparable in size, their settlement and assimilation processes in the Netherlands have been very different. Immigrants from former colonies were often accustomed to Dutch culture, law, educational and political systems, and language. This is particularly true for those arriving prior to or during the de-colonisation process. Conversely, immigrants from Turkey and Morocco arrived mainly as guest workers, with no initial plan to stay on a permanent basis. Thus, their social, linguistic, and cultural assimilation into Dutch society has been relatively slow.

As for immigration from other European countries, the Netherlands has attracted around 30,000 immigrants per year since the mid-1960s, although numbers have skyrocketed since the first enlargement of the European Union in 2004.

Against this background, our analysis considers separately individuals from a Dutch background, those having a migration history from European countries, from the former colonies (Indonesia and Suriname), and from Turkey and Morocco.

3.2 Data and sample selection

We use administrative data from the Dutch *Centraal Bureau voor de Statistiek* (CBS). CBS collects information on all individuals who reside or have resided, in the Netherlands. We use 2020 municipal population registers, which contain anonymised demographic information on all persons ever appearing in the municipal population registers starting 1 January 1995. By merging this information and those of the legal parents of each person appearing in the register, we recreate family lineages for the entire Dutch population up to their earliest available ancestors and identify the ethnic background of each family.[5]

We consider as *Dutch* those who have only Dutch-born ancestors up to the third generation (i.e. the grandparents). The others are divided into mutually exclusive categories depending on their place of birth or that of their ancestors. We define as *first generation* immigrants those who appear in the registers as born outside of the Netherlands and as *second generation* immigrants are those who are born in the Netherlands and have one or both parents who are born abroad. *EU-15* refers to all individuals who were born or have at least one among their parents or grandparents who were born in the European Union. *Ex-colonies* includes all individuals who have been born or have at least one among their parents or grandparents who were born, in one of the two largest Dutch former colonies: the Dutch East Indies (today's Indonesia) and Suriname. *Turkey–Morocco* includes all individuals who have been born or have at least one

[5] We use the wording *ethnic background* and not *place of birth* following the Dutch government official reporting, which distinguishes between *allochtonen* and *autochtonen*. *Allochtonen* are officially defined as persons who have at least one parent who was born outside the Netherlands. We exclude return migrants (i.e. foreign-born first-generation immigrants who have an all-Dutch lineage) and those whose legal parents change (usually due to divorce or adoption).

among their parents or grandparents who were born, in either Turkey or Morocco.[6]

In line with common practice in both the intergenerational mobility and earning dynamics literature, we focus on men and distinguish between three types of family members: fathers (F), first-born sons (S_1), and second-born sons (S_2). We consider women only when constructing family lineages.

We then pair individuals to their income information, which is available starting in 2003. Income microdata is collected from Dutch public administrations, of which the most important data provider is the Tax and Customs Administration. Our analysis is based on what CBS defines as gross personal income, which includes income from employment, income from own business, income insurance benefits as well as social security benefits. It excludes income from property, child-related transfers, and housing benefits.

Modeling intergenerational income dynamics can give rise to two related measurement issues. First, annual income data are a mixture of permanent and transitory components (Solon, 1992; Zimmerman, 1992). Thus, a reliable proxy of permanent earnings would require taking several annual observations. However, a second issue arises: in any given year, children and parents are at different points of their life cycle, which usually leads to an underestimation of the offspring's permanent income and overestimation of that of the parents (Haider & Solon, 2006; Nybom & Stuhler, 2016). We address these issues by selecting only individuals aged between 28 and 60 who have at least three consecutive non-missing income entries from 2003 to 2019.[7]

Finally, we match our sample to a set of characteristics at the neighborhood (*buurt*) and city (*gemeente*) level. CBS records the address spells of each individual appearing in their municipal population registers. To identify the location where individuals grew up, we search for their parents' most recurrent address between 1980 and 1995.[8] We then assign to each address a neighborhood and a municipality and compute a set of income and ethnic segregation indicators, which might impact the intergenerational transmission process (Chetty et al., 2014; Chetty & Hendren, 2018a).

With respect to ethnic segregation, we create a measure of segregation using a Theil (1972) Index as in Chetty et al. (2014), where the degree of racial segregation in each municipality is:

$$H^E = \sum_j \left[\frac{pop_j}{pop_{total}} \frac{E - E_j}{E} \right], \tag{9}$$

where pop_j is the population of neighborhood j, and pop_{total} is the total population of the

[6] If individuals have two or more non-Dutch ethnic backgrounds, the patrilineal lineage prevails. Individuals from other non-Dutch backgrounds are excluded from the sample. We also exclude cases where we cannot observe all grandparents and observable grandparents are all Dutch.

[7] As in the earnings dynamics and sibling correlations literature, we exclude zero earnings observations and assume that earnings are missing at random (Björklund & Jäntti, 2009; Bingley & Cappellari, 2019). As robustness, we also exclude from the sample those at the top and bottom percentiles of the national income distribution. Results are unchanged.

[8] Note that, on average, reference individuals in our sample are born in the early 1980s, and their fathers in 1953 (see Table 1).

municipality. E is an entropy index for the municipality and is computed as $E = \sum_r \phi_r \log \frac{1}{\phi_r}$. Here, ϕ_r denotes the share of individuals of ethnic origin r in the municipality.[9] Similarly, in $E_j = \sum_r \phi_{rj} \log \frac{1}{\phi_{rj}}$, ϕ_{rj} is the share of individuals of ethnic origin r in each neighborhood. Thus, H^E measures the degree to which the distribution of ethnic groups in each neighborhood deviates from that of the municipality.

We construct a similar indicator of income segregation H^I by using information on income for all residents in any given neighborhood. In this case, following Chetty et al. (2014), income segregation is computed with the index suggested by Reardon (2011):

$$H^I = 2\log(2) \sum_p E(p)H(p). \tag{10}$$

$E(p)$, the entropy index in each municipality, is defined as $E(p) = p\log(2)\frac{1}{p} + (1-p)\log(2)\frac{1}{1-p}$, with p being the p-th ventile of the income distribution. $H(p)$ is instead the Theil Index for the p-th ventile and is computed as in Equation 9. This index is a weighted average of segregation at each ventile p.

To capture poverty segregation, we also construct a Theil index H^P using Equation 9 in which ϕ and ϕ_j are the share of individuals (in the municipality and the neighborhood, respectively) with income below the 25th percentile. Finally, we also consider the neighborhood-level share of non-Dutch residents (ϕ_E) and of relatively poor individuals (i.e. those below the 25th percentile, ϕ_P).

For each of these measures we construct a dummy variable having value one ("High") when the relative indicator is in the top quartile of its own distribution, and zero ("Low") otherwise.

Our final sample consists of $532,711$ triads of fathers, first-born sons, and second-born sons. For each family member, we consider the log earnings in deviation from the group mean w (see Equation 1 in Section 2), where the group g is defined either in terms of ethnic background (Section 4), ethnic background and immigrant generation or ethnic background and other characteristics that are likely to impact the assimilation process, such as neighborhood-level ethnic or income segregation (Section 5).

3.3 Descriptive statistics

Table 1 reports the average year of birth, average gross income, and average number of years used to compute the permanent income for each member of the triads in our sample. The first column refers to the overall sample, the following columns refer to each ethnic group separately. Fathers on average are born in 1953 and have an income of just below 55,000 EUR. However, while fathers of Dutch descent earn a higher-than-average income, those originating from Turkey and Morocco tend to have a substantially lower income (around 27,000 EUR). A similar pattern, although

[9] Our definition of ethnic origin follows the four aforementioned groups: Dutch, EU-15, former colonies, and Turkish and Moroccan.

Table 1: Descriptive statistics on triads

	Fathers				
	Overall	Dutch	EU-15	Ex-col	Tur/Mor
Year of birth	1953	1953	1952	1953	1955
Gross income	54,915.29	57,948.77	55,906.26	55,685.63	27,017.74
Income observability	10	10	9	11	12
	First-born sons				
	Overall	Dutch	EU-15	Ex-col	Tur/Mor
Year of birth	1980	1980	1979	1981	1981
Gross income	47,528.70	49,850.06	47,856.70	43,264.95	34,872.20
Income observability	13	14	14	13	13
	Second-born sons				
	Overall	Dutch	EU-15	Ex-col	Tur/Mor
Year of birth	1984	1984	1983	1984	1985
Gross income	43,813.45	45,272.85	43,083.48	38,680.50	33,013.75
Income observability	11	11	12	11	10
N	532,711	313,525	24,462	28,018	20,582

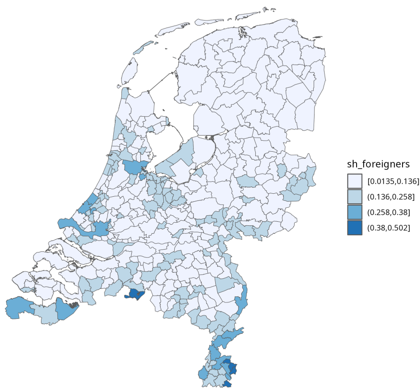
Note: The Table reports the average year of birth, average gross income, average number of years used to compute the permanent income for each member of the triads in our sample, and cell size, by ethnic origin.

with lower variability, is also observed in the case of first- and second-born sons. Moreover, first- and second-born sons always earn a lower income than their fathers, except in the case of the Turkey/Morocco group, where children on average earn more than the previous generation.

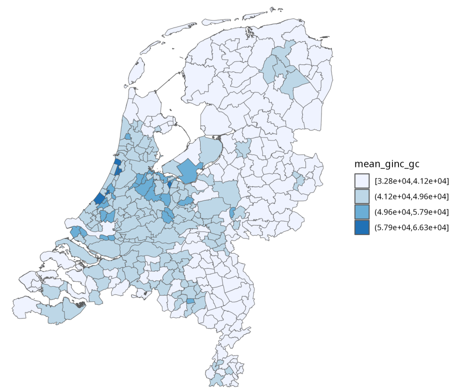
Table A.1 shows that Dutch individuals tend to live where the share of immigrants is lower and in less ethnically segregated areas. They are also less likely to reside in poorer neighborhoods, as proxied by the share of low-income households and the measure of income segregation. Conversely, immigrants from former colonies and of Turkish-Moroccan origin are, on average, over-represented in areas with less native and less wealthy residents, while immigrants of European origin are more similar to Dutch natives.

Figure 2a illustrates the widespread dispersion of immigrants across the Netherlands. However, specific regions manifest a heightened concentration of immigrant population. Notably, South Holland features such concentrations, particularly within its significant municipalities. This province encompasses the Dutch seat of government, The Hague, alongside Rotterdam, its largest urban center. Additionally, the Limburg region, situated as the southernmost of the twelve provinces, is also marked by a notable immigrant presence, with Maastricht as its provincial capital. Amsterdam, the national capital, assumes prominence by hosting a substantial international community, a phenomenon attributed to its historical eminence and cosmopolitan ambiance. The geographical triangle delineated by the provinces of South Holland, North Holland, and Utrecht, which encompass major urban centers such as Amsterdam, Rotterdam,

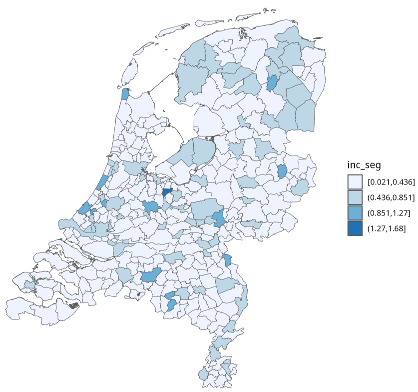
Figure 2: Maps



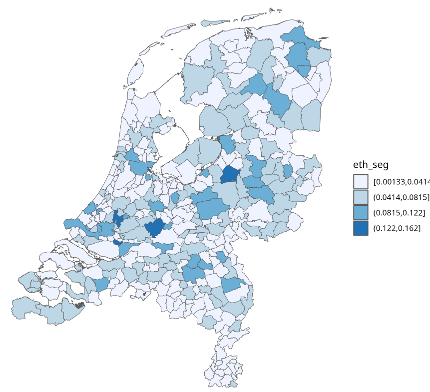
(a) Share of immigrants



(b) Average income



(c) Income segregation



(d) Ethnic segregation

Note: Geographical distribution of (a) the share of immigrants, (b) average income, (c) income segregation, and (d) ethnic segregation. The first two variables are measured at the neighborhood level, while segregation indexes are computed at the municipality level.

The Hague, and Utrecht, are associated with greater economic activity and opportunities, contributing to elevated average income levels shown in panel Figure 2b. Finally, Figures 2c and 2d reveal a pervasive dispersion of both income and ethnic segregation across the Netherlands. However, there are some spatial concentrations in close proximity to major urban agglomerates and the capital.

4 Results across ethnic groups

We study the patterns in sibling correlation in permanent earnings (r_S) across immigrant groups and further decompose it to estimate the extent to which this is due to intergenerational components (i.e. due to parental permanent income, r_I/r_S). We also provide estimates of the father-to-child correlation (or intergenerational correlation, IGC). Our preferred model is the

Table 2: Main results

(a) GMM

	Dutch		EU-15		Ex-Colonies		Turkey-Morocco	
	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.
r_S	0.312	(0.003)	0.315	(0.010)	0.309	(0.010)	0.298	(0.012)
r_I/r_S	0.830	(0.022)	0.923	(0.047)	0.858	(0.040)	0.538	(0.033)
IGC	0.225	(0.006)	0.250	(0.010)	0.232	(0.008)	0.163	(0.008)

(b) REML

	Dutch		EU-15		Ex-Colonies		Turkey-Morocco	
	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.
r_S	0.258	(0.002)	0.249	(0.006)	0.250	(0.006)	0.242	(0.007)
r_I/r_S	0.084	(0.002)	0.105	(0.008)	0.130	(0.008)	0.093	(0.010)
IGC	0.147	(0.002)	0.162	(0.006)	0.180	(0.005)	0.150	(0.008)

Note: Panel (a) reports the results of GMM estimates; panel (b) those of REML estimates. r_S is the sibling correlation in income; r_I is the part of r_S that is due to intergenerational components; r_I/r_S is the share of the sibling correlation that is due to intergenerational components. IGC is the intergenerational correlation in income (father-to-child correlation).

one assuming that intergenerational transmission in income is heterogeneous across families, following Bingley & Cappellari (2019). We show results for Dutch natives, which we take as a benchmark, immigrants originating from EU-15 countries, former colonies, and Turkey and Morocco separately.[10] Table 2 reports our main results.

Our GMM estimates of the sibling correlation are similar across ethnic groups and range between 0.298 and 0.315. Importantly, the patterns are in line with the estimates for the group of Dutch natives, for whom the sibling correlation is 0.312. In comparison to the Danish context, our estimates of the sibling correlation are slightly larger than the 0.22 estimate by Bingley & Cappellari (2019). A similar result emerges also when estimating the sibling correlation with a model assuming that intergenerational transmission in income is homogeneous across families (REML estimates). Indeed, while point estimates are slightly smaller than with GMM, the sibling correlation across ethnic groups ranges from 0.242 for the Turkey-Morocco immigrant group to 0.258 for the Dutch natives. Thus, differently from Schnitzlein (2012), who estimates sibling correlations equal to 0.165 for Danish natives and to 0.263 for second-generation immigrants, and regardless of the model used, we do not observe substantially larger values of r_S for immigrants than for natives.

Next, we investigate whether the fact that sibling correlation in income is very similar across ethnic groups also implies that the relevance of parental permanent income is comparable. Thus, we estimate the intergenerational share, i.e. the ratio between the intergenerational component

[10] Due to the difference in the timing of arrival shown in Figure 1, we also consider immigrants from Indonesia and Suriname separately. The results are identical.

r_I and the sibling correlation r_S. As reported in Table 2a, we observe quite high values for both European immigrants and those from former colonies (0.923 and 0.858, respectively). These are higher than that referred to Dutch natives, for whom 83% of the sibling correlation is attributable to the intergenerational component r_I. Conversely, for individuals originating from Turkey and Morocco, r_I only contributes to around half of the sibling correlation.

These results confirm those by Bingley & Cappellari (2019), as heterogeneously distributed intergenerational transmission accounts for a large fraction (between 50 to 90 percent) of the overall sibling correlation of permanent earnings. Moreover, our estimates indicate that the subgroups of immigrants who are more similar to Dutch natives due to historical and institutional reasons (i.e. Europeans and those from former colonies) also tend to have comparable patterns in parental influence. Other immigrants, including guest worker immigrants –typically sourced from Turkey and Morocco–, while displaying analogous levels of sibling correlation, owe half of this to factors independent of parental income. As they have lower average levels of income (see Table 1), it seems reasonable to expect that their higher degree of mobility translates into less transmission of poverty across generations.

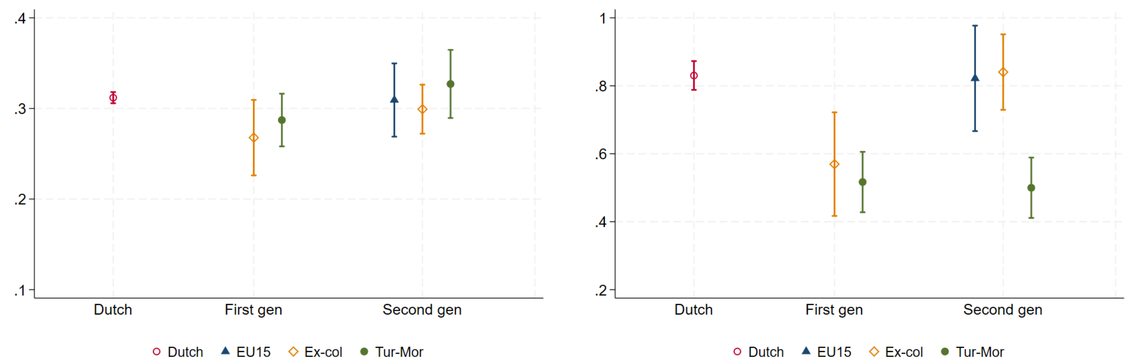
When we allow for homogeneity in intergenerational transmission between families, the coefficient referred to individuals of former colonies' origin reaches 0.130, while it is around 0.100 for the other immigrant groups and 0.084 for natives (Table 2b). This points to the existence of fairly similar intergenerational patterns across all groups. However, this might be due to the fact that estimates in the REML model are relatively compressed, thus also cross-group differences are less noticeable.

Finally, we consider the intergenerational correlation in income (IGC), or father-to-child correlation, across ethnic groups. In comparison to a point estimate of 0.225 for Dutch natives, we find that immigrants tend to have slightly higher values (see Table 2a). As before, immigrants from Turkey and Morocco are an exception, as this group seems to experience a relatively less important role of parental influence (0.163). Such difference might be explained by Turkish and Moroccan immigrants starting from a lower socio-economic position compared to Dutch natives and to Europeans and those coming from former colonies (van Ours & Veenman, 2003). Hence, it is reasonable for them to experience a higher degree of mobility. Such a pattern, although less evident, is confirmed under the REML model (Table 2b).

5 Results across generations and neighborhood characteristics

In the previous section, we show that Dutch natives and immigrants have comparable levels of sibling correlation. Yet, for almost all ethnic groups the intergenerational component and the father-to-child correlation are higher than those of natives. Estimates for immigrants of Turkish and Moroccan descent are considerably lower, suggesting a less relevant role of the intergenerational component (i.e., parental earnings) and a more influential role of the residual component

Figure 3: Results by immigrant generation



(a) Sibling correlation (b) Intergenerational share

Note: Each plot reports point estimates and corresponding confidence intervals at 95% level. Panel (a) shows results on the sibling correlation in income (r_S); panel (b) those on the share of the sibling correlation that is due to intergenerational components (r_I/r_S). Point estimates and standard errors are also reported in Table A.2.

in explaining the sibling correlation. These differences in intergenerational transmission dynamics across ethnic groups might hide heterogeneous patterns in the assimilation mechanism over immigrant generations. Here, we explore the existence of separate paths across sub-groups.

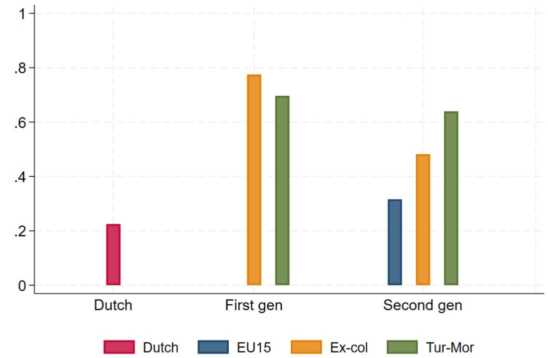
When addressing the evolution of intergenerational transmission in income for immigrants, we might expect that ethnic disparities fade as families settle and acquire host country-specific human and social capital. Thus, second-generation immigrants would behave more similarly to natives, and so would their intergenerational transmission mechanism.

Figure 3a reports our estimates of the sibling correlation in permanent earnings by immigrant generation. Point estimates are fairly similar across generations and ethnic groups, although those referred to as first-generation immigrants are slightly lower than those of natives.[11] When we compute intergenerational shares by immigrant generation (Figure 3b), however, estimated parameters suggest a large heterogeneity in the contribution of the intergenerational component to the sibling correlation across sub-groups. In particular, the role of parental permanent income seems to be much higher for natives, while the residual component has a substantial role for first-generation immigrants.

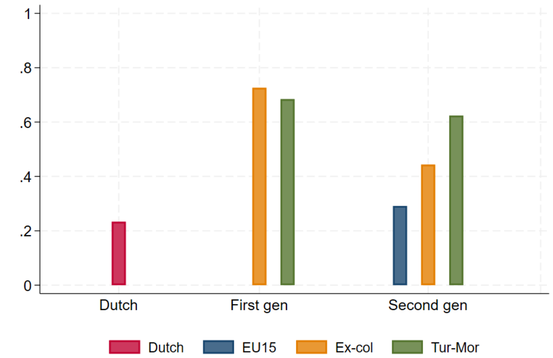
When considering second-generation immigrants, estimated values align with the ones referred to by the Dutch natives. The only exception is given by immigrants of Turkish and Moroccan origin, who maintain the same degree of importance of the intergenerational component as the previous generation. These results seem to confirm the hypotheses mentioned above. If the intergenerational transmission mechanism tends to assimilate across generations, this might be because the characteristics of the parental and residual components become similar

[11] Coefficients and standard errors are also reported in Table A.2. We exclude the group of first-generation EU-15 immigrants due to its small sample size (i.e., less than 600 observations).

Figure 4: Community characteristics by immigrant generation



(a) Highly segregated in income



(b) Highly segregated in ethnicity

Note: Each plot reports the share of individuals living in a highly segregated neighborhood by ethnic origin and immigrant generation. Panel (a) refers to income segregation (H^I); panel (b) to ethnic segregation (H^E).

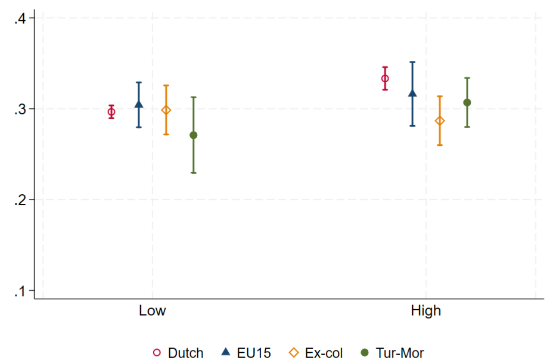
to those of natives and so does their relative weight in explaining the sibling correlation. Our estimates suggest that this process occurs within the span of just two generations for immigrants from EU countries and former Dutch colonies, possibly due to the shared history and institutions with the native population. On the other hand, the ethnic group that does not share such strong ties with the Dutch native population seems to experience a slower assimilation process.

We further investigate the potential reasons behind these heterogeneities. Over the last decades, a large literature has investigated the drivers of intergenerational mobility differences and the role of mediating factors such as neighborhood and school quality (Bügelmayer & Schnitzlein, 2018; Hedman et al., 2019; Hedman & Ham, 2021). Above all, neighborhood effects have been proven to be crucial for long-term outcomes such as earnings, via their temporal dimension (Chetty & Hendren, 2018a). Thus, the differences in intergenerational mobility between natives and immigrants of different ethnic backgrounds uncovered in Figure 3 might mask some heterogeneities deriving from these long-term exposures. Indeed, Kleinepier et al. (2018) find that non-Dutch children, especially Turkish and Moroccan, are more likely to live in poor neighborhoods than their native counterparts, not only at a specific point in time during their childhood but also throughout their entire youth.[12]

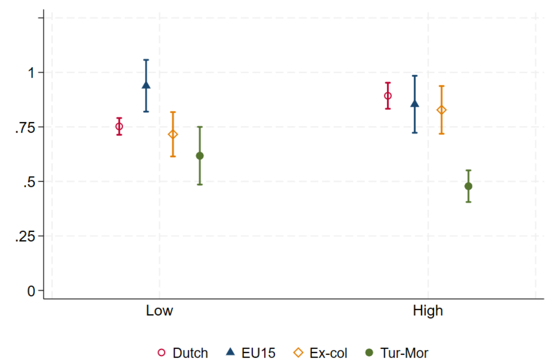
We explore the role of neighborhood characteristics and consider the degree of segregation in income H^I and ethnic segregation H^E (Chetty et al., 2014). As described in Section 3.2, we define as highly segregated those neighborhoods that belong to the top quartile of the distribution. Figure 4 reports the share of individuals living in highly segregated neighborhoods by ethnic origin and immigrant generation. Three considerations arise. First, the two measures, which are strongly correlated, give very similar distributions. Second, the proportion of

[12] With Swedish data, Manley et al. (2020) also find that childhood neighborhood has long-lasting effects on residential careers, but these are attenuated by family effects.

Figure 5: Results by income segregation H^I



(a) Sibling correlation



(b) Intergenerational share

Note: Each plot reports point estimates and corresponding confidence intervals at 95% level. Panel (a) shows results on the sibling correlation in income (r_S); panel (b) those on the share of the sibling correlation that is due to intergenerational components (r_I/r_S). Point estimates and standard errors are also reported in Table A.2.

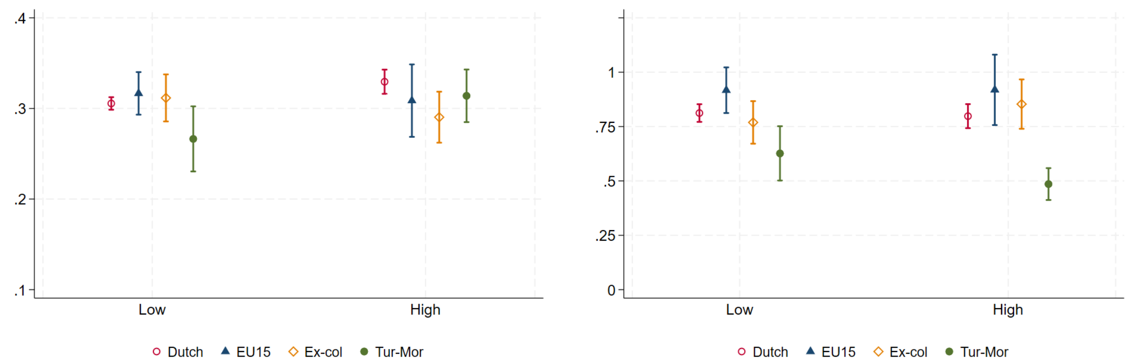
individuals living in highly segregated neighborhoods is extremely high among first-generation immigrants (around 70%), and significantly lower among Dutch natives (around 23%). Third, the proportion of individuals living in highly segregated neighborhoods reduces substantially for second-generation immigrants, except for those of Turkish and Moroccan origin.

Together with the evidence in Figure 3 this suggests a link between assimilation patterns, the degree of income and ethnic segregation and the relative weight of the parental component of the income transmission process. In particular, neighborhood characteristics might be relatively less persistent for the groups that quickly assimilate the intergenerational dynamics of the native population. Conversely, immigrants on a slower assimilation path, for whom the transmission of neighborhood status is more persistent across generations, seem to experience a lower influence of the parental transmission into their sibling correlation in income. This suggests that neighborhood dynamics might contribute to explaining the intergenerational transmission mechanism for the latter immigrant group.

Thus, we turn to directly assessing the importance of living in ethnically or economically segregated areas by considering ethnic- and income-based segregation in the municipality as measures of spatial heterogeneity. Figures 5 and 6 report the results by level of income and ethnic segregation in the neighborhood, respectively. "Low" and "High" refer to neighborhoods in the bottom three quartiles and the top quartile of the distribution, respectively, as described in Section 3.2.

Estimated sibling correlations in earnings are in line with our main results, regardless of the level of segregation in the neighborhood of residence, and so is the estimated intergenerational share. As expected, for immigrants from Turkey and Morocco the estimated intergenerational component is overall relatively less important, but it is especially low the higher the level of

Figure 6: Results by ethnic segregation H^E



(a) Sibling correlation (b) Intergenerational share

Note: Each plot reports point estimates and corresponding confidence intervals at 95% level. Panel (a) shows results on the sibling correlation in income (r_S); panel (b) those on the share of the sibling correlation that is due to intergenerational components (r_I/r_S). Point estimates and standard errors are also reported in Table A.2.

segregation. Indeed, those residing in highly segregated areas tend to exhibit below-average values of the intergenerational share, suggesting that this dimension is not entirely captured by the intergenerational component explaining the sibling correlation in permanent income. This result is especially relevant because it implies that the importance of the neighborhood is not homogeneous across neighborhood characteristics. Moreover, it shows that neighborhood effects influence transmission especially for the ethnic group experiencing higher, and more persistent, segregation levels.

In the Appendix, as robustness, we provide additional results based on the poverty segregation index H^P (Figure A.1) and on neighborhood-specific measures of income and ethnic heterogeneity. We consider the share of households having income below the 25th percentile (Figure A.2) and the share of non-Dutch residents (Figure A.3). Estimates yield similar conclusions as those presented above.

6 Conclusions

For decades, the variation in earnings shared by siblings was believed to be mostly due to factors uncorrelated with parental earnings (Solon et al., 1991; Björklund et al., 2010). The recent contribution by Bingley & Cappellari (2019) shows that when one assumes heterogeneity in intergenerational transmission between families, intergenerational persistence accounts for more than two-thirds of the sibling correlation in permanent earnings. It is not trivial, however, whether this new evidence applies also to the immigrant population and to what extent it may explain differences in immigrant assimilation paths across groups and generations.

We follow the approach of Bingley & Cappellari (2019) to decompose the sibling correlation of permanent earnings into intergenerational and residual sibling components and to compute the corresponding intergenerational share for a sample of Dutch and immigrant individuals over three generations.

We find that a substantial fraction of the overall sibling correlation, indeed, derives from parental influences. When considering sub-populations on the basis of ethnic origin, the sibling correlation due to intergenerational transmission is similar to that of natives for immigrants from Europe and former Dutch colonies, while it is sensibly lower for those originating from Turkey and Morocco, who moved to the Netherlands mainly as guest-workers and share different characteristics with respect to Dutch natives and other immigrants.

When we analyze individuals by immigrant generation, two important results emerge. First, sibling correlation in earnings is slightly lower for first-generation immigrants compared to second-generation ones, who tend to align with Dutch natives. Second, the weight of parental income in the sibling correlation in earnings is lower for immigrants compared to natives. It returns to values comparable to the native population for second-generation immigrants from Europe and former colonies, while for immigrants of different origins (Turkey and Morocco) factors unrelated to parental income continue to have a meaningful role.

These heterogeneities suggest that different assimilation mechanisms might be at work. Thus, we follow the literature in exploring the potential role of mediating factors that could explain such discrepancies across groups (Bügelmayer & Schnitzlein, 2018; Chetty & Hendren, 2018b; Hedman & Ham, 2021). We consider two spatial measures of neighborhood ethnic and income segregation. Our analysis reveals that the patterns observed for the estimated intergenerational share also arise when considering the share of individuals living in highly segregated neighborhoods. We also find that that the role of the intergenerational component in explaining the sibling correlation in earnings is especially low for the group of immigrants for whom the transmission of neighborhood status persists across generations.

We conclude that, while the sibling correlation in income is fairly similar across native and immigrant groups, this correlation does not appear to be explained by the same factors. As immigrants assimilate into the native population, their intergenerational transmission mechanisms also become similar to the ones experienced by natives. However, such an assimilation mechanism is not homogeneous across groups. Our results imply that neighborhood effects are more relevant, and persistent, for those immigrants who are on a slower assimilation path experience.

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Appendix

A.1 Additional tables and figures

Table A.1: Descriptive statistics on triads by area-specific characteristics

	Dutch		**EU-15**		**Ex-col**		**Tur/Mor**	
Income segregation	Low	High	Low	High	Low	High	Low	High
Average income	58,319.74	56,824.26	57,173.13	53,040.05	62,260.25	48,018.62	29,252.02	25,887.18
Group share	0.775	0.225	0.698	0.302	0.541	0.459	0.336	0.664
Ethnic segregation	Low	High	Low	High	Low	High	Low	High
Average income	58,272.11	57,036.40	56,035.71	55,575.28	61,236.07	48,100.28	28,188.16	26,387.94
Group share	0.767	0.233	0.756	0.244	0.580	0.420	0.350	0.650
Poor HHs segregation	Low	High	Low	High	Low	High	Low	High
Average income	58,035.87	57,794.73	56,342.52	54,596.87	58,774.61	50,374.37	28,352.71	25,556.06
Group share	0.784	0.216	0.760	0.240	0.637	0.363	0.523	0.477
Immigrants share	Low	High	Low	High	Low	High	Low	High
Average income	58,148.09	57,609.03	57,673.57	53,520.89	62,386.57	50,060.09	28,144.26	26,745.78
Group share	0.695	0.305	0.579	0.421	0.459	0.541	0.195	0.805
Low-income HHs share	Low	High	Low	High	Low	High	Low	High
Average income	60,061.88	47,071.18	59,069.18	42,566.17	61,388.20	38,813.52	28,489.79	26,140.95
Group share	0.840	0.160	0.809	0.191	0.749	0.251	0.374	0.626

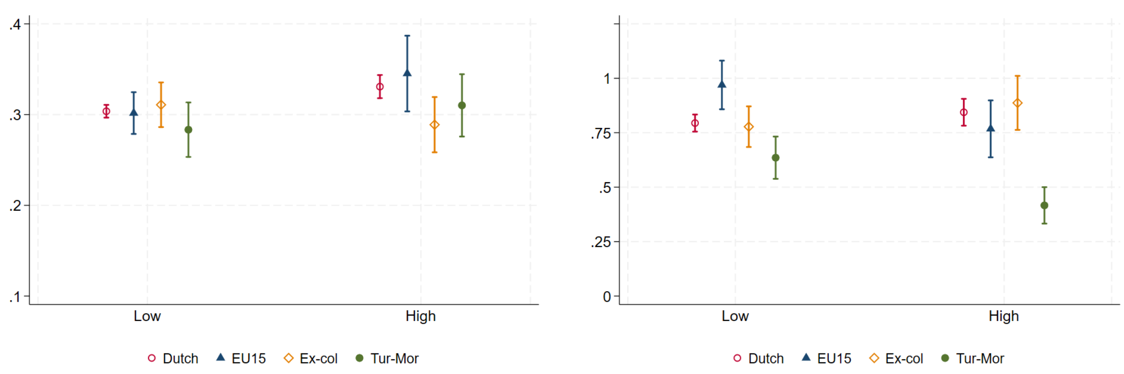
Note: The Table reports average gross income and group share by ethnic origin and by level of: municipality-specific income segregation, municipality-specific ethnic segregation, municipality-specific segregation of poor households, share of immigrants in the neighborhood, and share of low-income households in the neighborhood. Low and High levels refer to the bottom three quartiles and the top quartile, respectively.

Table A.2: Results by immigrant generation and by area-specific characteristics

	Dutch		EU-15		Ex-col		Tur/Mor	
Immigrant generation	-		1	2	1	2	1	2
r_S	0.312			0.309	0.268	0.299	0.287	0.327
S.E.	(0.003)			(0.021)	(0.021)	(0.014)	(0.015)	(0.019)
r_I/r_S	0.830			0.822	0.569	0.840	0.517	0.500
S.E.	(0.022)			(0.079)	(0.078)	(0.057)	(0.045)	(0.045)
Income segregation	Low	High	Low	High	Low	High	Low	High
r_S	0.297	0.333	0.304	0.316	0.299	0.287	0.271	0.307
S.E.	(0.004)	(0.006)	(0.013)	(0.018)	(0.014)	(0.014)	(0.021)	(0.014)
r_I/r_S	0.752	0.893	0.939	0.854	0.716	0.828	0.618	0.478
S.E.	(0.020)	(0.030)	(0.061)	(0.067)	(0.052)	(0.056)	(0.068)	(0.037)
Ethnic segregation	Low	High	Low	High	Low	High	Low	High
r_S	0.305	0.329	0.317	0.309	0.312	0.290	0.266	0.314
S.E.	(0.004)	(0.007)	(0.012)	(0.020)	(0.013)	(0.014)	(0.018)	(0.015)
r_I/r_S	0.812	0.798	0.917	0.919	0.769	0.853	0.627	0.486
S.E.	(0.021)	(0.028)	(0.054)	(0.083)	(0.050)	(0.058)	(0.064)	(0.037)
Poverty segregation	Low	High	Low	High	Low	High	Low	High
r_S	0.304	0.331	0.302	0.345	0.311	0.289	0.283	0.310
S.E.	(0.004)	(0.007)	(0.012)	(0.021)	(0.013)	(0.016)	(0.015)	(0.018)
r_I/r_S	0.794	0.844	0.969	0.768	0.778	0.887	0.635	0.416
S.E.	(0.020)	(0.031)	(0.057)	(0.067)	(0.048)	(0.063)	(0.049)	(0.043)
Share of low income households	Low	High	Low	High	Low	High	Low	High
r_S	0.294	0.369	0.293	0.374	0.301	0.290	0.275	0.312
S.E.	(0.003)	(0.008)	(0.011)	(0.024)	(0.011)	(0.018)	(0.017)	(0.015)
r_I/r_S	0.705	0.972	0.878	0.862	0.813	0.741	0.545	0.528
S.E.	(0.020)	(0.032)	(0.055)	(0.072)	(0.046)	(0.065)	(0.056)	(0.040)
Share of non-Dutch residents	Low	High	Low	High	Low	High	Low	High
r_S	0.304	0.334	0.306	0.328	0.291	0.315	0.292	0.299
S.E.	(0.003)	(0.007)	(0.012)	(0.020)	(0.012)	(0.016)	(0.020)	(0.014)
r_I/r_S	0.761	0.932	0.842	1.019	0.797	0.793	0.506	0.550
S.E.	(0.020)	(0.033)	(0.054)	(0.079)	(0.051)	(0.055)	(0.059)	(0.039)

Note: The Table reports point estimates and standard errors of the sibling correlation in income (r_S) and the share of the sibling correlation that is due to intergenerational components (r_I/r_S) by ethnic origin, immigrant generation and area-specific characteristics. Low and High levels refer to the bottom three quartiles and the top quartile, respectively.

Figure A.1: Results by poverty segregation H^P

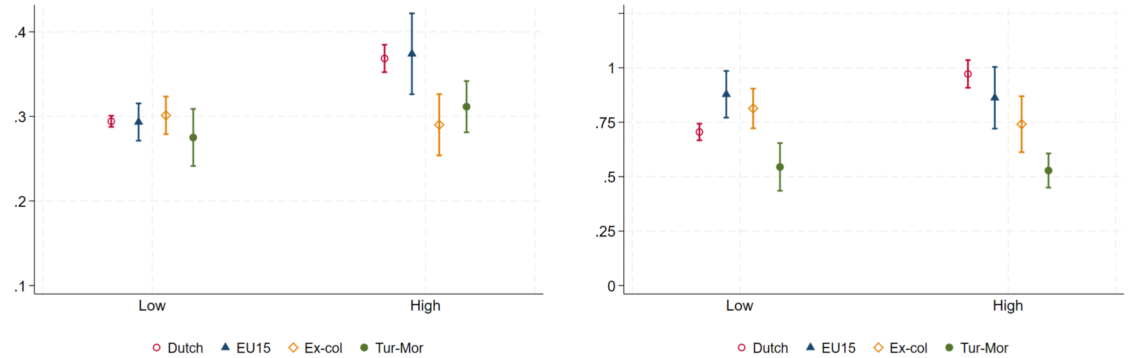


(a) Sibling correlation

(b) Intergenerational share

Note: Each plot reports point estimates and corresponding confidence intervals at 95% level. Panel (a) shows results on the sibling correlation in income (r_S); panel (b) those on the share of the sibling correlation that is due to intergenerational components (r_I/r_S). Point estimates and standard errors are also reported in Table A.2.

Figure A.2: Results by neighbourhood share of low income households ϕ_I

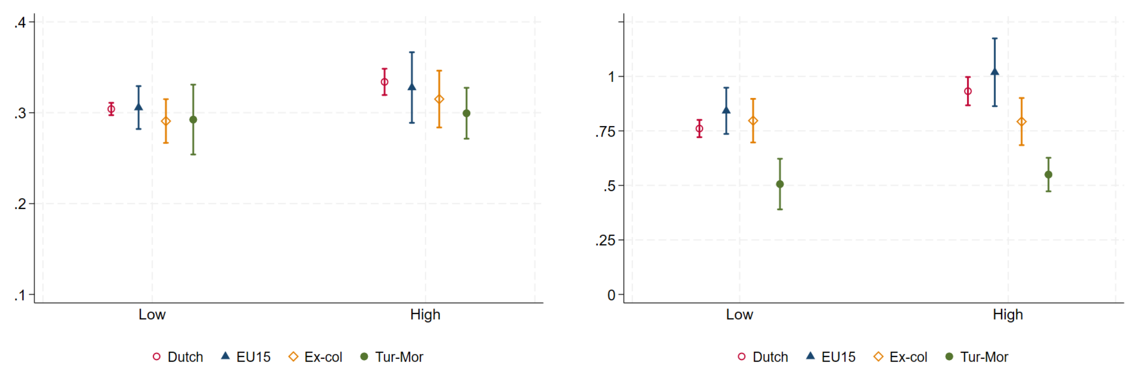


(a) Sibling correlation

(b) Intergenerational share

Note: Each plot reports point estimates and corresponding confidence intervals at 95% level. Panel (a) shows results on the sibling correlation in income (r_S); panel (b) those on the share of the sibling correlation that is due to intergenerational components (r_I/r_S). Point estimates and standard errors are also reported in Table A.2.

Figure A.3: Results by neighborhood share of non-Dutch residents ϕ_E



(a) Sibling correlation

(b) Intergenerational share

Note: Each plot reports point estimates and corresponding confidence intervals at 95% level. Panel (a) shows results on the sibling correlation in income (r_S); panel (b) those on the share of the sibling correlation that is due to intergenerational components (r_I/r_S). Point estimates and standard errors are also reported in Table A.2.