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Invisible Immigrants? Urbanisation, Co-National Density and the Legal Integration of Refugees

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Abstract

Using the quasi-random allocation of refugees and detailed administrative data, we examine the effect of urban density on refugees' decisions to naturalise. Our results indicate that refugees assigned to urban areas are more likely to naturalise, largely due to a higher density of co-national networks. We find that a one standard deviation increase in co-national density increases the likelihood of naturalising by 1.3 percentage points. Our findings remain robust even after accounting for factors such as labour market effects and public attitudes and seem to stem from the reduced information costs and strength of weak ties within co-national networks.

JEL classification

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Keywords

refugees, legal integration, naturalisation, urbanisation, co-national networks

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1 Introduction

By the end of 2022 there were 12.4 million refugees and a further 1.3 million asylum seekers in Europe (IOM, 2019; UNHCR, 2022). Although European countries receive only around 20% of global refugee flows, the public and political response to the growing number of refugees has often been adverse. This sentiment is fuelled by poor integration trajectories, high dependency on welfare states, and sluggish labour market outcomes (Foged et al., 2022; Adamson, 2020; Enchautegui and Giannarelli, 2015). Despite the policy importance of refugee integration, we still know relatively little about the local conditions that encourage or hinder it. This is particularly true for *legal* integration through naturalisation, which results in citizenship and grants refugees a full set of rights, including political representation through voting (Huddleston and Vink, 2015). In the absence of legal integration, refugees' inability to vote may deepen the problems they face due to their relative 'invisibility' to local and national governments (Biavaschi and Facchini, 2020).

Most of the empirical literature on refugee integration focuses on economic outcomes. Yet labour market participation captures only one dimension of integration and is not a substitute for full citizenship. Securing employment may be a necessity, whereas naturalisation is a choice that reflects not only perceived economic returns but also longer-run attachment to the host country. The determinants of legal integration may therefore differ from those of labour market integration. At the same time, the role of locational characteristics has received limited attention, even though there is clear evidence that where refugees are placed affects their educational attainment, employment prospects, and earnings (Aslund and Rooth, 2007; Aslund et al., 2010, 2011; Damm, 2014; Bansak et al., 2018; Delacretaz et al., 2023). This paper examines whether location also shapes refugees' decision to naturalise, focusing on urban density and, in particular, co-national density as key dimensions of the local context.

We conceptualise naturalisation as a decision that weighs the benefits of citizenship against its costs (Bevelander and Veenman, 2006; Fouka, 2024). The benefits include improved access to employment, higher expected earnings, and greater security and protection from discrimination. The costs include information and bureaucratic hurdles, language acquisition, adaptation to host-country norms, and potentially the loss of origin-country citizenship. We argue that these costs and benefits are shaped by urban density and, in particular, by the density of co-national networks. Dense labour markets can raise the economic returns to citizenship, but we expect this channel to operate largely through co-national networks and the weak ties they generate. Such networks transmit job information, facilitate occupational matching, and help refugees learn which opportunities become available once citizenship constraints are relaxed (Granovetter, 1973; Patacchini and Zenou, 2012; Martén et al., 2019; Klaesson et al., 2021; Rajkumar et al., 2022). Co-national networks may also reduce the fixed costs of

naturalisation by lowering information frictions about administrative procedures and by providing practical guidance on the integration exam and application process.

At the same time, dense co-national environments may weaken the marginal value of citizenship. If co-national communities provide informal insurance, social support, and protection from discrimination, then some of the social and economic functions of citizenship may be partially substituted. Moreover, strong bonding ties may reduce incentives to invest in host-country–specific skills and to form bridging ties with natives (Putnam, 2007). These opposing forces imply that the relationship between co-national density and naturalisation may be non-linear. At low levels of co-national density, marginal increases can substantially reduce information and assimilation costs and increase the expected benefits of citizenship. At high levels, however, marginal benefits may fall while assimilation costs may rise, potentially lowering the propensity to naturalise.

Empirically, identifying the causal effect of local context on naturalisation is challenging because migrants sort into places that match their preferences and opportunities. We overcome this issue by exploiting the Dutch refugee dispersal system, which allocates refugees first to reception centres and subsequently to social housing in municipalities on a quasi-random basis. We combine this institutional setting with highly detailed administrative data covering the universe of refugees who received asylum residence permits in the Netherlands between 2014 and 2016. This allows us to estimate the effect of assignment location characteristics on subsequent naturalisation decisions, while controlling for detailed individual characteristics and features of the asylum process. The Netherlands is also a compelling context in its own right. With more than 45,000 asylum applications in 2015 alone and one of the highest population densities in the OECD, it provides substantial variation in urban and co-national density across municipalities.

Our paper contributes to several strands of the literature. A comprehensive study of refugee naturalisation is Mossaad et al. (2018), who analyse refugees in the United States and find that the characteristics of arrival cities are associated with naturalisation alongside individual characteristics such as country of origin and human capital. European evidence is more limited, often focuses on earlier cohorts, and typically studies labour market integration rather than legal integration. Recent work on refugee integration in Europe has examined the role of asylum processing times (Gathmann and Keller, 2018; Hainmueller et al., 2016), linguistic training (Foged et al., 2022; Lochmann et al., 2019), and locational characteristics such as initial assignment location or co-national networks (Eckert et al., 2022; Martén et al., 2019; Stips and Kis-Katos, 2020). A related literature on *immigrant* naturalisation finds mixed results for the role of migrant concentration (Leclerc et al., 2023; Abascal, 2017), but causal identification is difficult in those settings due to sorting. In contrast, the quasi-random allocation of refugees in the

Netherlands allows us to identify how local co-national density affects naturalisation decisions for refugees.

Our findings show that refugees assigned to denser municipalities are more likely to naturalise. However, once we control for co-national density, the effect of population density becomes economically and statistically insignificant, indicating that co-national networks are the channel through which density affects the decision to naturalise. We estimate a robust non-linear relationship between co-national density and naturalisation. At low to moderate levels, increases in co-national density raise the probability of naturalisation, but the marginal effect declines with density and becomes negative at very high levels of co-national concentration. At the mean, a one standard deviation increase in co-national density increases the likelihood of naturalising by 1.3 percentage points, and the effect turns negative only at very high levels of co-national density. This pattern is robust to alternative specifications, sample restrictions, and controls for local labour market conditions, political attitudes, and observable measures of co-national network quality. Overall, the results suggest that co-national networks facilitate naturalisation by reducing information and integration costs, but that very high levels of co-national concentration may weaken incentives to assimilate or partially substitute for the benefits of citizenship.

The remainder of the paper proceeds as follows. Section 2 outlines the conceptual framework. Section 3 describes the Dutch asylum system. Section 4 presents the data and sample construction. Section 5 discusses the econometric approach and identification. Section 6 presents the main results and robustness checks. Section 7 concludes.

2 Naturalisation and density

2.1 The costs and benefits of naturalisation

We conceptualise naturalisation as an outcome emerging from the interaction between individual refugee characteristics and contextual factors, including urban density, co-national networks, and other features of the localities in which refugees settle. Following Bevelander and Veenman (2006) and Fouka (2019) refugees weigh the costs and benefits of becoming citizens but these costs and benefits are themselves shaped by the local environment in which refugees are placed. In our context, urban density, particularly the density of co-nationals, is a key feature of the local environment that affects naturalisation decisions by shaping labour market opportunities, social attitudes and information costs.

Formally, in each period refugees make a decision whether or not to naturalise. We

can write the utility of naturalisation of a refugee i located in j in period t as:

$$U_{ijt}^{N} = B_{ijt}^{N} - C_{ijt}^{N} + \epsilon_{ijt} \tag{1}$$

where

$$B_{ijt}^{N} = B_{ijt}^{E} + B_{ijt}^{S} \tag{2}$$

and

$$C_{ijt}^{N} = C_{ijt}^{I} + C_{ijt}^{A}. \tag{3}$$

and ϵ_{ijt} is an idiosyncratic shock that is uncorrelated to benefits, B_{ijt}^{N}, and costs, C_{ijt}^{N}. When $U_{ijt}^{N} > 0$ a refugee decides to naturalise.

B_{ijt}^{E} denotes economic benefits (such as access to a wider set of jobs, higher earnings and better insurance against labour market risk), B_{ijt}^{S} stands for social benefits (reduced discrimination, greater security and a stronger sense of belonging). C_{ijt}^{I} captures information and bureaucratic costs (time and money spent understanding and navigating rules and procedures), while C_{ijt}^{A} captures assimilation costs (learning the language and norms of the host country, and potential loss of origin-country citizenship where dual nationality is not allowed).

Urban density, and particularly the presence of co-national networks, can affect the naturalisation decision by shifting the benefits and costs, B_{ijt}^{N} and C_{ijt}^{N}, as we outline below.

2.2 Urban and co-national density

Economic benefits (B_{ijt}^{E}). A large urban literature shows that dense cities offer thicker labour markets, more diverse occupations, and faster learning by doing (Duranton and Puga, 2004; De La Roca and Puga, 2017; Papageorgiou, 2022; Niebuhr et al., 2024). In such environments refugees are more likely to find jobs and match into occupations that fit their skills. This raises the expected economic returns to holding citizenship if citizenship relaxes legal barriers to certain jobs (*e.g.*, public-sector positions) or reduces the risk of losing work in the future (Gathmann and Keller, 2018; Hainmueller et al., 2019), thereby increasing B_{ijt}^{E}. While these economic gains are often linked to overall urban density, we expect them to depend more directly on the local density of co-nationals. Co-national networks generate many weak ties through workplace and social interactions, and refugees embedded in such communities are more likely to learn about job opportunities, training, and the labour-market advantages attached to citizenship (Granovetter, 1973; Rajkumar et al., 2022). Consistent with urban network models, job information is transmitted more efficiently in denser social environments (Wahba and Zenou, 2005; Sato and Zenou, 2015), and evidence for Sweden, the UK, and Germany suggests that co-ethnic networks improve labour market entry and earnings,

especially when many co-nationals are employed (Edin et al., 2003; Patacchini and Zenou, 2012; Martén et al., 2019; Stips and Kis-Katos, 2020). Employed co-nationals and those with higher education are particularly likely to transmit job information and facilitate access to better jobs, implying that the economic benefit may hinge not only on the density but also on the quality of co-national networks.

Social benefits (B^S_{ijt}). The social returns to naturalisation depend on the broader local climate in which refugees live. Dense urban areas tend to exhibit systematically different attitudes towards immigrants than less dense places. Evidence for the Netherlands and other European countries suggests that attitudes towards asylum seekers and immigrants are polarised, but that pro-immigration parties and voters are disproportionately concentrated in cities (Albada et al., 2021; Coenders et al., 2012; Kuppens et al., 2020). In the Dutch context, support for the relatively pro-immigration Social Democrats is stronger in urban municipalities, whereas support for the anti-immigration Party for Freedom (PVV) is concentrated in more peripheral areas. Evidence from house price analysis further supports the view that attitudes toward refugees are more negative in peripheral areas, with the willingness to pay for refugee centres being significantly more negative in municipalities with higher nationalist vote shares (Dröes and Koster, 2023).

Differences in local attitudes shape B^S_{ijt} by affecting exposure to discrimination, social hostility, and informal barriers to participation. If everyday discrimination is lower in denser cities, citizenship may be less needed as a protective device, so the marginal social gain from naturalisation can be smaller (Fouka, 2019). Co-national density can further shift these social returns through a distinct mechanism: dense co-national communities may provide informal insurance and protection that partially substitutes for the social and political insurance associated with citizenship, thereby reducing the marginal value of naturalisation even when the broader local climate is less welcoming.

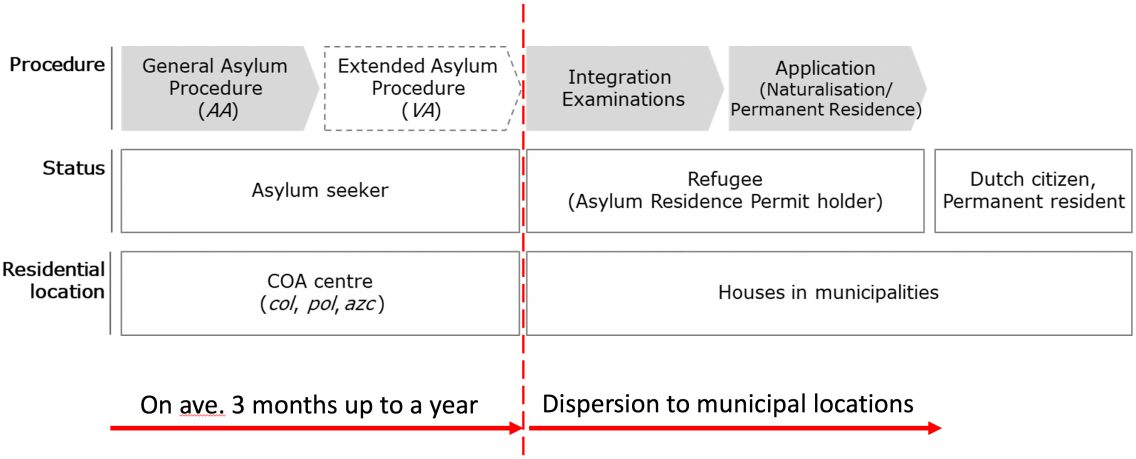
Information frictions (C^I_{ijt}). Co-national density is further likely to reduce information frictions surrounding the naturalisation process. A substantial body of research demonstrates that co-ethnic enclaves lower informational barriers by offering practical assistance and facilitating the transmission of knowledge regarding legal institutions and administrative procedures (Bertrand et al., 2000; Damm, 2009; Edin et al., 2003; Klaesson et al., 2021). These enclaves can serve as information hubs in which expert knowledge is shared through everyday interactions, enabling individuals to navigate complex bureaucratic environments more effectively. Informal peer networks may provide guidance on the requirements and processes associated with naturalisation, including assistance with completing documentation, preparing for language examinations, and understanding eligibility criteria, thereby lowering information costs C^I_{ijt}.

Assimilation costs (C^A_{ijt}). Assimilation costs capture the effort required to acquire host-country–specific skills and to build bridging ties with natives. More open and diverse urban environments may lower these costs by increasing contact opportunities and reducing psychological and cultural barriers to integration. Co-national density, however, affects C^A_{ijt} primarily by shaping the composition of social interactions. When a large share of everyday social and economic life is organised within co-national networks, incentives to form bridging ties may weaken. In line with Putnam (2007), strong bonding ties within co-national enclaves can crowd out bridging ties, lowering incentives to invest in host-country language and norms and thereby increasing effective assimilation costs. At the same time, co-national communities can facilitate integration on practical dimensions (e.g. support and guidance), implying that C^A_{ijt} may vary non-monotonically with co-national density.

Non-linear effects. Having outlined these channels, we can now consider our expected relationship between naturalisation and co-national density. Due to differences in the slopes of the naturalisation benefit and cost functions, B^N_{ijt} and C^N_{ijt}, this relationship is unlikely to be linear. At very low levels of co-national density, migrants face high information costs C^I_{ijt} and assimilation costs C^A_{ijt} due to weak peer networks and limited access to guidance or role models, which depresses naturalisation rates. As co-national density increases from low levels, these costs fall sharply: co-ethnic networks facilitate information sharing about the naturalisation process and reduce fixed costs of integration, while the economic and social benefits of citizenship remain large.

At intermediate levels of co-national density, information and assimilation costs are minimized while the marginal returns to citizenship remain substantial, as access to mainstream labour markets and social institutions still depends strongly on formal legal status. This combination maximizes the net benefits of naturalisation and leads to the highest likelihood of naturalisation. By contrast, at high levels of co-national density, the marginal benefits of naturalisation $B'^N_{ijt}(d)$ decline while marginal costs $C'^N_{ijt}(d)$ may increase. Dense co-ethnic communities can partially substitute for the economic and social functions of citizenship by providing employment opportunities, social support, and protection from discrimination, thereby reducing the returns to legal integration. At the same time, incentives to invest in host-country–specific skills may weaken, increasing net assimilation costs C^A_{ijt}. High levels of co-national density may also result in congestion in the bureaucratic system, resulting in longer processing times, competition for language and integration courses, and higher administrative burdens, which collectively increase the time, effort, and psychological costs of naturalisation (raising C^I_{ijt} and C^A_{ijt}).

These arguments suggest that the naturalisation benefit function is likely to be concave in co-national density d_i, with $B'^N_{ijt}(d_i) > 0$ and $B''^N_{ijt}(d_i) < 0$, while the naturali-



Notes: If an asylum claim under the General Asylum Procedure *AA* is accepted, the individual does not go through the Extended Asylum Procedure (*VA*). The information in this figure is from the Immigration and Naturalisation Service and the Central Agency for the Reception of Asylum Seekers (*Centraal Orgaan opvang asielzoekers*) and IND (2019) and is visualised by the authors.

FIGURE 1 – STANDARD PROCEDURES FOR ASYLUM AND NATURALISATION

sation cost function is likely to be convex, with $C'^{N}_{ijt}(d_i) > 0$ and $C''^{N}_{ijt}(d_i) > 0$. If so, these functions imply that there is a level of co-national density that maximises net benefits $B^{N}_{ijt} - C^{N}_{ijt}$, generating an inverted U-shaped relationship between co-national density and the likelihood of naturalising.

3 Refugees in the Dutch context

3.1 Asylum policy and application procedures

The current legal framework for asylum in the Netherlands is called the Alien Act of 2000 (*Vreemdelingenwet 2000*) and The Civic Integration Act (*Wet inburgering*)[1]. Those who look for asylum in the Netherlands have to follow the application procedures for an asylum residence permit as shown in Figure 1. After arrival asylum seekers go through the General Asylum Procedure (*AA: Algemene Asielprocedure*) at refugee centres run by the Central Agency for the Reception of Asylum Seekers (*Centraal Orgaan opvang asielzoekers*: *COA*). At the end of this process, the application will either be rejected or an asylum residence permit will be issued, sometimes after an Extended Asylum Procedure (*VA: Verlengde Asielprocedure*).[2]

During the period of asylum application and after being granted asylum, refugees

[1]The first version, which was in force in 2007, followed by the amended version in 2013 and 2021.

[2]According to CBS, on average asylum seekers waited for 109 days to obtain the asylum residence permit during the period between 2014 and the first half of 2018 (CBS, 2019). Compared to other EU countries, the application duration in the Netherlands is substantially shorter. Bertoli et al. (2022) estimate the average application processing time in Germany, which accepted over 1 million refugees in 2014, was approximately 16 months while other European countries took approximately 9 months.

receive shelter, meals, access to the necessary medical care at the COA centres, and are relocated as the asylum claim proceeds.[3] At the onset of the asylum claim, they stay in one of the central reception centres (*centrale ontvangstlocatie: COL*) in Ter Apel, Budel-Cranendonck and Veenhuizen. When the asylum application begins, asylum seekers will move to a Process reception centre (*procesopvanglocatie: POL*). Once asylum seekers have obtained an asylum residence permit and become refugees, they move to an asylum seekers reception centre (*Asielzoekerscentrum: AZC*) located across the Netherlands to wait for a house in a municipality. When refugees move to *AZC* or housing after the asylum application procedure they are allocated randomly (Tolsma et al., 2021), an issue that we return to in 5.2. The rights of asylum status holders depend on the type of permit that they hold. During the application process asylum seekers are allowed to work only after six months with a maximum duration of employment (24 out of 52 weeks) while refugees with asylum status can work without a working permit or any constraints.

In order for refugees to become eligible for Dutch citizenship a number of conditions must be met. These include being 18 years old or above, having lived in the Netherlands for at least five years with a valid residence permit, having no criminal record, and being sufficiently integrated into Dutch society (IND, 2019). To prove a sufficient level of integration, refugees have to pass the civic integration examination or meet the exemption requirements such as obtaining a diploma taught in Dutch or providing evidence of medical difficulties. The civic integration exam consists of five components: listening; reading; writing; speaking Dutch; and knowledge of Dutch society (*Kennis van de Nederlandse Maatschappij*). Refugees are eligible for a social loan of up to € 10,000 to cover the costs associated with the integration programme (DUO, 2022).[4] Once the integration exam is passed individuals receive an integration diploma and their social loan is waived if the exam was completed within the required three year integration period. If a component of the exam is failed it can be retaken at a cost of € 150.

Once a naturalisation application is submitted to municipal offices, the average processing time to completion was 344 days in 2018 (IND Naturalisation and Option Monitor 2018-2024). Legally, the Immigration and Naturalisation Service (IND) is required to issue a decision within 12 months of receipt.

[3]The locations of COA centres are also shown in Figure A2 in the Appendix. Dröes and Koster (2023) show that reception centres are as good as randomly distributed across the Netherlands.

[4]The estimated cost of the integration programme is € 7,000 (€ 14/h×500h). Fiolet Taaltrainingen (nd) indicates that the average preparation time is 500 hours. The average cost of integration courses in Amsterdam for instance is € 13.8 per hour (Stichting Blik op Werk, nd) and there is a fee of € 150 to take the exams.

4 Data and sample

4.1 Data

This study utilises Dutch administrative data of refugee cohorts entitled *Asielcohort*, which is provided by the Dutch Central Bureau of Statistics (CBS). It covers all refugees and asylum seekers who arrived in the COA centres or received an asylum residence permit as well as very detailed personal information such as country of origin, the location of the COA centre they registered in, current location, education obtained in the Netherlands, economic status and earnings, and allows us to construct the majority of the variables used in this analysis.

The sample for our estimations consists of all refugees in the Netherlands, aged 18 or over, who obtained an asylum residence permit in the period 2014-16, and who remained in their initially assigned municipality. This provides a total of 34,477 unique refugees. Each refugee is observed annually from the year following permit receipt until they move out of their initially assigned municipality, the seventh year since permit receipt, or 2023, whichever comes first. This results in an unbalanced panel.This latter requirement prevents post-assignment sorting and is returned to in Section 5.2.

We complement this dataset with municipality-level information including unemployment rate and population density from CBS, matching to *Asielcohort* using municipality codes. In addition, the *BRP* (Personal Record Database), which records the universe of residents in the Netherlands, is also used to calculate the share of co-national population as well as to identify refugees who have acquired Dutch citizenship. Furthermore, the wage data *SPOLIS* contains labour market outcomes of all employed individuals in the Netherlands, and is used to compute hours worked and whether or not an individual is in employment.

4.2 Sample characteristics

As Table 1 indicates, 41.8% of our sample—refugees who arrived in the Netherlands in 2014, 2015 or 2016—received Dutch citizenship by the end of 2023. Column (1) also indicates that the average age of refugees in our sample is about 31 years and that only 30% are female. We also see that 62.8% of the sample are from Syria, 11.8% from Ethiopia and about 10% from Eritrea. Table 1 indicates that 30.8% of our sample are single, while 58.0% are parents.

Table 1 also provides summary statistics for the sub-sample of refugees who naturalised in column (2), compared with those who did not in column (3). It indicates that the two groups are almost identical in terms of age and gender although, predictably, those who naturalised had been in the Netherlands for longer (6.8 years) than those

TABLE 1 – SUMMARY STATISTICS (COHORTS 2014-2016)

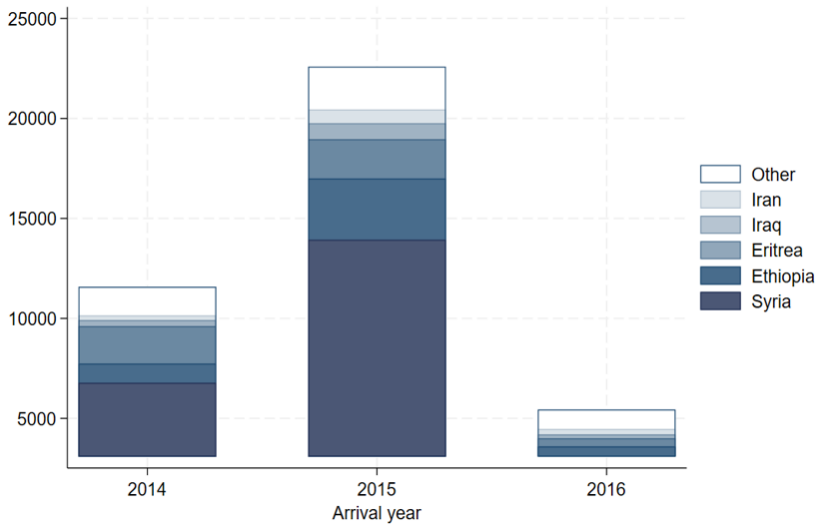
	(1) All		(2) Naturalised		(3) Non-naturalised	
	Mean / %	SD	Mean / %	SD	Mean / %	SD
Naturalised	41.8%					
Years since migration	5.80	1.31	6.79	0.88	5.09	1.09
Arrival year						
2014	30.7%		31.6%		30.0%	
2015	58.3%		60.4%		56.8%	
2016	11.1%		8.1%		13.2%	
Asylum claim months	4.57	4.27	4.57	4.14	4.57	4.37
Arrival age	30.97	10.08	32.06	10.20	30.19	9.92
Female	29.6%		29.3%		29.9%	
Country of origin						
Syria	62.8%		70.4%		57.4%	
Ethiopia	11.8%		8.8%		13.9%	
Eritrea	9.9%		6.5%		12.3%	
Iraq	2.8%		2.7%		2.9%	
Iran	2.5%		2.1%		2.7%	
Stateless	11.2%		20.1%		4.9%	
Family size	2.20	1.76	2.35	1.83	2.10	1.70
Position in household						
Single	30.8%		25.5%		34.5%	
Spouse/partner	8.1%		8.4%		7.8%	
Parent	58.0%		63.4%		54.2%	
Child	3.1%		2.7%		3.5%	
Current municipality						
Population density	1.860	1.811	1.858	1.799	1.861	1.819
Co-national density	0.040	0.078	0.040	0.078	0.041	0.079
Unemployment rate	3.9%	0.9%	3.9%	0.9%	3.9%	0.9%
PVV voting share	14.1%	4.4%	14.1%	4.4%	14.1%	4.4%
Co-nat. education level	1.47	0.55	1.34	0.69	1.57	0.40
Co-nat. years in municipality	7.17	3.16	6.61	3.73	7.57	2.59
Co-nat. employment rate	36.9%	15.7%	33.6%	18.6%	39.3%	12.8%
Employed co-nat. stock (in 1000s)	1.236	2.649	1.195	2.635	1.265	2.658
Observations	123,622		51,726		71,896	

Notes: Sample consists of refugees from the 2014-2016 arrival cohorts. Column (2) presents those who naturalised while Column (3) presents those who have not naturalised. Population density and co-national population density are measured in units of 1,000 addresses/km^2, while employed co-national stock is in 1,000. Unemployment rate refers to the share of unemployed among the total population in the municipality. Co-national education level is coded as 1 (low), 2 (secondary), and 3 (tertiary education) in the Netherlands. Co-national years in municipality denotes the average years of residence in the municipality among co-nationals. Co-national employment rate refers to the share of employed among co-nationals in the municipality. PVV voting share is the average municipal vote share for the PVV party between 2010 and 2017.

TABLE 2 – MUNICIPAL LOCATIONS OF REFUGEES

No	Municipality	Sample distribution	Population distribution
1	Amsterdam	6.0%	5.0%
2	Rotterdam	4.4%	3.7%
3	's-Gravenhage	3.9%	3.1%
4	Utrecht	2.3%	2.0%
5	Groningen	1.8%	1.3%

Notes: Refugee sample consists of refugees from the 2014-2016 arrival cohorts. Population by municipality is as of January 2019 from StatLine.



Notes: Number of refugees from each country of origin by arrival year, from 2014 to 2016. The sample includes both integrated (those who passed or were exempted from the exam) and non-integrated refugees, as well as those who moved from their initially allocated municipality.

FIGURE 2 – THE NUMBER OF REFUGEES BY ARRIVAL COHORT

who did not (5.1 years).[5] It is also notable that 70.4% of those who naturalised were from Syria, compared to 57.4% of the non-naturalised, while 25.5% of the naturalised were single compared to 34.5% of the non-naturalised. With respect to locational characteristics, including population density, unemployment rate, and voting share for the far-right PVV party, the naturalised and non-naturalised groups are almost identical in all respects.

Figure 2 provides the total number of refugees in our sample that arrived in each year and the countries of origin of the largest groups. Throughout the period, refugees from Syria are the largest group, although other countries account for a notable proportion in particular years too, *e.g.*, Eritrea accounted for one-fifth of refugees in 2014.

[5]This latter finding is unsurprising since a requirement of naturalisation is to have resided in the Netherlands for at least 5 years.

5 Econometric framework

5.1 Role of assignment location on naturalisation

We begin the empirical analysis by examining whether urban density influences the decision to naturalise. To do so, we estimate the following baseline equation:

$$Pr(y_{imt} = 1) = \beta + \lambda D_{mt_a} + x'_{it_0}\theta + \eta_r + e_{it}, \tag{4}$$

where y_{imt} indicates whether individual i in municipality m in year t has naturalised. D_{mt_a} denotes the urban density in the municipality of the refugee's initially assigned location in t_a, and x_{it_0} denotes a vector of individual characteristics such as gender, country of origin, and age at arrival, t_0.[6] We further include years since migration to the Netherlands (a measure of the number of years from arrival to integration or 2023 if no integration), length of asylum application and arrival year dummies. As discussed in Section 5.2 below, we restrict our analysis to those refugees

who remained in their initially assigned municipality until acquiring naturalization. Hence, the municipality that refugees were allocated to is the municipality in which they resided at the time of naturalisation. We include 40 travel-to-work-area fixed effects, η_r, known as COROP regions in the Netherlands. Finally, e_{it} is the error term. Equation 4 is estimated using a linear probability model with standard errors clustered at the municipality level. Appendix Tables A1 and A2 provide a detailed description of all variables.

In Section 2, we hypothesised that co-national networks, rather than urban density per se, may be the key determinant of the decision to naturalise. We therefore extend the equation as follows:

$$Pr(y_{imt} = 1) = \beta + \lambda_1 D_{mt_a} + \lambda_2 D^2_{mt_a} + \psi_1 C_{mt_a} + \psi_2 C^2_{mt_a} + x'_{it_0}\theta + \eta_r + e_{it} \tag{5}$$

where C_{mt_a} is co-national density in municipality m. In line with Section 2 we also allow for non-linear effects of urban and co-national density.

Our locational characteristics are measured at the Dutch municipality level. During our sample period there were 355 such municipalities, with an average land area of 107km^2.

In the existing literature, De La Roca and Puga (2017) measure density in Spain within a circle of radius 10km (so an area of 314km^2) while studies examining co-ethnic density use spatial units varying from neighbourhoods in Stockholm (Klaesson et al., 2021), to Danish municipalities (which on average are slightly larger than their Dutch counterparts) (Damm, 2009), to much larger Swiss Cantons (averaging a land area

[6] In this study, the five largest refugee nationalities are captured by five separate dummy variables. All remaining nationalities are grouped into an 'other' category, with 'stateless' coded separately. Please note that $t_a > t_0$, see Figure 1

of 1,473km^2) (Martén et al., 2019). As such, Dutch municipalities would seem to fall comfortably within those used in the existing literature and would seem to be the appropriate spatial scale to capture density effects relating to factors such as labour markets and public attitudes.

As outlined in Section 2, there are several mechanisms through which co-national density can affect the costs and benefits of integration. The effectiveness of co-ethnic networks in influencing the costs of naturalisation may increase with the 'quality' of the co-ethnic group; its longevity, educational composition, and participation into employment. Such quality is likely to enhance the community's capacity to accumulate and disseminate relevant knowledge (Edin et al., 2003; Klaesson et al., 2021). We use three different measures of co-ethnic quality. First, the share of *employed* co-nationals to capture those who are exposed to other workers and the business environment more generally as sources of information. Second, we capture the average education level of the co-ethnic community measured as the average education level in the Netherlands.[7] Third, we proxy the age of the co-ethnic enclave itself by measuring the average length of time that members of the enclave have resided in that municipality for. We include this on the basis that an older enclave will contain greater knowledge and experience of Dutch administrative processes.

We argue that co-national density more generally can heighten the economic benefits of citizenship by expanding labour market opportunities and improving access to information. We therefore also control for the municipal unemployment rate in some extended specifications.

Finally, the social benefits of naturalisation may be lower in dense areas if discrimination is less salient. To capture these public attitudes we include the average vote share of the anti-immigrant PVV across the 2010 and 2017 national elections.

If the estimate of ψ does not change after including these controls, we interpret this change as suggestive evidence of weak ties within co-national networks to matter for naturalisation decisions, rather than observable measures of network quality, general labour market opportunities, or external public attitudes.

5.2 Quasi-random allocation and identification

A key feature of the allocation of refugees to social housing locations within the Netherlands is that it is undertaken on a quasi-random basis. This has the benefit of alleviating concerns that there may be sorting of, for instance, refugees of certain nationalities to big cities.

[7] Co-national education level is the mean education level among co-nationals in the municipality, coded as 1 (low), 2 (secondary), and 3 (tertiary education).

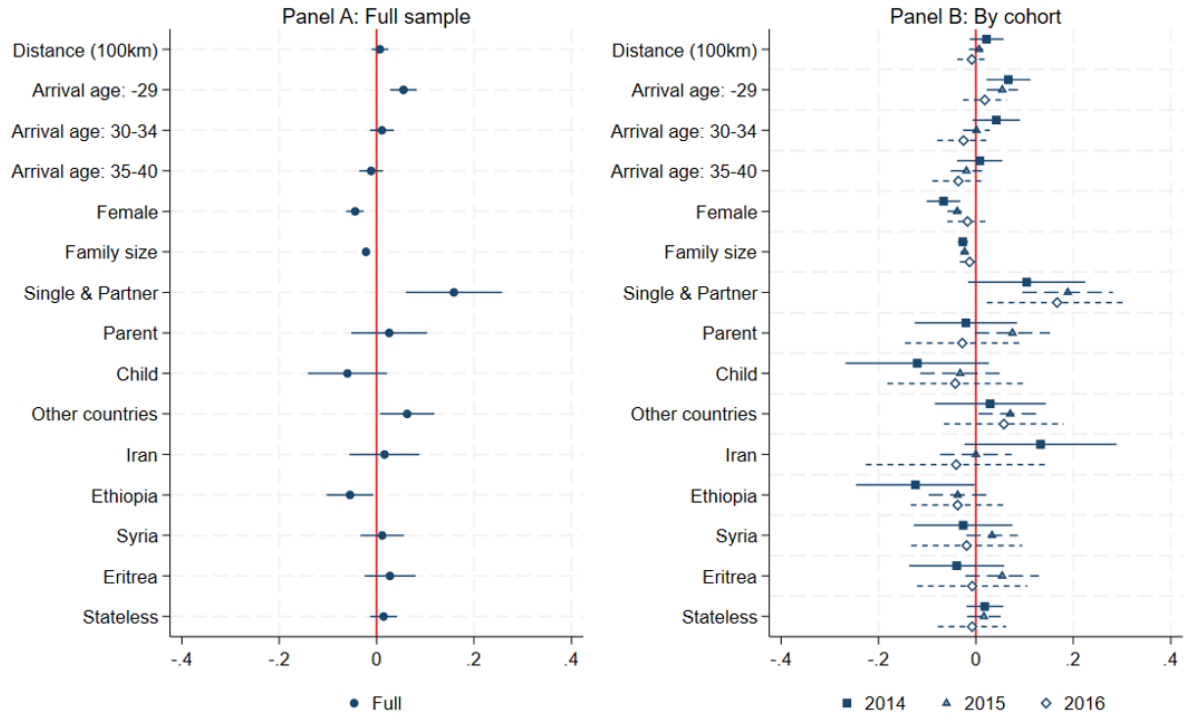
At arrival, applicants are placed in *AZCs* (asylum seeker centres) located throughout the country, where they stay while their asylum application is processed. Once granted asylum and the right to remain in the Netherlands, they are assigned to social housing in a municipality. As Hooijer (2020) points out, the refugee dispersal system in the Netherlands aims to prevent the disproportionate concentration of refugees in large cities by providing refugee targets for all municipalities proportional to their population size. Other factors, such as individual characteristics, should not play a major part in the dispersal decision; and physical interaction between refugees and placement officers is extremely limited or non-existent. Still, we expect assignment decisions to be driven primarily by the availability and characteristics of the social housing stock. For example, families are more likely to be placed in larger units, which are more common in suburban municipalities, whereas single refugees are more likely to be assigned to smaller units in denser, central locations. Crucially though, refugees' nationality does not play a role in where they are assigned. As a result, Syrian refugees are for example not systematically more likely to be placed in municipalities with pre-existing Syrian clusters.

Refugees receive a single offer of accommodation on a take-it-or-leave-it basis. If they decline the offer they forfeit the right to reside in an AZC refugee centre and they would not be given priority for social housing in other municipalities. In practice this means joining the back of a very long queue—in Amsterdam and Utrecht for instance, the waiting time for social housing is at least 9 years.[8] Overall, refugees have little scope for location choice. As Hooijer (2020) notes, this contrasts with the process in other European countries such as Denmark and Sweden. Studies such as Hooijer (2020) and Robinson et al. (2003) emphasise that refugee dispersal in the Netherlands is largely a mechanical exercise.

A quasi-random, or exogenous, allocation of refugees implies that their placement in housing is independent of individual characteristics. In the context of our analysis, to avoid endogeneity concerns, this requires refugee allocation to be independent of *unobserved* characteristics, *conditional* on observable characteristics that may affect location assignment. The Dutch dispersal system provides no obvious mechanism through which unobserved refugee characteristics could influence their spatial allocation and our analysis controls for a range of observable refugee characteristics.

Nevertheless, to evidence the random distribution of the refugees in our sample, we undertake two exercises. First, we regress our initial variable of interest, population density, on observed individual refugee characteristics. The results are provided in Figure 3. The left hand panel shows the results for the full sample, while the right hand side shows the results for the three individual cohorts 2014, 2015 and 2016 separately.

[8]See for example, EU factcheck.

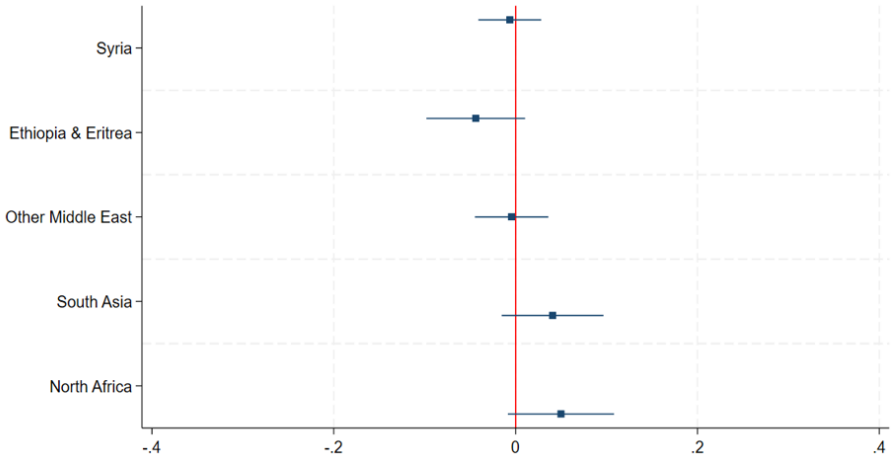


Notes: The dots represent the point estimates from regressions of each individual characteristic on standardised population density, with standard errors clustered at the municipality level. The bars indicate 95% confidence intervals. Results are shown separately for the full sample and for permission-obtained cohorts (2014, 2015, and 2016). Distance refers to the distance between the centroids of refugee centre municipalities and allocated municipalities, measured in 100km. The full table is available in the Appendix (Table A3).

FIGURE 3 – RANDOMISATION TEST: POPULATION DENSITY

We also constructed a 'distance' variable, which measures the distance between the refugee centre to which refugees are initially allocated and the public housing that they are ultimately assigned to. This is to ensure there is no systematic allocation of refugees in areas close to refugee centres, for instance.

It can be seen that the vast majority of observables, including the distance variable and variables capturing the country of origin, are not associated with population density in a statistically significant manner, as we would expect. While some variables show a degree of statistical significance, this typically stems from one or at most two cohorts rather than from all three cohorts. Furthermore, the variables that do show some statistical significance, such as gender and family size, likely reflect housing allocation constraints. Families, especially single mothers with children, are more likely to be assigned to larger single-family units, which are disproportionately available in less urban municipalities, whereas singles and males are more often placed in smaller apartments in denser areas.



Notes: The dots represent the point estimates from regressions of each individual characteristic on standardised co-national density, with standard errors clustered at the municipality level, controlling for the same individual characteristics as in Figure 3. The bars indicate 95% confidence intervals. Each row presents the randomisation test for a specific country-of-origin and co-national density pairing: Syrian refugees on Middle Eastern density; Eritrean and Ethiopian refugees on East African density; non-Syrian Middle Eastern refugees on Middle Eastern density; South Asian refugees on South Asian density; and North African refugees on North African density. Refugees from other regions are excluded from this analysis due to insufficient sample size. The full set of results is reported in Table A4 in the Appendix.

FIGURE 4 – RANDOMISATION TEST: CO-NATIONAL DENSITY

Second, given our focus on co-national density, we examine whether refugees are more likely to be allocated to municipalities with a higher presence of their co-nationals. This would be problematic for our analysis if certain nationalities differed in unobserved ways that both affected their propensity to naturalise and influenced where they ended up living, for example if Syrians had stronger preferences for urban areas and were therefore more likely to sort into cities. Figure 4 therefore provides the association between refugees' country of origin and the density of co-nationals within the municipality to which they are assigned. As can be seen, we find no evidence to suggest that refugees are more likely to be assigned to municipalities in which fellow co-nationals reside.

The refugee dispersal process outlined above and the analysis undertaken provides no indication to suggest that the dispersal process is not random, *conditional* on some observable refugee characteristics. Despite this fact, we confine our sample to refugees who remained in their initially assigned municipality until successfully acquiring naturalization or the end of the sample period. This prevents *post-assignment* sorting; however, notably, only a minority of refugees (12.8% of the total sample) relocate to other municipalities. Inclusion of these 'movers' in our estimations will not materially alter our primary findings.

6 Results

6.1 The effect of density on civic integration

Table 3 presents the baseline results, which examine how the density of the initial assignment location affects the probability of naturalising. All variables in the tables are standardised with mean zero and unit standard deviation to ease interpretation.

Column (1) estimates a linear relationship between the probability of naturalisation and population density: a one standard deviation increase in density is associated with a 0.698 percentage point higher probability of naturalisation. Column (2) adds a quadratic term; the linear term remains similar in magnitude and statistically significant, while the quadratic term is statistically insignificant.

In Column (3) we add linear and quadratic terms for co-national density. Co-national density absorbs the entire effect of population density, which becomes statistically insignificant and close to zero, while both the linear and squared terms in co-national density are statistically significant. This suggests that, beyond the benefits and costs associated with co-national density, there is little evidence of an independent effect of urban density itself. The estimated turning point is 2.5 standard deviations above the mean (where the 95th percentile is 2.21 standard deviations above the mean). Below this level, co-national density is positively associated with the probability of naturalisation, whereas above it the relationship becomes negative. This turning point therefore indicates that it is only at the very highest levels of observed co-national density that its relationship with the probability to naturalise becomes negative. Column (3) further indicates that at the mean level of co-national density, a standard deviation increase in co-national density implies a 1.3 percentage point increase in the naturalisation probability, which is non-negligible.[9] If we evaluate the marginal effect, instead, at two standard deviations above the mean, a one standard deviation increase in co-national density implies a 0.26 percentage point increase in the probability of naturalising (0.132-2(0.0265*2)), which is still positive but much closer to zero.

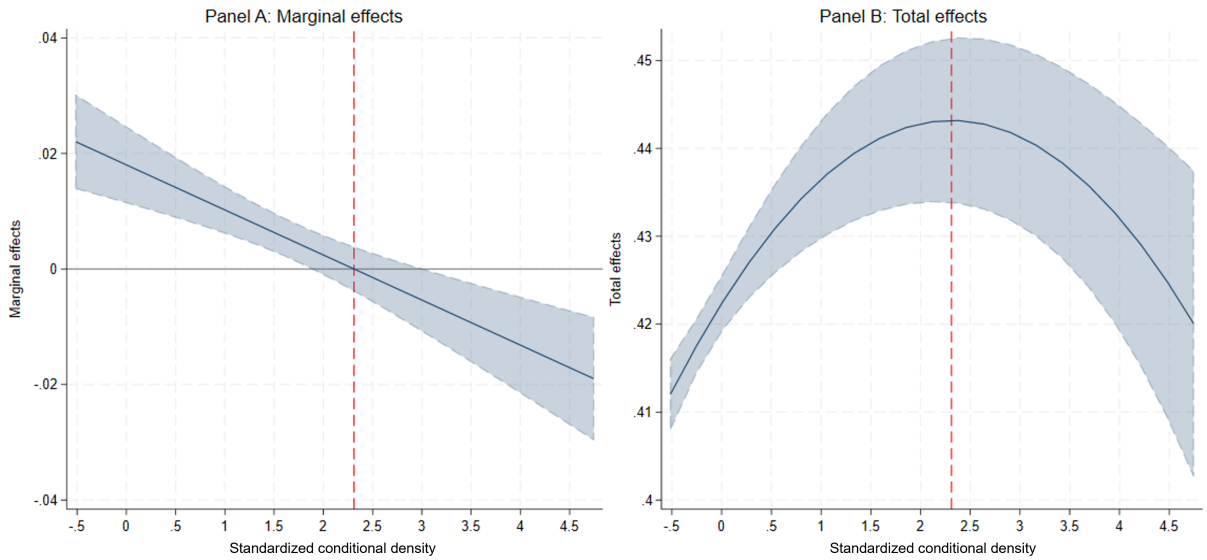
Columns (4)-(7) present several refinements. Column (4) excludes population density, column (5) adds province fixed effects, column (6) adds travel-to-work-area fixed

[9] At the mean level of co-national density (which equals zero by construction), the marginal effect is $0.0132 - 2 \times 0.00265 * 0 = 0.0132$, which is simply the linear coefficient from the quadratic specification. We are unaware of previous studies that examine the link between co-national networks and refugee naturalisation with which we can make comparison. However, studies have examined the impact of co-national networks on immigrant employment outcomes. For instance, Battisti et al. (2022) find a one standard deviation increase in co-national network size increases the short-term probability of being employed by 7.8 percentage points, while Edin et al. (2003) find a one standard deviation increase in ethnic concentration increases earnings by 13%. Studies that explore the relationship between co-national density and *immigrant* naturalisation find mixed results but Abascal (2017) finds that a 10-percentage-point increase in the share of co-ethnics who are naturalised is associated with a 2–3 percentage-point increase in an immigrant naturalising. Although we cannot make direct comparison with these studies, it is notable that our effect size is smaller in magnitude than those estimated for labour market outcomes.

TABLE 3 – BASELINE REGRESSION RESULTS

Dependent variable:	*Naturalised*						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Population density *(sd)*	0.00698***	0.00698***	0.000991				
	(0.00210)	(0.00256)	(0.00372)				
(Population density *(sd)*)^2		4.97e-06	0.00172				
		(0.00164)	(0.00231)				
Co-national density *(sd)*			0.0132***	0.0147***	0.0148***	0.0180***	0.0269***
			(0.00431)	(0.00318)	(0.00322)	(0.00334)	(0.00913)
(Co-national density *(sd)*)^2			−0.00265**	−0.00240**	−0.00270***	−0.00390***	−0.00704**
			(0.00111)	(0.000948)	(0.000889)	(0.000850)	(0.00287)
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Province fixed effects					Yes		
TTWA fixed effects						Yes	Yes
Number of observations	123,622	123,622	123,622	123,622	123,622	123,622	31,753
Years since residence permit	1-7	1-7	1-7	1-7	1-7	1-7	6
Co-national density turning pt. (*sd*)			2.49	3.06	2.74	2.31	1.91
R^2	0.080	0.080	0.080	0.080	0.080	0.080	0.179

Notes: All specifications are estimated using a linear probability model. *sd* stands for variables standardised with mean zero and unit standard deviation. Column (1) regresses the probability of naturalisation on standardised population density at the municipality level, including individual controls: arrival age, gender, country of origin, months of asylum application, position in the household, family size, and arrival year. Column (2) adds a quadratic term in population density. Column (3) further includes a quadratic term in co-national density. Column (4) excludes population density from Column (3). Column (5) adds province fixed effects. Column (6) adds travel-to-work-area (TTWA) fixed effects. Column (7) reports the cross-sectional specification measured in the sixth year since residence permit approval. Standard errors are clustered at the municipality level, in parentheses, *** p<0.01, ** p<0.05, * p<0.1.



Notes: The figures display the relationship between the probability of naturalisation and standardised co-national density, expressed in standard deviations from the mean, based on the specification in Column (6) of Table 3. Panel A shows the marginal effect of co-national density at each value of the distribution, with the shaded area representing the 95% confidence interval. The red dashed line indicates the turning point at 2.311, beyond which the marginal effect becomes negative. Panel B displays the total effect, defined as the discrete change in the predicted probability of naturalisation.

FIGURE 5 – CO-NATIONAL DENSITY AND NATURALISATION: NON-LINEAR EFFECTS

effects, and column (7) restricts the sample to everyone in their sixth year since migration. Given the five-year residency requirement and processing time of up to 12 months, the sixth year is the first point at which refugees are eligible to apply for naturalisation. Across all specifications, the non-linear relationship between naturalisation probability and co-national density remains statistically significant and consistent, with turning points at the very upper levels of co-national density within our sample.

Figure 5 plots the marginal effects based on the preferred specification shown in Column (6). The relationship is positive up to 2.31 standard deviations away from the mean, beyond which the marginal effect turns negative. This declining marginal effect of co-national density is consistent with the theoretical framework in Section 2 and Ozgen et al. (2017). At low levels of co-national density, an increase in co-national density substantially reduce information and assimilation costs because peer networks are initially weak. As co-national density rises, co-ethnic networks facilitate information sharing and lower the fixed costs of integration, raising the probability of naturalisation. At high levels of co-national density, however, the negative relationship suggests that the costs of co-national concentration, such as weaker incentives to assimilate, begin to dominate.

6.2 *Further exploration and potential mechanisms*

Table 4 provides a further exploration of potential mechanisms, motivated by the conceptual framework in Section 2. We argued that co-national density may be correlated with several local characteristics that shift either the benefits of naturalisation, $B^N_{ijt} = B^E_{ijt} + B^S_{ijt}$, or its costs, $C^N_{ijt} = C^I_{ijt} + C^A_{ijt}$. For example, co-national density may proxy for labour-market opportunities (affecting B^E_{ijt}), the quality of co-national networks and information transmission (affecting C^I_{ijt}), the strength of bonding versus bridging ties (affecting C^A_{ijt}), or local social attitudes and discrimination (affecting B^S_{ijt}). Each column therefore augments the baseline specification from Column (6) of Table 3 with a single municipality-level variable capturing one of these channels, before combining them jointly in Column (7). The goal is to assess whether the estimated non-linear effect of co-national density is robust to plausible correlates that theory suggests could matter for B^N_{ijt} and C^N_{ijt}.

Column (1) adds the municipal unemployment rate as a proxy for general labour market conditions. The coefficient is statistically insignificant and the estimated co-national density effect is essentially unchanged, suggesting that broad local labour market tightness is not the main driver of naturalisation. This is in line with the observation that overall population density does not affect the naturalisation probability. Columns (2)–(5) then proxy for the quality of co-national networks, which may condition both the economic returns to citizenship and the extent to which co-national ties substitute for it. We consider the average education level and years of residence of co-nationals, as well as measures of co-national employment, capturing the extent to which co-nationals can transmit useful labour-market information and facilitate access to jobs (Edin et al., 2003; Patacchini and Zenou, 2012; Martén et al., 2019; Stips and Kis-Katos, 2020). Across these specifications, the co-national density coefficients remain stable.

Finally, Column (6) controls for local attitudes towards immigrants using the average municipal vote share for the PVV over 2010-2017, which we interpret as a proxy for local resistance towards immigrants. The PVV has consistently campaigned on restricting immigration and asylum, so a higher local PVV vote share plausibly captures more anti-immigrant attitudes and a less welcoming local environment (see Dröes and Koster, 2023, for further empirical support). Such resistance may affect the net returns to naturalisation through social benefits, B^S_{ijt}, but it may also affect the cost side by shaping access to information and administrative support, C^I_{ijt}, and potentially the speed of the naturalisation process. In particular, more hostile local environments could slow down naturalisation by reducing access to supportive institutions and increasing informal barriers, but they could also speed it up if they increase the perceived value of citizenship as a protective device. The PVV vote share is not statistically significant in these specifications, its inclusion does not alter the estimated non-linear effect of co-national density.

Column (7) includes all mechanism variables simultaneously. Municipal unemployment, co-national education, and co-national years of residence are statistically significant, yet the coefficients of co-national density remain stable. Taken together, these results suggest that the association between co-national density and the probability of naturalisation is robust to, and not driven by, observed differences in co-national network quality, local labour market conditions, or local public attitudes toward immigrants. This suggests that the non-linear effect of co-national density is not primarily driven by observable differences in the *quality* of co-national networks, by broader labour market opportunities, or by local resistance towards immigration. Although we acknowledge that our data provide no suitable proxies for bureaucratic costs C^I_{ijt} or assimilation costs C^A_{ijt}, or the strength of weak ties themselves, our findings are strongly consistent with the notion that these are the key mechanisms through which co-national density is influencing the decision to naturalise. Indeed, the strength of weak ties provided by co-national networks are likely reducing the cost of gaining information relating to the process of naturalisation, thereby increasing the likelihood of gaining citizenship. However, at the same time dense co-national networks reduce refugees' incentives to form bridging ties and invest in host-country–specific skills resulting in a reduced likelihood of naturalisation. Such networks may also reduce the social benefits of naturalising B^S_{ijt} by providing informal insurance and protection that partially substitutes for the social and political insurance value of citizenship. This combination naturally delivers positive effects at lower densities and a diminishing, potentially negative, marginal effect at high densities.

6.3 Robustness checks

We conduct a series of robustness checks to assess the stability of the baseline results across alternative samples and specifications (Table 5).

Column (1) re-estimates the baseline specification, including movers, defined as individuals who moved from the allocated municipality after 2020. The estimated coefficient is smaller than in the baseline specification, consistent with reduced exposure to the allocated municipality. Columns (2)–(4) replicate the baseline specification separately by cohort (residence permit granted in 2014, 2015, and 2016, respectively). Cohorts 2014 and 2015 show similar magnitudes to the baseline results, while Cohort 2016 shows smaller and statistically insignificant estimates, possibly reflecting shorter exposure periods and fewer opportunities to apply for naturalisation within the study period, consistent with the literature showing that naturalisation probability increases with time since arrival (*e.g.*, Govind, 2021; Mossaad et al., 2018).

Columns (5)–(6) report results separately for individuals who passed the integration exam and those who were exempted. The estimated magnitudes are similar across the

TABLE 4 – REGRESSION RESULTS: POTENTIAL MECHANISMS

Dependent variable:	*Naturalised*						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Co-national density *(sd)*	0.0211***	0.0182***	0.0165***	0.0181***	0.0177***	0.0175***	0.0179***
	(0.00377)	(0.00345)	(0.00365)	(0.00335)	(0.00465)	(0.00341)	(0.00469)
(Co-national density *(sd)*)^2	−0.00450***	−0.00366***	−0.00359***	−0.00389***	−0.00386***	−0.00379***	−0.00380***
	(0.000910)	(0.000890)	(0.000892)	(0.000857)	(0.000907)	(0.000837)	(0.000949)
Labour market factors:							
Unemployment rate *(sd)*	−0.00329						−0.00531**
	(0.00235)						(0.00262)
Quality of co-national network:							
Education level *(sd)*		0.0119**					0.0170**
		(0.00586)					(0.00701)
Residence years *(sd)*			0.00486				0.00620*
			(0.00353)				(0.00376)
Employment rate of co-nationals *(sd)*				0.00135			−0.00333
				(0.00297)			(0.00326)
Employed co-national stock *(sd)*					0.000303		0.00260
					(0.00301)		(0.00316)
Local resistance:							
PVV vote share *(sd)*						−0.00248	−0.00154
						(0.00262)	(0.00274)
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
TTWA fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	123,622	123,596	123,609	123,597	123,609	123,622	123,584
Co-national density turning pt. (*sd*)	2.34	2.49	2.30	2.33	2.29	2.31	2.36
R^2	0.080	0.080	0.080	0.080	0.080	0.080	0.081

Notes: All specifications are estimated using a linear probability model. *sd* stands for variables standardised with mean zero and unit standard deviation. Each column adds a single municipality-level characteristic to the baseline specification from column (6) of Table 3. Column (1) adds the unemployment rate among all population in the municipality, column (2) co-national education level, column (3) co-national average years of residence in the municipality, column (4) co-national employment rate, column (5) employed co-national stock, and column (6) the average PVV vote share in the municipality between 2010 and 2017. Column (7) includes all additional controls simultaneously. Standard errors are clustered at the municipality level, in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

TABLE 5 – REGRESSION RESULTS: ROBUSTNESS

Dependent variable:	*Naturalised*									
	Movers	Cohort: 2014–2015–2016			Exam status		Gender		Alternative measures	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Co-national density *(sd)*	0.0116***	0.0184***	0.0181***	0.00836	0.0195***	0.0159***	0.0206***	0.0102**		
	(0.00343)	(0.00589)	(0.00441)	(0.00940)	(0.00363)	(0.00472)	(0.00395)	(0.00436)		
Co-national density $(sd)^2$	−0.0025***	−0.0045**	−0.0036***	−0.0026	−0.0040***	−0.0040***	−0.0044***	−0.0026**		
	(0.0008)	(0.0020)	(0.0010)	(0.0026)	(0.0009)	(0.0013)	(0.0010)	(0.0011)		
Co-national stock *(sd)*									0.0114*	
									(0.0066)	
Co-national stock $(sd)^2$									−0.0015	
									(0.0023)	
Co-national emp. density *(sd)*										0.0179***
										(0.0033)
Co-national emp. density $(sd)^2$										−0.0041***
										(0.0009)
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
TTWA fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	133,667	37,173	72,006	14,443	86,742	36,880	86,974	36,648	123,622	123,622
Sample		2014	2015	2016	Pass exam	Exempt	Male	Female		
Turning pt. *(sd)*	2.32	2.04	2.51	1.61	2.44	1.99	2.58	1.96	3.80	2.18
R^2	0.079	0.091	0.065	0.103	0.079	0.085	0.078	0.088	0.080	0.080

Notes: All specifications are estimated using a linear probability model. *sd* stands for variables standardised with mean zero and unit standard deviation. Column (1) includes individuals who moved from the allocated municipality after 2020. Columns (2)–(4) replicate the baseline specification by cohort (2014, 2015, and 2016, respectively). Columns (5)–(6) report results separately for those who passed the integration exam and those who were exempted. Columns (7)–(8) report results by gender. Columns (9)–(10) replace the main density measure with co-national stock and employed co-national density, respectively. Standard errors are clustered at the municipality level, in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

two groups. Columns (7)–(8) present results separately by gender. The estimated effects are larger for males, although both genders show statistically significant coefficients with similar patterns.

Columns (9)-(10) replace the main density measure with alternative locational characteristics, namely co-national stock and employed co-national density (per land area). The results are comparable to the baseline specification.

To further validate our baseline results, we conduct placebo tests by randomly reassigning refugees across municipalities. Specifically, we randomly permute the assignment of refugees to municipalities 500 times and re-estimate the specification from Column 6 of Table 3 for each draw. If our baseline estimates reflect a genuine relationship between co-national density and naturalisation outcomes, the coefficients obtained from these placebo regressions should be statistically insignificant and centred around zero. Figure A3 in the Appendix confirms this: the placebo coefficients are tightly concentrated near zero, and the associated t-statistics range from 0.88 to 1.27, well below the conventional threshold. This stands in stark contrast to our baseline t-statistics of 4.59 to 5.39. Taken together, these results suggest that our baseline findings are unlikely to be driven by spurious correlation or omitted variable bias, providing further confidence in the causal interpretation of our estimates.

Overall, the robustness checks confirm that the main patterns observed in the baseline results remain broadly stable across alternative specifications.

7 Conclusion

When refugees do not achieve full legal integration in host countries they become socially and economically isolated and legally *invisible* to politicians and civil servants with no right or ability to influence policy. On the politicians side the absence of responsibility/duty often results in adverse views towards immigrants and a lack of investment in their integration. Yet despite the complexity and financial cost of refugee settlement programmes and the socio-economic impacts that would arise from their failure, policy makers currently have little guidance as to what factors may hinder or facilitate refugee integration. Existing evidence tends to be US based, focuses exclusively on labour market integration, examines immigrants rather than refugees, or examines earlier waves of refugees into Europe which were different in terms of both scale and ethnic composition. With this background in mind we examine rich, individual-level data for refugees who arrived in the Netherlands between 2014 and 2016 to identify the factors that affected their likelihood of achieving legal integration. Benefiting from the quasi-random allocation of refugees within the Netherlands, we are able to identify the causal role played by assignment location characteristics, controlling for individual-level characteristics and the asylum process itself. This allows us

to focus on how urban and co-national density may have influenced refugee integration.

Our analysis shows that the local concentration of co-nationals plays a central role in influencing refugees' naturalisation decisions. While population density initially appears positively associated with naturalisation, this effect disappears once co-national density is included, indicating that the relevant local mechanism operates through co-national networks rather than urban density per se. The relationship between co-national density and naturalisation is strongly non-linear. At lower levels of co-national density, increases significantly raise the probability of naturalisation: a one-standard-deviation increase in co-national density increases the likelihood of naturalising by roughly 1.3 percentage points at the mean. However, the marginal effect declines as density rises and becomes negative beyond approximately the 95th percentile of co-national density in our sample. This inverted U-shaped pattern is consistent with our theoretical framework: moderate co-national presence reduces information and assimilation costs through peer networks, whereas very high concentrations may weaken incentives for legal integration by providing alternative sources of social and economic support.

Further analyses suggest that this relationship is robust and not driven by other local characteristics. Controlling for local labour market conditions, the quality of co-national networks, and local political attitudes toward immigration leaves the estimated non-linear effect largely unchanged. Additional robustness checks - including alternative samples, cohort splits, subgroup analyses, and alternative measures of co-national presence - yield similar patterns. The results also remain stable in placebo tests based on random assignment across municipalities. Taken together, these findings indicate that the density of co-national networks has an independent and non-linear influence on civic integration, primarily through its effects on information frictions, assimilation incentives, and the social benefits associated with citizenship.

The findings of this study offer key insights for policymakers involved in refugee settlement and integration strategies. In particular, they suggest several implications for the design of placement policies. Assigning refugees to locations where co-nationals are already present appears to increase the probability that these individuals will subsequently acquire Dutch citizenship. The presence of co-national networks may facilitate knowledge diffusion, access to information, and opportunities for employment, all of which can support successful integration outcomes. Where settlement near co-nationals is not feasible, additional institutional support may be necessary to ensure that refugees are not disadvantaged by the absence of such networks. Policy interventions could focus on facilitating access to information, strengthening professional and social networks, and supporting labour market integration in order to compensate for the lack of co-national ties.

At the same time, these findings indicate the need for a balanced approach. While some degree of co-national presence can be beneficial, excessively dense co-national enclaves may reduce the likelihood of naturalization. Under such conditions, policies aimed at strengthening bridging social capital—such as initiatives that promote interaction with the broader host society—may be required to offset the potential isolating effects of highly concentrated co-national communities.

Since any policies that can reduce the obstacles to refugee integration are likely to be of significant long term benefit to host countries, these policy implications should provide some ammunition to policy makers who wish to overcome populist opposition to further investment into the asylum process. Only with full legal integration can refugees fully contribute to host country economies, participate within their societies and become visible to, and heard by, politicians and policy makers.

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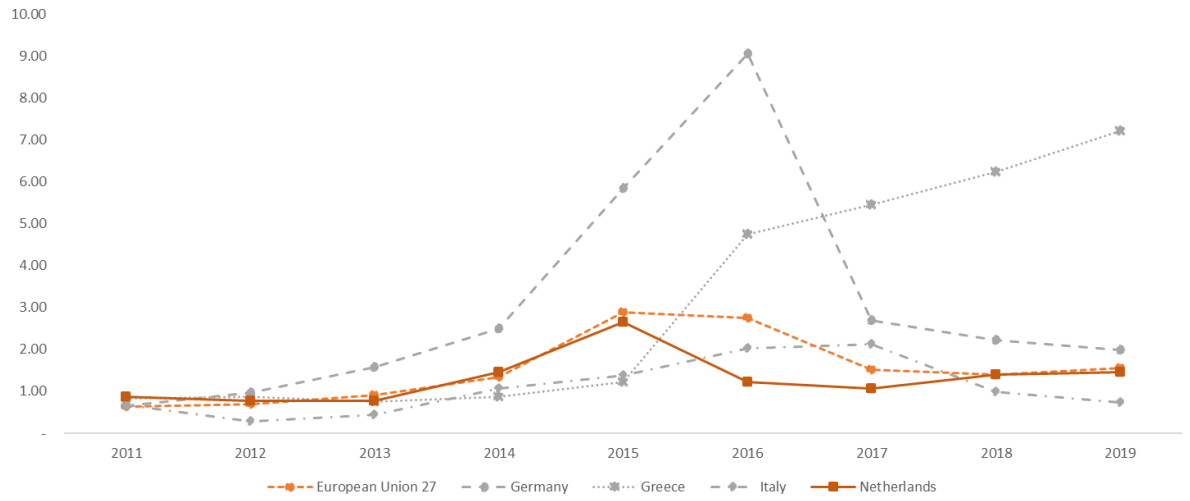
A Appendix

A.1 Refugees in numbers in Europe and in the Netherlands

Figure A1 provides the trends in asylum applications for the Netherlands, a selection of EU countries, and the EU as a whole, with each expressed relative to 2011 and in per capita terms. As Figure A1 indicates, by 2015 asylum applications in the Netherlands (which equalled 45,000 in number) were approximately 3 times their 2011 level, while the EU average was closer to 4.5 times the 2011 level. In large part these increases were a result of the violence in Syria which forced a large number of people to flee. In Germany, asylum applications peaked in 2016 at approximately 14 times their 2011 level while Greece, unlike the rest of the EU, did not experience a reduction in asylum applications after 2015/16 with numbers still increasing in 2019.[10]

Among the recent refugees in the Netherlands, the Central Bureau of Statistics (CBS) reveals that only a quarter of those of working-age who were granted an asylum residence permit in 2014 had a job three and a half years later (CBS, 2019). Furthermore, the vast majority of the employed refugees worked as part-time and/or temporary workers (81 and 89%, respectively). Compared to the overall foreign-born employment rate (64.9% according to OECD (2019a)), asylum residence holders, who are able to work without restrictions, performed notably worse. As a result of poor economic participation, approximately 90% of working-aged refugees were receiving social benefits one and a half years after obtaining their residency permit.

De Vroome and Van Tubergen (2010) and De Vroome et al. (2011) empirically analyse the integration of refugees in the Netherlands, using survey data collected in 2003. Even



Notes: Source: Eurostat (2021); World Bank (2021)

FIGURE A1 – ASYLUM APPLICATIONS PER CAPITA SINCE 2011

[10] In terms of the impact on the labour force, the OECD (2019b) reports that refugees in the Netherlands constitute a 0.2% increase in the labour force, compared to 0.8% in Germany, 0.4-0.6% in Greece and a smaller increase of 0.1-0.15% in other European countries such as France.

though the composition of the refugees' countries of origin differ from that of recent refugees, they found that 74.4% of the sample held Dutch nationality after spending 9.5 years in the Netherlands on average (De Vroome et al., 2011).[11] Ersanilli (2014) claims that the naturalisation rate among all immigrants in the Netherlands is generally high compared to other European countries. Hoon et al. (2019) also point out that over 80% of the immigrants who arrived in the Netherlands from 1995 to 1999 had Dutch citizenship by the end of 2015. On the other hand, the labour market participation rate among the sample, aged between 18 and 64, was only approximately 20% (De Vroome and Van Tubergen, 2010).

[11] The top five countries of origin in their sample are Afghanistan, Iraq, Somalia, Iran and the former Yugoslavia. On the other hand, the recent refugees are mainly from Syria and Eritrea.

A.2 Variable descriptions

TABLE A1 – LIST OF INDEPENDENT VARIABLES AT THE INDIVIDUAL LEVEL

No.	Variable	Description
1	Years since migration (YSM)	A variable that indicates the number of years that the individual has spent in the Netherlands since migration
2	Arrival year	Dummy variables that indicate when an individual arrived in the Netherlands.
3	Arrival age (Age at arrival)	Age when the individual registered at COA refugee centres in the Netherlands for the first time
4	Female	Equal to 1 if the individual is female, 0 otherwise.
5	Family size	The number of individuals in the asylum application
6	Position in household	An indicator of the individual's position in the household. This includes Single; living with a married or unmarried partner and no children (Spouse/Partner); living with children regardless of their marital status (Parent); and living with their parent (Child).
7	Country of origin	The country of origin of each individual. The 5 largest refugee countries of origin (*i.e.*, Syria, Eritrea, Ethiopia, Iran, and Iraq) are coded as dummies for each and the remainder are assigned to Other.
8	Stateless	A dummy indicating the individual is stateless.
9	Asylum application months	Number of months since the individual arrived in the Netherlands to be granted an asylum residence permit

TABLE A2 – LIST OF INDEPENDENT VARIABLES AT THE MUNICIPALITY LEVEL

No.	Variable	Description
1	Population density	The number of people per square kilometre of land (1000 people/km^2).
2	Co-national density	The number of people with the same group of nationalities per square kilometre of land (1000 people/km^2). The nationality groups are based on the Standard country or area codes for statistical use (M49) by the United Nations Statistics Division (UNSD).
3	Unemployment rate	The unemployment rate of each municipality out of the total population aged 15 to 75, taking a value between 0 to 1.
4	PVV voting share	The average municipal vote share for the PVV party between 2010 and 2017.
5	Co-national education level	The mean education level among co-nationals in the municipality, coded as 1 (low), 2 (secondary), and 3 (tertiary education).
6	Co-national years in municipality	The average years of residence in the municipality among co-nationals.
7	Co-national employment rate	The share of employed individuals among co-nationals in the municipality.
8	Employed co-national stock	The total number of employed co-nationals residing in the municipality.
9	Co-national stock	The number of people with the same group of nationalities in municipalities (1000 people/municipality).

A.3 *Randomisation results*

TABLE A3 – RANDOMISATION TEST

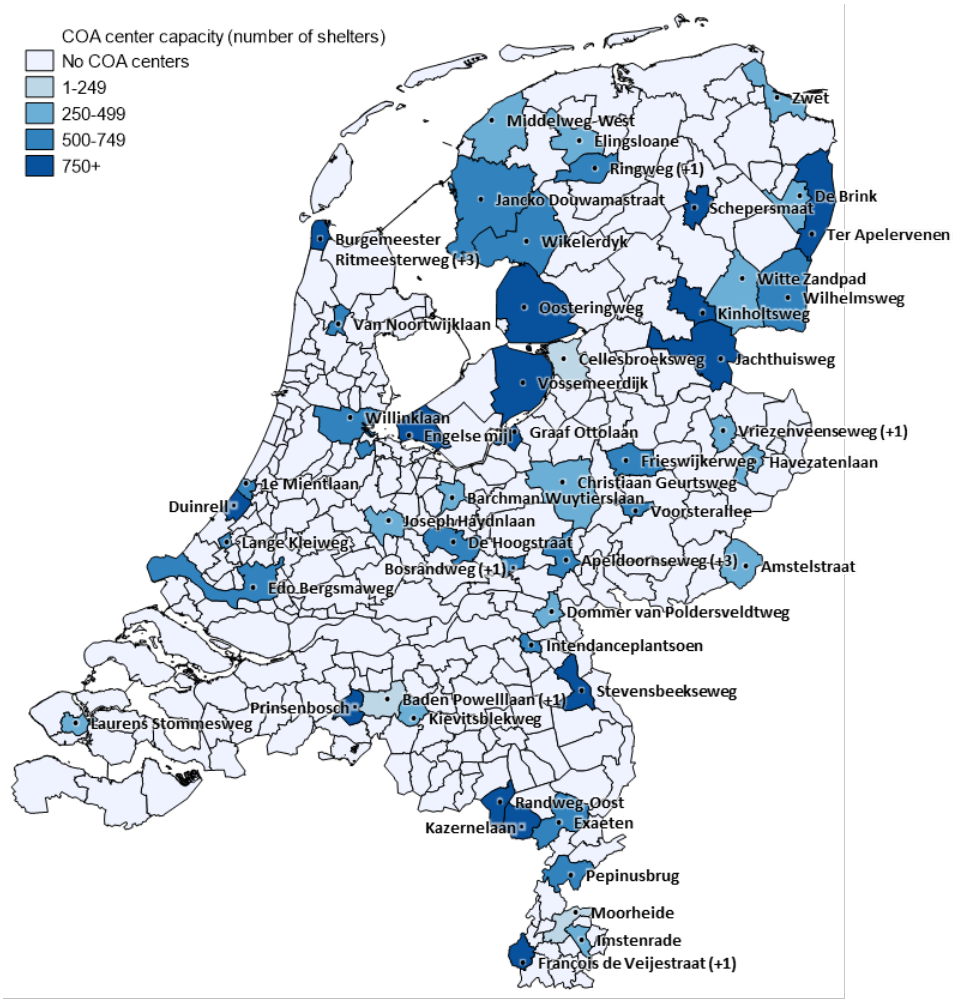
	(1) All	(2) Cohort 2014	(3) Cohort 2015	(4) Cohort 2016
Distance (100 km)	0.00657	0.0220	0.00630	−0.00850
	(0.00877)	(0.0176)	(0.0107)	(0.0153)
Arrival age				
Below 30	0.0550***	0.0667***	0.0541***	0.0182
	(0.0138)	(0.0231)	(0.0162)	(0.0228)
30–34	0.0108	0.0418*	0.00117	−0.0255
	(0.0124)	(0.0248)	(0.0140)	(0.0274)
35–40	−0.0114	0.00783	−0.0196	−0.0361
	(0.0125)	(0.0236)	(0.0164)	(0.0271)
Female	−0.0442***	−0.0665***	−0.0386***	−0.0174
	(0.00910)	(0.0175)	(0.0102)	(0.0212)
Household size	−0.0219***	−0.0268***	−0.0234***	−0.0130
	(0.00323)	(0.00531)	(0.00397)	(0.0103)
Position in household				
Single/partner	0.159***	0.104*	0.188***	0.167**
	(0.0503)	(0.0612)	(0.0473)	(0.0733)
Parent	0.0257	−0.0205	0.0748*	−0.0281
	(0.0396)	(0.0535)	(0.0393)	(0.0597)
Child	−0.0600	−0.120	−0.0325	−0.0425
	(0.0412)	(0.0749)	(0.0415)	(0.0709)
Stateless	0.0142	0.0183	0.0164	−0.00794
	(0.0141)	(0.0192)	(0.0177)	(0.0357)
Country of origin				
Other country	0.0626**	0.0293	0.0703**	0.0574
	(0.0283)	(0.0580)	(0.0332)	(0.0626)
Iran	0.0161	0.133*	−0.000104	−0.0406
	(0.0365)	(0.0794)	(0.0374)	(0.0943)
Ethiopia	−0.0547**	−0.124**	−0.0375	−0.0376
	(0.0244)	(0.0620)	(0.0303)	(0.0490)
Syria	0.0114	−0.0263	0.0330	−0.0192
	(0.0227)	(0.0515)	(0.0270)	(0.0578)
Eritrea	0.0273	−0.0395	0.0537	−0.00768
	(0.0265)	(0.0496)	(0.0385)	(0.0576)
Observations	34,472	9,743	19,894	4,823
R^2	0.639	0.627	0.651	0.639
COROP effects	Yes	Yes	Yes	Yes

Notes: Standard errors are clustered at the municipality level, in parentheses. *** p<0.01, ** p<0.05, * p<0.1. This table presents randomisation tests examining whether population density at the allocated municipality is orthogonal to pre-treatment individual characteristics. Each column reports coefficients from a regression of standardised population density on individual characteristics, with COROP fixed effects included throughout. Column (1) reports results for the full sample, while Columns (2)-(4) report results separately by arrival cohort (2014, 2015, and 2016). The dependent variable is standardised population density at the allocated municipality. Distance refers to the distance between the centroids of refugee centre municipalities and allocated municipalities, measured in 100km.

TABLE A4 – RANDOMISATION TEST: CO-NATIONAL DENSITY

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Middle East		East Africa		Middle East		South Asia		North Africa	
Syria	−0.129	−0.00640								
	(0.0878)	(0.0176)								
Ethiopia & Eritrea			0.0232	−0.0439						
			(0.0879)	(0.0276)						
Other Middle East					0.112**	−0.00442				
					(0.0553)	(0.0205)				
South Asia							0.216***	0.0407		
							(0.0678)	(0.0284)		
North Africa									0.316*	0.0498*
									(0.180)	(0.0297)
Observations	34,472	34,472	34,472	34,472	34,472	34,472	34,472	34,472	34,472	34,472
R^2	0.012	0.582	0.007	0.502	0.009	0.582	0.012	0.676	0.012	0.567
Individual controls		Yes		Yes		Yes		Yes		Yes
COROP effects		Yes		Yes		Yes		Yes		Yes

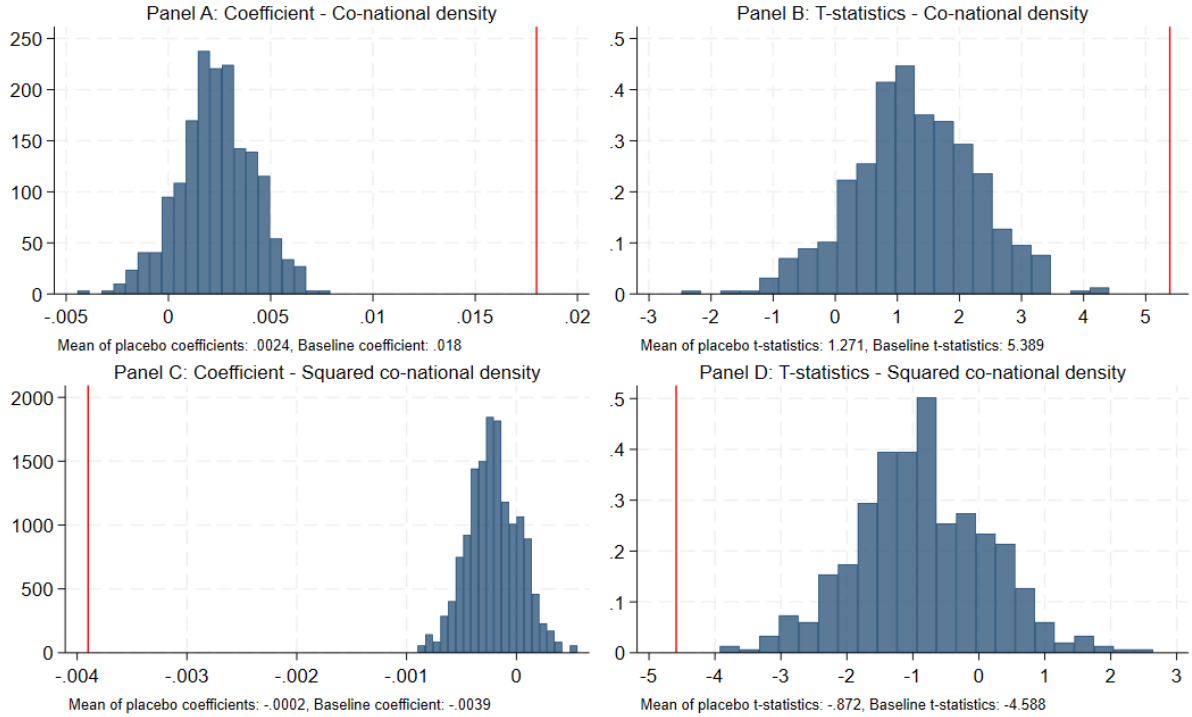
Notes: Standard errors are clustered at the municipality level, in parentheses. *** p<0.01, ** p<0.05, * p<0.1. This table presents randomisation tests examining whether co-national density at the allocated municipality is orthogonal to pre-treatment individual characteristics. Each pair of columns reports coefficients from a regression of a country-of-origin specific co-national density measure on individual characteristics, without (odd columns) and with (even columns) individual controls and COROP fixed effects. The dependent variables are co-national density measures for Syrian (Columns 1–2), Eritrean and Ethiopian (Columns 3–4), Middle Eastern (Columns 5–6), South Asian (Columns 7–8), and North African refugees (Columns 9–10).



Notes: Shading refers to the capacity (*i.e.,* number of beds/shelters) that the municipalities have as of 2020. The text on the map provides the names of each COA centre(s). The dots in a municipality with a COA present are not intended to reflect the precise locations of each COA centre within that municipality.

FIGURE A2 – COA CENTRES BY MUNICIPALITIES

A.4 Placebo test



Note: We conduct placebo tests by randomly reassigning refugees across municipalities 500 times and re-estimating the specification from Column 6 of Table 3 for each draw. The figures display the distributions of the estimated coefficients and associated t-statistics for population density and co-ethnic density across the 500 permutations. Panels A and B display the coefficient and t-statistic of the linear term of co-national density, and Panels C and D display those of the squared term. The red vertical line indicates the baseline estimate.

FIGURE A3 – PLACEBO TESTS