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Naturalisation and residential environment of immigrants in the Netherlands

Christophe Leclerc

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Naturalisation and residential environment of immigrants in the Netherlands

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Chapter 1

Introduction

1.1. Naturalisation, residential environment and the migrant life course

Naturalisation is an important aspect of immigrant receiving countries' immigration policy[1]. By making the journey to citizenship more or less restrictive, receiving states decide where to draw the line between those who are entitled to join the national community as full members and those who do not enjoy all rights and privileges associated with citizenship. From an immigrant's perspective, becoming a citizen is a key moment of the settlement process (Bloemraad, 2006). Because naturalisation implies becoming a full member of a political and legal community, it comes with a number of formal rights that can help improve immigrants' life in the host country. Naturalised immigrants can vote in national elections, can have access to those public sector jobs that are restricted to nationals and are allowed to permanently stay in the receiving country. In the EU, naturalised immigrants can travel to and work in EU countries without any restrictions. In addition to these formal rights, recent studies show that a 'citizenship premium' is also reflected in a reduced risk of discrimination in both the job and housing market (Peters, 2020; Peters et al., 2018).

Studies that investigate naturalisation in the context of the migrant life course, focus their attention on the role played by individual factors. Thus, the decision to naturalise is typically treated as an individual choice in which aspiring citizens assess the costs and benefits of naturalisation before deciding whether they want to engage in the procedure and apply (Yang, 1994). While the benefits of naturalisation may be substantial, costs of naturalisation are also significant, including financial costs[2] but also sometimes the difficult prospect of losing one's country of origin citizenship[3]. Following this line of reasoning, individual characteristics such as immigrants' socio-economic status, age, or country of origin are considered to play an important role in the decision to naturalise (Chiswick & Miller, 2009; Peters et al., 2016; Yang, 1994). Similarly, studies that look at the relevance of citizenship acquisition for immigrants' post-settlement trajectory explore the relationship between naturalisation and individual-level indicators of economic

[1] In this thesis, I understand the concept of naturalisation as the process through which foreign born individuals acquire Dutch citizenship. The terms "naturalisation" and "citizenship acquisition" are used interchangeably.
[2] In 2020, the fee for the naturalisation procedure in the Netherlands amounted to 901 euros. In addition to this, immigrants also need to pay for the naturalisation exam (350 euros in 2020) and possibly for preparatory courses (IND, 2021).
[3] In the Netherlands, the requirement for applicants to renounce the country of origin's citizenship was abolished in 1991 and reintroduced in 1997. Although several exceptions remain applicable, this requirement applies to a substantial part of the immigrant population (van Oers et al., 2013).

integration. Hence, it has been found that becoming a citizen increases immigrants chances to find a job and to gain a higher income (Hainmueller et al., 2019; Peters et al., 2018; Peters, 2020; Peters et al., 2020).

Life chances and life decisions are, however, not only determined by individual factors. They are also dependent on the social structure in which individuals are embedded (Farwick, 2011; Wingens et al., 2011). Family members, friends, work colleagues, or members of organisations shape individuals' decision and provide a framework in which individuals may either flourish or wither. This interplay between social structure and human development can be captured by looking at individuals' close environment, the neighbourhood. The socio-economic composition of a neighbourhood partly determines the type of social interaction people have on a daily basis, the kind of schools children attend, the type of activities people are able to engage in, and the number of economic opportunities workers have access to. The residential environment therefore plays a strong role in producing socio-economic opportunities and social norms and has a strong impact on people's well-being (Friedrichs & Blasius, 2003; Joshi et al., 2017; Meijer et al., 2012; Mouratidis, 2020). The residential context matters particularly for foreign-born individuals who - upon arrival in the destination country- are more likely to move into low-income and migrant-concentrated neighbourhoods and have to rely, due to their precarious socio-economic position, to a large extent on neighbourhood-level resources (Ryan et al., 2008).

With the exception of a few studies (Abascal, 2017; Hochman, 2011; Liang, 1994; Vogiazides, 2018; Yang, 1994), limited attention has been dedicated to the interplay between naturalisation and immigrants' residential context. As a result, very little is known about how neighbourhood's factors could influence the naturalisation process but also on how naturalisation could affect immigrants' choice of residence. This thesis addresses this gap by exploring the question of immigrants' citizenship with a new perspective that pays greater attention to immigrants' place of residency. It does so in the context of the Netherlands, a country that has a long history of immigration and which strongly contrasts with the US context, that has remained dominant in the literature, in terms welfare system and dynamics of neighbourhoods' segregation.

This introduction will specify in section 2 the research question and aim of the thesis. This will be followed in section 3 by a state-of-the-art and, in a fourth section, by a theoretical framework aimed at laying out the theoretical implications of this thesis. Section 5 will shed light on the Dutch context and, more specifically, will discuss immigration flows to the Netherlands, Dutch citizenship policy and the rules of the

Dutch housing market. The specificities of Dutch register data will be addressed in section 6 while section 7 will cover the empirical strategy, including the study population, the methods of analysis and the main challenges. Section 8 will be about data management and ethical positioning. Finally, section 9 will offer an outline of the dissertation.

1.2. Research question and aim of the thesis

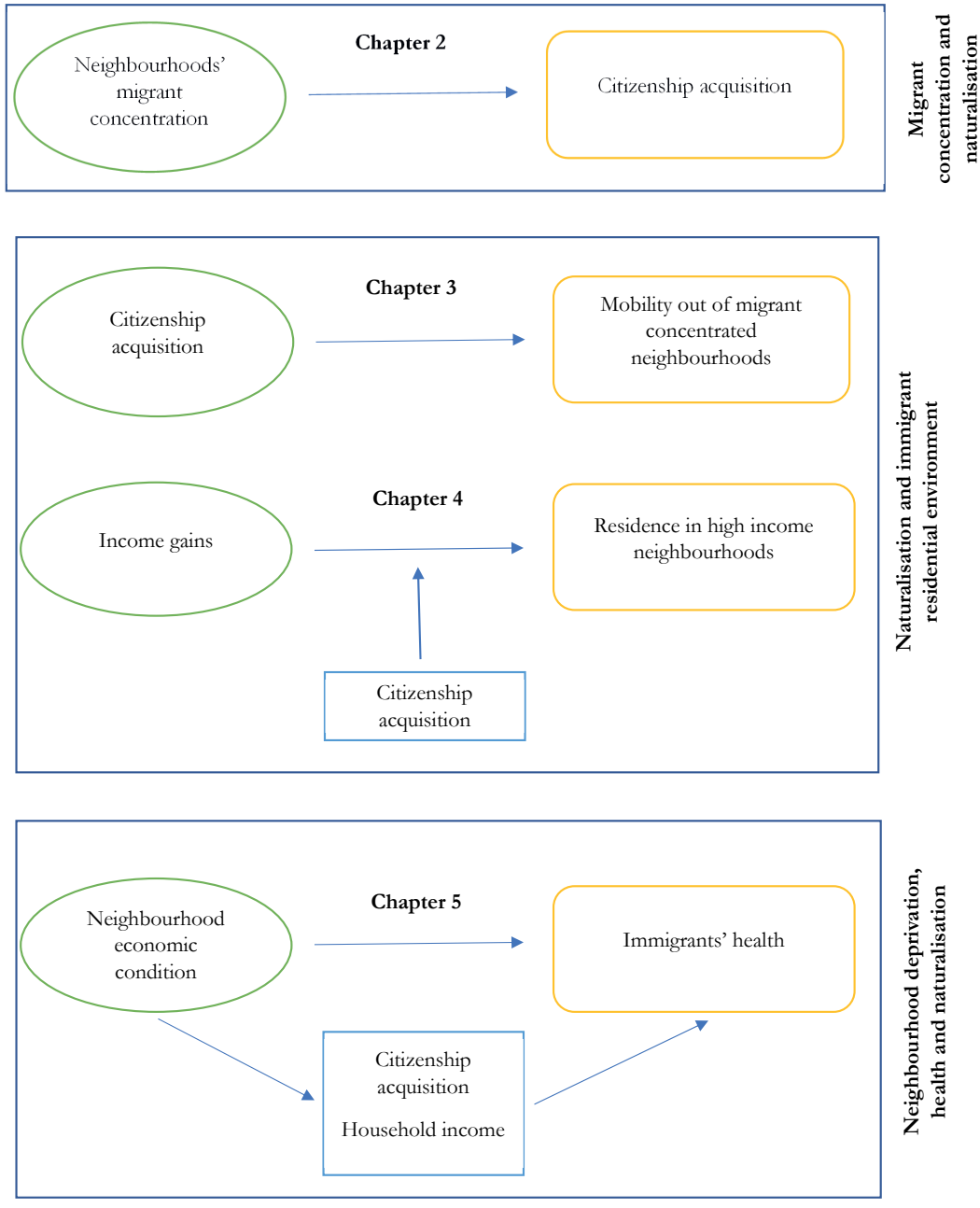
This thesis investigates the relationship between naturalisation and immigrants' residential context and addresses the following research question: *How do the residential environment and immigrant naturalisation interrelate in immigrants' post-settlement process in the Netherlands?*

In order to comprehensively address this research question, this thesis explores the relationship between naturalisation and immigrants' residential context using three different theoretical angles (Figure 1.1) that fit within the common framework of spatial assimilation theory. Hence, the first part of this thesis analyses the relevance of immigrants' residential context on immigrants' propensity to naturalise and addresses the following sub-question (1): *to what extent is neighbourhood's migrant concentration associated with immigrants' decision to naturalise in the Netherlands?* Using theoretical arguments grounded in inter-group contact and information-sharing theories, this chapter posits that living in a neighbourhood with a dense immigrant-based network may be negatively related to immigrants' propensity to become Dutch citizens. Yet, this relationship may be conditioned by how much information about the citizenship procedure immigrants receive from their neighbours. The second part of this thesis - chapters three and four - takes a different perspective and examine the extent to which citizenship status shapes the type of neighbourhood in which immigrants live. Therefore, it addresses the following sub-question (2): *to what extent does immigrants' citizenship status condition immigrants' residential mobility?* These two chapters engage with the literature on immigrants' residential mobility (Bolt & van Kempen, 2003, 2010) and also contribute to a growing field of research that explores the question of the citizenship premium in the Dutch labour and housing market (Peters, 2019; Peters et al., 2020, 2018). In these chapters, I argue that naturalisation can potentially reduce some of the obstacles immigrants face in the housing market and that this signalling potential is conditioned by immigrants' propensity to be discriminated. Finally, the last part of this thesis adds a new empirical dimension: immigrants' health. This section investigates the association between neighbourhood's

deprivation and immigrants' mortality and, more specifically, assesses the extent to which this association may be driven by immigrants' household income and citizenship status. It therefore lays out the following sub-questions (3): *to what extent is neighbourhood deprivation associated with a greater risk of mortality among immigrants living in the Netherlands? And what is the confounding role of income and citizenship status?* This final chapter contributes to a growing literature on neighbourhoods' effects but also draws attention to the relevance of citizenship acquisition for immigrants' health.

The questions asked in this thesis have both academic and societal relevance. From an academic point of view, the thesis aims to unite two fields of research that have so far been studied distinctively but are connected both theoretically and empirically, namely the fields of citizenship studies and of studies focusing on immigrants' residential context. By doing so, I aim to generate a better understanding of the process of citizenship acquisition, as well as of its potential effects, and aim to shed light on the relevance of neighbourhood factors for immigrants' settlement process in the Netherlands. In terms of societal relevance, this thesis can also prove useful to policymakers. At a time when citizenship policies across Europe tend to be more restrictive and when foreign-born nationals residing in European countries are more likely to live in economically-deprived neighbourhoods (OECD, 2015), I hope that this thesis can inform policymaking in the fields of immigration and urban planning aiming at facilitating immigrants' settlement process and improving immigrants' living conditions.

Figure 1.1 Citizenship acquisition and immigrants' residential context: focus of the dissertation



1.3. Naturalisation and immigrants' residential context: a state of the art

Citizenship acquisition and immigrants' residential context: two distinctive bodies of literature

Questions related to citizenship acquisition and immigrants' residential context have received significant academic attention. Although studies focusing on these two topics have a lot of commonalities, including a mutual focus on immigrants' integration process, they however constitute two separate strands of literature that seldom engage with one another.

Starting with citizenship acquisition, there is a vast literature on the factors associated with the propensity of immigrants to become citizens and on the relevance of naturalisation for immigrants' integration trajectory. It is well-documented that immigrants' decision to naturalise is determined by a large array of individual and contextual factors. At the individual level, age at migration, gender and socio-economic status are often considered important predictors of citizenship acquisition (Peters et al., 2016; Yang, 1994). Characteristics of the origin country may also condition immigrants' propensity to naturalise. Thus, studies show that immigrants coming from politically insecure and economically unstable countries are more likely to obtain the citizenship of the host country (Chiswick & Miller, 2009; Peters et al., 2016). Moreover, the absence or presence of dual citizenship regulations may also add significant costs to the naturalisation procedure (Peters et al., 2016). The decision to naturalise is also shaped by institutional factors, including the restrictiveness of destination countries' citizenship policies (Peters et al., 2016) and the perception of an inclusive political climate (Carrillo, 2015; Logan et al., 2012). A growing body of literature also analyses the relevance of citizenship acquisition for immigrants' post-settlement process. In contrast with a political discourse that tends to view naturalisation merely as the crown on the integration process, studies show that becoming a citizen can serve as a powerful vehicle for economic integration. Thus, there is increasing evidence that citizenship acquisition reduces the risk of nationality-based discrimination in the job market, a phenomenon often described as citizenship premium. This citizenship premium translates into a higher propensity to have a job (Bratsberg et al., 2002; Peters et al., 2018) but also into higher income gains (Hainmueller et al., 2019; Peters et al., 2020). Citizenship acquisition is also associated in the literature with better health outcomes (Minsart et al., 2013; Riosmena et al., 2015; Walkden et al., 2018). This relationship may be driven by the fact that becoming a citizen alleviates the stressors related to legal status

precariousness (Aranda et al., 2014; Gonzales et al., 2013; Robertson & Runganaikaloo, 2014) but also by the fact that having a secured legal status increases immigrants' use of health services (Scheppers et al., 2006; Tarraf et al., 2014; Winters et al. , 2018).

Studies focusing on immigrants' residential context are also strongly embedded in the literature on immigrants' integration process. First, important attention has been dedicated to the link between immigrants' residential mobility and integration trajectory. According to the spatial assimilation theory, immigrants tend to move upon arrival to neighbourhoods with a high proportion of immigrants and low-income individuals before to relocate to more affluent neighbourhoods as they integrate socially, culturally and economically in the destination country (Alba & Nee, 1997). From this perspective, the residential divide between natives and immigrants is merely caused by differences of integration. Although studies focusing on immigrants' housing trajectories show the relevance of cultural and socio-economic factors for immigrants' residential mobility (Andersen, 2016; Vogiazides, 2018), they also suggest that immigrants are on average more likely to remain in concentrated and deprived areas after controlling for socio-economic resources. This may be due to the fact that some immigrants draw important resources from their local immigrant networks and therefore prefer to reside in migrant concentrated areas. Moreover, immigrants' residential trajectory may be obstructed by discriminatory practices from a different range of housing market actors (Bengtsson et al., 2012; Ondrich et al., 2003; Van der Bracht et al., 2015), a phenomenon that is described in the literature as place stratification. Second, previous studies have also explored the relevance of residential context for immigrants' settlement process. Hence, it is often argued that living in a neighbourhood with a high concentration of immigrants or co-nationals matters for immigrants' educational achievement and economic integration (Ihlanfeldt & Sjoquist, 1998; Overman, 2002). It may also affect immigrants' social and cultural integration, although questions remain regarding the direction of this relationship (Bolt & van Kempen, 2010; Bouma-Doff, 2007; Gijsberts & Dagevos, 2007; Musterd & Ostendorf, 2009). Similarly, neighbourhoods' economic characteristics may be relevant for immigrants' labour market performance. Immigrants living in deprived areas may have a limited access to job information and fewer contacts with role models which can reduce their propensity to be employed (Pinkster, 2007, 2009). Moreover, neighbourhood deprivation is also associated with poorer mental and physical health outcomes (Chang et al., 2012; Denney et al., 2018; Hajat et al., 2010; Raphael et al., 2020).

Citizenship acquisition and immigrants' residential context: a relation rarely addressed in the literature

As described, citizenship acquisition and immigrants' residential context are traditionally studied separately and, as a consequence, there is little knowledge about the extent to which these two concepts relate to one another. There are, however, several notable exceptions.

Several studies explore the link between neighbourhoods' characteristics and immigrants' naturalisation propensity. Here, attention is specifically paid to the potential effect of living in a large immigrant community on immigrants' propensity to naturalise (Hochman, 2011; Liang, 1994; Logan et al., 2012; Mossaad et al., 2018; Yang, 1994). These studies develop conflicting theoretical expectations. While having regular contacts with other immigrants may facilitate immigrants' access to valuable information related to citizenship, hence increasing the chances of naturalisation (Abascal, 2017; Logan et al., 2012), it may also limit immigrants' contacts with natives (Liang, 1994) which could ultimately lead to a lower propensity to naturalise. These studies also produce contradictory findings. Yang (1994), Abascal (2017), and Mossad et al. (2018) find that living in a migrant concentrated neighbourhood increases immigrants' propensity to naturalise. However, Bueker (2006) and Logan et al. (2012) reach an opposite conclusion.

Taking a different perspective, several studies also shed light on the relevance of naturalisation for immigrants' residential mobility. South, Crowder and Chavez (2005) find that possessing US citizenship increases immigrants propensity to move to neighbourhoods with a proportionally larger Anglo populations. In the Swedish context, Vogiazides (2018) comes to a similar conclusion and finds that naturalised immigrants are more likely to leave distressed areas. Both studies use citizenship acquisition as an indicator of cultural assimilation, hence simply viewing naturalisation as a logical step in the spatial assimilation process. Yet, becoming a Dutch citizen may also be viewed as a positive signal by housing market actors, thereby reducing the risk of citizenship-based discrimination. This question is discussed and tested in the Dutch context in a study exploring the relation between naturalisation and homeownership (Peters, 2020). Here, it is found that becoming a Dutch citizen significantly increases immigrants' propensity to become homeowners, especially for immigrants who do not have a native Dutch partner.

1.4. Naturalisation and immigrants' residential context: theoretical perspectives

Naturalisation and immigrants' residential context in the framework of spatial assimilation theory

The concepts of naturalisation and immigrants' residential environment are intrinsically linked to theories developed to explain immigrants' integration process. Yet, in spite of this shared theoretical ground, previous studies have failed to unite these two concepts within a single theoretical framework. In this thesis, I offer a first attempt at doing so and argue that spatial assimilation theory is a relevant framework to understand how the concepts of naturalisation and immigrants' residential environment interrelate.

The spatial assimilation theory is an important component of the assimilation framework (Alba & Nee, 1997) and a relevant framework to understand immigrants' post-settlement process. It was first developed in the early 20th century to explain the location decision of newcomers moving to the United States (Burgess, 1925). It argues that newcomers would first move to densely populated, migrant concentrated, and economically deprived areas often located in urban centres. These groups would subsequently re-locate to wealthier and less concentrated areas as they integrate culturally and economically in the host country. Since its early developments, the spatial assimilation framework has been used to explain immigrants' residential mobility but also appeared to be a relevant tool to understand the dynamics of immigrant and economic concentration in American and European cities (Vaalavuo et al., 2019; Vogiazides, 2018). Hence, following the spatial assimilation argument, neighbourhood deprivation should be entirely explained by cultural and socio-economic factors.

Within the context of this thesis, spatial assimilation theory can first help understanding how the neighbourhood context may condition immigrants' citizenship acquisition process. From a spatial assimilation perspective, immigrants living in a migrant concentrated or economically deprived neighbourhood are more likely to show a lower degree of economic and cultural integration and may therefore be less likely to acquire the citizenship of the host country (Alba & Nee, 1997). Yet, immigrants' assimilation process is also shaped by various resources that can be found at the neighbourhood level. Living in a neighbourhood with a large and dense immigrant community for instance could limit the chances of inter-group contact and could inhibit the process of cultural assimilation (Liang, 1994). Immigrants living

in an economically deprived neighbourhood may also lack important social and material resources that are essential for their economic integration process (Pinkster, 2007, 2009). This potential lack of cultural and economic integration is relevant for immigrants' naturalisation process. Immigrants who are not well-integrated culturally or economically may not have the desire to integrate in the native community and, therefore, may not show the same intention to naturalise. Furthermore, immigrants who intend to become Dutch citizens must invest significant financial resources due to the costs of preparing and submitting an application, and need to pass an integration test. This implies that immigrants who are in a financially precarious situation may simply be barred from completing the procedure.

The spatial assimilation framework also sheds light on how citizenship acquisition may affect immigrants' residential mobility, hence conditioning the type of neighbourhood in which they live. Following the spatial assimilation theory, naturalised immigrants, who tend to show a higher level of cultural and economic integration, should be more likely to move to wealthier and predominantly native neighbourhoods. Yet, this relation may also operate in a different way. As shown in the literature (Alba & Logan, 1993), the process of spatial assimilation may be obstructed by the fact that immigrants are often confronted with discrimination on the part of housing market actors, a process labelled in the literature as place stratification. In this context, becoming a Dutch citizen may be perceived as a positive signal of economic integration and intention to stay by mortgage lenders, landlords and rental agencies which can reduce the risk of statistical discrimination. This signalling potential of citizenship, often defined as citizenship premium, has been observed in the Dutch context in the job market and among mortgage lenders (Peters, 2020; Peters et al., 2018, 2020).

Spatial assimilation theory may also help understanding some of the neighbourhood effects observed in the literature. Because factors related to economic and cultural integration play an important role in immigrants' post-settlement process, it is essential to control for neighbourhoods' compositional factors that are related to spatial assimilation in order to isolate the unique effect of neighbourhoods' characteristics on immigrants' life. In this regard, naturalisation appears to be a relevant factor to control for. As observed in the literature, having a secured legal status is associated with better health outcomes and with a more frequent utilisation of health services (Aranda et al., 2014; Aung et al., 2010; Gonzales et al., 2013; Javier et al., 2010; Ortega et al., 2007; Robertson & Runganaikaloo, 2014; Tarraf et al., 2014; Winters

et al., 2018). Citizenship acquisition is also found to have a positive effect on immigrants' job status and earnings (Peters et al., 2020). If immigrants living in migrant concentrated or economically deprived neighbourhoods are predominantly non-naturalised, as the spatial assimilation theory would suggest, then immigrants' citizenship status could appear to be a significant endogenous factor.

Outline of the theoretical arguments developed in this thesis

The first empirical chapter of this dissertation focuses on the relation between immigrants' residential context and citizenship acquisition. The topic of citizenship acquisition is often analysed through a cost-benefits perspective in which immigrants ponder the costs and benefits of naturalisation before to decide whether or not they want to initiate the procedure (Yang, 1994). In this context, studies often put emphasis on individual-level factors (Yang, 1994) as well as on contextual factors, including the political stability of the origin country (Chiswick & Miller, 2009) and the nature of citizenship policies in the destination country (Peters et al., 2016). This chapter takes a different angle and focuses on the relevance of the residential context in which immigrants are embedded. More specifically, this chapter investigates the effect of neighbourhoods' immigrant concentration on immigrants' propensity to naturalise. Building on previous studies mainly based in the US context, this chapter pays attention to neighbourhood-level factors that may condition, in conflicting ways, immigrants' assimilation process. Hence, I argue that living in a migrant concentrated neighbourhood reduces the possibility of inter-group contacts which could lead to a lower desire to integrate into the native community and could result in a lower propensity to naturalise. This first argument is labelled as *migrant enclosure* theory (Liang, 1994). This relation may however be conditioned by the fact that immigrants living in a concentrated neighbourhood are more likely to be in regular contact with individuals who have completed the naturalisation procedure themselves (Abascal, 2017). As a result, they are better able to gather information about the benefits and costs of the process and may view the host society as more inclusive. This could increase their probability to naturalise. In this thesis, this argument is defined as the *naturalisation diffusion* hypothesis.

The following two chapters of this dissertation analyse the relation between naturalisation and immigrants' residential context through a different perspective by investigating the relevance of citizenship acquisition for immigrants' residential mobility. Directly engaging with scholarly debates about spatial

assimilation and place stratification theories, I argue that becoming a citizen of the host country may send a positive signal to housing market actors, thereby reducing the risk of discrimination on the ground of nationality (Peters, 2019). This positive signal can take various forms. Citizenship acquisition may be considered a signal of economic integration, which may positively affect the risk-calculation of housing market actors since immigrant groups are often associated with a risk of non-payment. Moreover, naturalisation indicates an intention to stay in the destination country which could satisfy landlords looking for long-term commitment. Additionally, naturalised immigrants may be considered by housing actors as more traceable if they leave the country with a rent debt which also alleviates the risk associated with non-payments. Because naturalisation may reduce the risk of discrimination, it can potentially strengthen immigrants' position in the housing market and facilitate their residential mobility. Yet, if naturalisation matters for immigrants' residential mobility, does it equally matter to all immigrant groups? There are reasons to believe that the effect of naturalisation is conditioned by two additional individual factors: immigrants' economic situation and immigrants' propensity to be discriminated. First, housing market actors apply very strict economic requirements when it comes to rental agreements and mortgage acquisition. In this context, immigrants with a temporary contract or with a low income may see their housing application being denied, regardless of their citizenship status. Second, some immigrant groups may be less likely to be discriminated by housing market actors than others. This could be the case for instance of EU immigrants who may be associated with a lower risk of non-payment and may not be exposed to the same extent to taste-based discrimination. Additionally, the risk of being exposed to citizenship-based discrimination may vary depending on the type of housing market actors that immigrants have to deal with. While discrimination in the Dutch housing market has been observed among mortgage lenders and actors in the private renting sector, there is no evidence of such practices in the public housing sector (Sociaal en Cultureel Planbureau, 2009).

The final empirical chapter of this dissertation investigates the interplay between neighbourhood deprivation, immigrant health and socio-economic resources, including citizenship status. This empirical chapter engages with the literature focusing on the health effects of neighbourhood factors. Numerous studies observe significant patterns of poor health in deprived neighbourhoods (Joshi et al., 2017; Klijs et al., 2016; Schneiders et al., 2003; Schulz et al., 2012). This relation may be driven by contextual factors but

could also be driven by compositional effects, economically deprived neighbourhoods being often populated by individuals with fewer socio-economic resources. Studies that analyse the relation between neighbourhood deprivation and health in the context of immigrant groups often fail to disentangle the effect of contextual factors from those of compositional characteristics. In this thesis, I argue that the relation between neighbourhood's deprivation and health may be partly driven by two types of individual-level socio-economic resources that are related to both immigrants' mobility and immigrants' health: immigrants' income and citizenship status. As regards immigrants' income, I posit that immigrants living in economically deprived neighbourhoods are more likely to have fewer financial resources, which can also independently have a detrimental effect on their health. Regarding citizenship acquisition, I argue, from a spatial assimilation perspective, that immigrants living in a deprived neighbourhood are less likely to be Dutch citizens. Yet, studies show that becoming a citizen may be related to better health outcomes (Minsart et al., 2013; Riosmena et al., 2015; Walkden et al., 2018). First, citizenship is associated with important security for immigrants and their family and may therefore reduce the psycho-social stressors inherent with living with a precarious legal status (Aranda et al., 2014; Gonzales et al., 2013; Robertson & Runganaikaloo, 2014). Second, immigrants with a precarious status may be reluctant to get in contact with health services for fear that this could either jeopardize their citizenship application or lead to a risk of forced out-migration (Aung et al., 2010; Javier et al., 2010; Ortega et al., 2007; Tarraf et al., 2014; Winters et al., 2018). From this perspective, citizenship acquisition may lead to a more frequent usage of health services. In this context, it is therefore important to control both for immigrants' income and citizenship status to isolate the unique effect of neighbourhoods' contextual factors.

1.5. The Dutch context

This thesis focuses on the Netherlands. This choice is driven by several theoretical considerations, in addition to pragmatic considerations related to the availability of high-quality microdata, as detailed in the next section. First, the Netherlands constitutes a country with a long and rich history of immigration and where one in five residents is either an immigrant her/himself or has at least one parent born abroad (Salentin & Schmeets 2017, p. 4). Second, it is a country where there is there is growing evidence of taste-

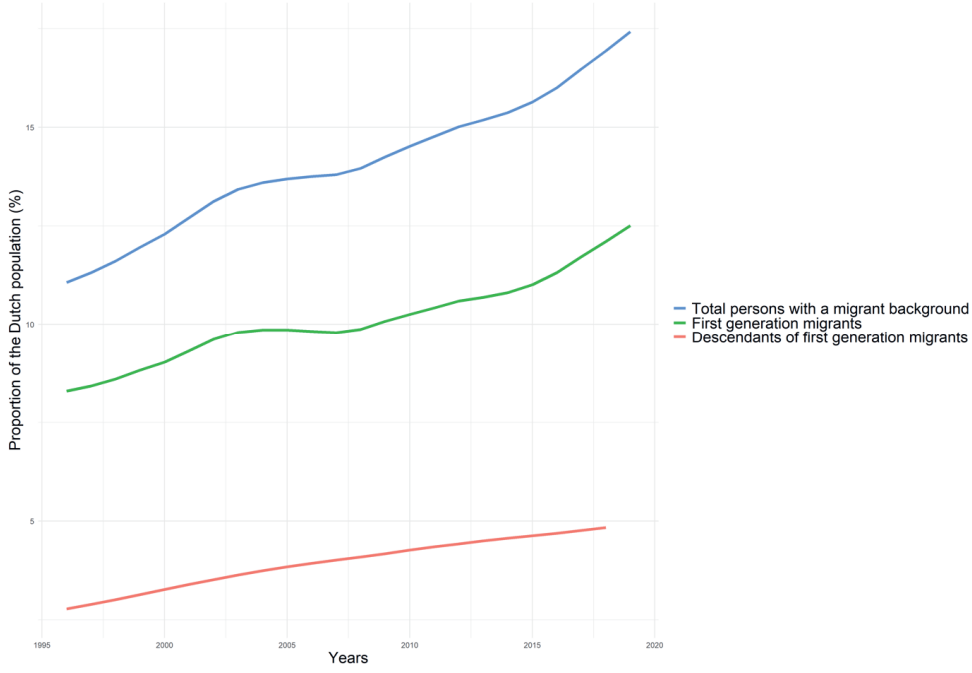
based and statistical discrimination in the housing market sector. It is therefore an appropriate context to study the relevance of citizenship acquisition for immigrants' residential mobility. Third, the Dutch institutional context appears to be very different from that of the US, where most of the literature has been based. By studying the relation between citizenship acquisition and neighbourhoods' residential environment in the Netherlands, I am therefore able to test several arguments previously developed in the US context in a country with a different citizenship policy, a different type of welfare state and different dynamics of neighbourhoods' segregation.

In the following section, I provide information on how migration flows and stocks, as well as citizenship policies, have evolved over the last decades in the Netherlands. I also describe the structure and the rules of the Dutch housing market with a specific focus on the socio-economic composition of neighbourhood, including income characteristics and migrant concentration.

Immigration rates and citizenship policy in the Netherlands

The Netherlands has a large and growing immigrant population. In 1996, foreign-born residents accounted for 8.3% of the overall Dutch population, a number that went up to 11.3% in 2016 (Figure 1.2). In the last decade, the number of immigrants settling annually in the Netherlands has also increased steadily (Figure 1.3). This trend was partly driven by economic immigrants coming from Romania and Bulgaria and from southern European countries.

Figure 1. 2 Proportion of first generation migrants and their descendants (with two foreign-born parents) in the Netherlands over time

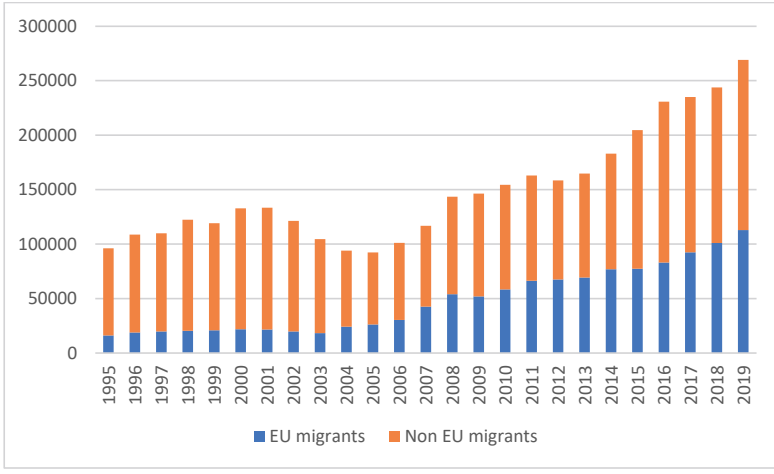


Source: Statistics Netherlands

It is in this context that the topic of citizenship policy gained ground in the political debate and that the Netherlands gradually shifted its approach towards citizenship acquisition. After the 1st of January 1985, and the adoption of the new Dutch nationality act, conditions to become a Dutch citizen were considered to be rather liberal. Immigrants who aspired to become Dutch citizens had to be at least eighteen years old, had to hold a permanent residence permit in the Netherlands, had to be a Dutch resident for at least five consecutive years and had to show a willingness to renounce his or her foreign citizenship – a requirement that would later be abolished in 1991. Dutch citizenship policy however took a different turn in 1997 with the restauration of the renunciation requirements and with the revised Dutch nationality act of 2003 that established stricter language and integration requirements. Ever since, immigrants who engage in the naturalisation procedure are required to pass a formal naturalisation test in which they will be tested on their knowledge of Dutch society and their command of the Dutch language. The application fee also increased significantly in the last twenty years, moving from 336 euros in 2003 to 901 in 2020. On top of this,

immigrants must now also pay for the naturalisation exam and for the preparatory courses. Overall, conditions of access to nationality in the Netherlands are considered halfway favourable by international standards (Migrant Integration Policy Index, 2020).

Figure 1. 3 Number of new migrants coming to the Netherlands per year



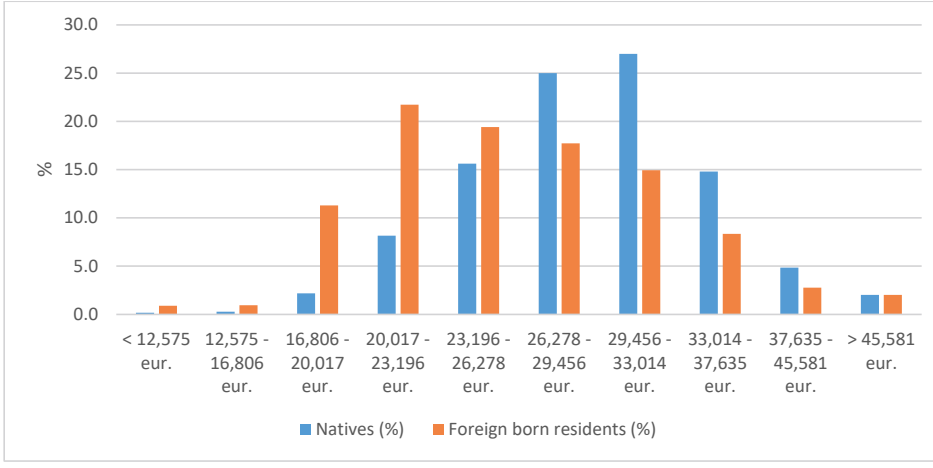
Source: Statistics Netherlands

Housing market rules, immigrants' residential location and housing market discrimination

The Dutch housing market is in many respects very different from other European housing markets. In 2012, 32% of all dwellings were social rental homes (Government of the Netherlands, n.d). This makes the Netherlands the country with the highest share of social housing in Europe. The Dutch social housing sector is strictly regulated. Since 2010, housing associations are required to allocate 90% of their dwellings to individuals with an income below a certain threshold. In 2018, this threshold was set to 41 056 euros. Rent levels in the social housing sector are determined with a rent points system and cannot exceed a certain value fixed each year (720.42 euros in 2019); (Government of the Netherlands, n.d.). The share of owner-occupied homes (60%) is also quite important. This is likely to be the result of tax-incentives on mortgages and state guarantees for buyers. As a result, the Dutch housing market has a very low share of private rental homes (8%), a number that is exceptionally low for European standards (Government of the Netherlands, n.d).

The Netherlands is a country with significant spatial economic inequality. In 2016, 11.1% of Dutch neighbourhoods had an average income lower than the fourth decile of Dutch income while 33.2% of Dutch neighbourhoods had an average income situated in the top three deciles. Overall, our data show that foreign-born individuals are more likely to reside in poorer neighbourhoods than Dutch natives (Figure 1.4). The same observation can be made for rates of migrant concentration (Figure 1.5). While only 11% of Dutch neighbourhoods have a high or very high rate of migrant concentration (higher than 25%), these neighbourhoods constitute the place of residence of more than half of the immigrant population. This is particularly the case for immigrants coming from Morocco and Turkey who predominantly reside in concentrated neighbourhoods[4]. Most of these neighbourhoods are in highly urbanised areas and more specifically in the cities of Amsterdam, Rotterdam, The Hague and Utrecht.

Figure 1. 4 Population distribution in the Netherlands, by mean neighbourhood household income



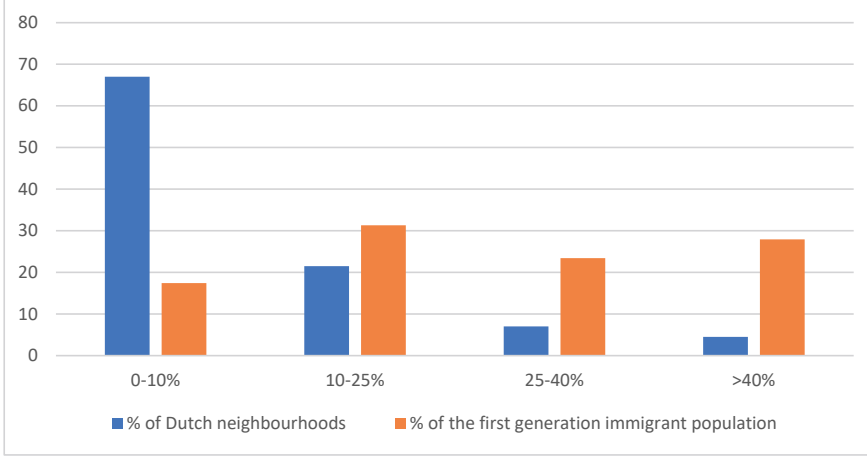
Source: Statistics Netherlands

These geographical patterns of segregation are partly explained by the fact that foreign-born persons are not as well integrated in the job market as Dutch natives and also face housing market discrimination. Although the Netherlands is a country with strong anti-discrimination policy (Migrant Integration Policy

[4] 45.6 % of Moroccan immigrants and 42.7% of Turkish immigrants lived in a neighbourhood with a rate of people with an immigrant background higher than 40% in 2016.

Index, 2020), there is evidence that housing market actors sometimes use discriminatory criteria in the allocation of housing, especially in the private housing sector (Sociaal en Cultureel Planbureau, 2009). Such discriminatory practices may be based on skin colour (College voor de Rechten van de Mens, 2018), religious faith (College voor de Rechten van de Mens, 2016) and ethnicity (De Groene Amsterdammer, 2018). Housing market actors may also discriminate against immigrants who do not possess Dutch citizenship. Even though discrimination on the ground of nationality in the field of housing is strictly prohibited in the Netherlands by the General Equal Treatment Act (Algemene Wet Gelijke Behandeling), it is common practice for housing market actors to request information about individuals' legal status. While such information is supposedly collected to check that prospective tenants or buyers meet all the required financial criteria, recent legal cases show that it can also be used as a source of discrimination (College voor de Rechten van de Mens, 2011; College voor de Rechten van de Mens, 2012; College voor de Rechten van de Mens, 2016a; College voor de Rechten van de Mens, 2019).

Figure 1. 5 Proportion of native neighbourhoods and proportion of first-generation immigrants across migrant concentration categories (percentage of individuals with an immigrant background)



Source: Statistics Netherlands

1.6. Dutch register data

This thesis makes use of register data provided by Statistics Netherlands. In the Netherlands, population register data are compiled from several interrelated registers such as basic registers for population data (*Basisregistratie Personen*, BRP), firms, enterprises, building and addresses and are supplied by a number of public agencies working in collaboration with the Ministry of the Interior and Kingdom Relations. These data are stored in the System of Social Statistical Datasets (SSD) and include a wide range of socio-economic and demographic characteristics (Bakker, 2014). Using unique personal identifiers, I am able to link this information to all individuals residing in the Netherlands.

In the last two decades, the use of register data has become increasingly popular in social sciences. In the context of this thesis, register data offer several important advantages. First, because almost all individuals registered at a Dutch municipality are automatically included in the SSD, register data are not prone to non-response bias. It is typically acknowledged that the risk of non-response is more prevalent among immigrant populations (Deding et al., 2008; Kappelhof, 2014). The language barrier remains an important obstacle to answering survey questions, especially for individuals who have recently arrived in the Netherlands. Moreover, immigrants who have experienced discrimination may show feelings of distrust towards survey institutions. Additionally, immigrants who are in an unsecured legal situation may be reluctant to get in contact with public agencies from fear that this could lead to a risk of forced out-migration. Second, because register data contain objective information provided by external agencies, they are not sensitive to social desirability bias, another common issue in survey methodology. Finally, the panel structure of these data provides the opportunity to study the relation between naturalisation and neighbourhood characteristics with a longitudinal perspective. From a methodological standpoint, having a longitudinal design allows researchers to control for selection bias due to unobserved characteristics. In terms of research design, it also offers a chance to identify variables' patterns overtime and to shed light on specific period effects.

Using register data also has significant limitations. A first limitation is that, by nature, register data do not contain information about non-registered individuals. This could raise questions about the representativity of my study population as undocumented immigrants, who are often in a more vulnerable and precarious position, cannot be included in my analyses. However, in the context of this thesis, I am only

interested in individuals who are eligible for naturalisation and therefore who legally reside in the Netherlands. Undocumented immigrants, who do not have a legal residence in the Netherlands, are therefore not part of the target population. A second limitation resides in the fact that register data only includes administrative information, therefore overlooking subjective information about individuals. In this thesis, I am therefore not able to include information about immigrants' social identification and attitudes, including attachment to the Netherlands, intention to stay, or language spoken at home. Important information about the nature and frequency of immigrants' social contacts also cannot be directly measured. I make up for these limitations using various strategies. Regarding immigrants' social integration, I use as a proxy, in all the empirical chapters, a variable indicating whether immigrants are in partnership with a Dutch native. I also include in Chapter 3, 4 and 5 a measure of the number of children living in the household and, in Chapter 4, a measure of duration of stay in the Netherlands. All these measures have been used in previous studies (Macpherson & Strömgren, 2013; South & Crowder, 2005; Vogiazides, 2018). This thesis indirectly measures immigrants' social interactions by exploring the nature of the community in which immigrants are embedded. In this regard, I measure for instance whether individuals live in a neighbourhood with a high proportion of individuals with a migrant background, with a high proportion of co-nationals, or with a high proportion of individuals with a migrant background within the same age category. These measures have been used in the past as proxies of social-network availability (Bratsberg et al., 2021).

In this thesis, I derive from the SSD two types of information. I retrieve data at the individual level for each foreign-born individual residing in the Netherlands from 1995 to 2016. Demographic information, including gender, age at arrival, partner status and country of origin but also information about citizenship status, migration motive, date of arrival, date of death are available from 1995 onwards. Information about individuals' job status is available from 1999 onwards while individuals' household income and type of job contract can only be retrieved from 2003 onwards. Finally, it is only possible to gather information about individuals' type of housing and household composition from 2003 onwards. Subsequently, I create the measures of neighbourhood characteristics using individual information about all Dutch residents. This information is then aggregated at the neighbourhood level, and in some cases, at the municipal level. Following this process, I am able to collect information about neighbourhoods' ethnic composition but also about neighbourhoods' economic characteristics.

1.7. Empirical strategy

Population

This thesis focuses on foreign born nationals who have migrated to the Netherlands and are registered at a Dutch municipality. I define foreign-born individuals as individuals who are born outside of the Netherlands with two foreign parents. I further specify this population by excluding, in all the empirical chapters, individuals who were born in Suriname or in the Dutch Antilles as these immigrants may benefit from a facilitated citizenship acquisition procedure. I also generally exclude immigrants who naturalise within the first three years of residency. These immigrants are likely to have been in a partnership with a Dutch citizen prior to their arrival in the Netherlands and may therefore have specific characteristics as regards naturalisation. Finally, I leave apart, for methodological reasons, all immigrants living in a neighbourhood with fewer than 100 residents. Each empirical chapter focuses on different cohorts. This choice is driven by theoretical reasons, as the length of the observation period may depend on the research question, but also by practical elements such as data availability. These cohorts are based on immigrants' date of arrival in the Netherlands. Thus, chapter 2 includes individuals who have arrived in the Netherlands in 1996, 1997, 2001 and 2002, chapter 3 focuses on individuals who have arrived in the Netherlands in 2003, 2004 and 2005, chapter 4 on individuals who first registered in the Netherlands in 2003 and 2004 and chapter 5 on all individuals who arrived between 1985 and 1995. As all immigrants are tracked until 2016 at the latest, this implies that each empirical chapter follows individuals for a different period of time.

Methods of analysis

The empirical analyses in this thesis use two main methods of analysis. Chapter 2, 3 and 5 use a Cox Proportional Hazard Model which is a specific type of survival analysis. Survival analysis is a set of statistical methods designed to estimate the timing and occurrence of a specific event (Box-steffensmeier, 1997). While being initially developed for the field of medicine, it has recently gained popularity in sociology and has been occasionally used to study citizenship effects (Peters, 2019). Cox Proportional Hazard Model has the advantage of controlling for right censoring which is particularly important in the case of short follow-up

periods. It also accounts for individual's changes over time and is therefore well-suited for longitudinal data (Box-steffensmeier, 1997). Chapter 4 uses an individual fixed effects approach. In contrast with Cox Proportional Hazard Models, individual fixed effects regression only focuses on the variance within each individual over time (Allison, 2009). This has the advantage of controlling for unobserved time-invariant heterogeneity and therefore appears to be a powerful method to control for self-selection into naturalisation (Bratsberg et al., 2002; Peters et al., 2018).

Main challenges

This thesis constitutes one of the first attempts to map out the relation between citizenship acquisition and immigrants' residential context. This however comes with a significant number of challenges. The first challenge relates to operationalisation. While the concept of naturalisation can easily be measured by looking at the date at which immigrants have become Dutch citizens, the question of how to operationalise neighbourhoods remains an important subject of debate (van Ham & Manley, 2012). In the literature, scholars traditionally use administrative units, often drawn for the purpose of censuses. Alternatively, few studies use modifiable areal units drawn from radii of different fixed sizes or determined according to the number of nearest neighbours (Linssen et al., 2015). Either way, the size of the geographical units used as proxy of neighbourhoods can strongly vary from one research setting to the next. Studies focusing on the US for instance measure neighbourhood factors using very large geographical units such as metropolitan areas, PUMA[5]s or counties (Abascal, 2017; Liang, 1994; Logan et al., 2012; Mossaad et al., 2018; Yang, 1994). In the Netherlands, studies traditionally measure neighbourhoods at the *buurt* level (Agyemang et al., 2009; Koopman et al., 2012; Zorlu & Latten, 2009; Zorlu & Mulder, 2008). *Buurten* are the second smallest spatial units in the Dutch population register data. Larger than zip-code levels but smaller than municipalities, a *buurt* refers to a mid-size residential area that is composed, on average, of approximately 1,300 inhabitants and constitutes a clearly defined territory. In this thesis, I align with this literature and also measure neighbourhoods' characteristics at the *buurt*[6] level. This choice is motivated by two reasons. First, in contrast with modifiable areal units, administrative units have the advantage of being drawn along clear

[5] Public Use Microdata Areas (PUMAs) constitute geographic areas that include no fewer than 100,000 people each.
[6] For the sake of simplicity, *buurt* and *buurten* will be referred to as neighbourhood(s) in the rest of this thesis.

socio-economic, geographical, and historical lines. Second, I argue that the causal mechanisms developed in this thesis, and that are suggested to be behind neighbourhoods' effects, better operate at a medium scale level. In this context, the *buurt* appears to be a very convenient measure. Larger than the street-level (ZIP codes) but also smaller than the municipal level (*gemeente*), neighbourhoods are sufficiently big to cover diverse population groups and large enough to capture a significant number of social processes taking place beyond individuals' immediate environment.

The second challenge inherent with the study of citizenship and neighbourhoods' characteristics is that both naturalisation and residential mobility are not random processes. Therefore, it is important to control for potential biases due to self-selection. Self-selection is a common issue to all studies aiming at identifying the unique effect of citizenship acquisition. Immigrants who decide to initiate the naturalisation procedure may have particular characteristics that are not shared by other immigrants. These characteristics may be related to their degree of economic integration but also to their personal traits, including cultural integration or aspiration to integrate, skills or resilience. Not controlling for this process of self-selection could lead to an under or over estimation of the unique effect of naturalisation. A similar picture can be drawn for residential mobility. Individuals moving to migrant concentrated or predominantly native neighbourhoods may have a lower or higher desire to integrate in the host country and may have particular demographic and socio-economic characteristics. In the following chapters, I control for this potential bias using various quantitative techniques. As regards self-selection due to observed characteristics, I use in Chapter 2 an inverse probability of treatment weighing method (IPTW) in which I create weights based on individuals propensity to naturalise or to reside in a specific type of neighbourhood (Austin, 2016). I also control in all chapters for various variables that are closely linked with immigrants' social, economic and cultural integration. I address the issue of self-selection due to unobserved characteristics in Chapter 3 and 4. In Chapter 3, I use a time-invariant measure of citizenship acquisition that indicates whether an individual has acquired Dutch citizenship during the observation period and therefore captures endogenous factors related to self-selection into naturalisation. In Chapter 4, self-selection due to unobserved characteristics is partly accounted for with an individual fixed-effects strategy that controls for all time-invariant endogeneity at the individual level.

Lastly, it must be noted that foreign born residents do not constitute a homogeneous group. Consequently, immigrants are not all equally sensitive to the theoretical mechanisms tested in this thesis. I control for this heterogeneity using various interaction and sub-group analyses. Thus, I test in Chapter 2 whether the relation between naturalisation and neighbourhoods' migrant concentration may vary according to immigrants' migration motive or country of origin. In chapter 3, I test whether the effect of citizenship acquisition on residential mobility is conditioned by immigrants' financial situation but also pay particular attention to the case of Moroccan and Turkish migrants, two groups that are more likely to reside in concentrated neighbourhoods. Chapter 4 and chapter 5 pay particular attention to EU and non-EU citizens, two groups that unevenly exposed to discrimination and that do not face the same degree of legal status insecurity. I also run a specific analysis in Chapter 5 focusing on refugees.

1.8. Data management and ethical positioning

The datasets used in this thesis contain privacy-sensitive personal information. This information is strictly confidential and has been treated with great care, in line with the conditions of use imposed by Statistics Netherlands (CBS); (CBS, 2021). Although CBS does not supply these data to third parties, they allow access to pseudonymised data to academic institutions. Within the frame of this research project, access to these data is strictly regulated and bound by an obligation of confidentiality in conformity with the 'Statistics Netherlands Act' that came into force on January 2004. Section 37 of the Statistics Netherlands Act reads as follows "The data collected by CBS are solely intended for use in statistical purposes and are not provided to any persons other than those charged with carrying out the duties of the CBS. The data are then published only in a way that no identifiable information about an individual person, household, company, or institution can be derived".

Following these conditions, the data used for the analyses reported in this thesis are stored locally (CBS drive) and are accessible to researchers and authorized CBS staff via computers at Statistics Netherlands or through a remote access facility. A global plan for the analyses (GAP) contains a description of the data that are needed for the analyses and is available to all CBS employees. Third parties (e.g. other scholars) can access the data for replication purposes only.

The transcripts and out-puts (final versions of frequency tables, regression tables, maps) are publicly available as part of the replication material of your published papers[7]. They are also checked for conformity with CBS output guidelines and do not include privacy sensitive data This project is also scrutinized as part of the Ethics Monitoring of the MiLifeStatus project by the European Research Council.

1.9. Outline of the dissertation

This thesis is composed of four empirical chapters that are based on a combination of research articles that have been either published in or submitted to international journals. Chapter 2 is entitled "*Does residential context matters: migrant concentration and citizenship acquisition in the Netherlands*". This chapter assesses the effect of migrant concentration on immigrants' propensity to become Dutch citizens. It contributes to a growing field of literature that has examined, mainly in the US context, the relevance of immigrants' residential context for immigrants' propensity to naturalise. Results from this chapter show that immigrants' living in a neighbourhood with a high proportion of individuals with an immigration background are less likely to become Dutch citizens. Looking more specifically at the mechanisms underlying this relationship, I observe that this effect is mostly driven by social-networks availability, and more specifically, by the rate of co-nationals and the proportion of same-age immigrants living in a neighbourhood. However, this negative effect diminishes if the neighbourhood also includes a high share of naturalised immigrants. This may be due to the fact that immigrants who have regular contacts with naturalised immigrants are better able to gather information about the naturalisation procedure or to the fact that they may consider Dutch society more inclusive. In any case, this gives support to the *migrant enclosure* theory but also to the *naturalisation diffusion* argument. Taking a different perspective, Chapter 3 investigates the effect of citizenship acquisition on immigrants' mobility outside of concentrated neighbourhoods. This chapter is entitled "*Citizenship acquisition and neighbourhoods' economic wealth: analysing immigrant residential mobility in the Netherlands*". I argue in this chapter that naturalisation may act as a positive signal for various actors in the housing market sector, hence reducing the risk of nationality-based discrimination and facilitating immigrants' mobility out of concentrated neighbourhoods. In line with my expectations, I find that naturalised immigrants are more

[7] See: https://dataverse.harvard.edu/dataverse/christophe_leclerc/).

likely to leave concentrated neighbourhoods. This relation is however conditioned by their degree of integration in the job market and by the type of actors immigrants have to deal with. Overall, this supports the idea that naturalisation should not only be viewed as a symbol of integration but should also be considered a facilitator of integration. The effect of citizenship acquisition on immigrants' residential mobility is further discussed in Chapter 4, "*Immigrants' earnings and neighbourhood economic wealth: the conditioning role of citizenship*". In this chapter, I investigate whether the effect of income on immigrants' propensity to live in higher-income neighbourhoods is conditioned by immigrants' citizenship status. Results show that naturalised immigrants are more likely to live in wealthier neighbourhoods if they gain a higher income. This moderating effect is particularly strong for non-EU migrants who are more likely to be discriminated against in the housing market. This corroborates the spatial stratification theory but also provides further evidence of a citizenship premium in the housing market. Chapter 5 broadens the scope of the dissertation by analysing the relation between neighbourhoods' characteristics and citizenship acquisition through a different perspective, namely that of immigrants' health. In this chapter, entitled "*Neighbourhood economic deprivation and immigrants' all-cause mortality: residential context or compositional effects*?", I investigate whether the relation between neighbourhood deprivation and health is driven by immigrants' socio-economic resources and more specifically by immigrants' household income and citizenship status. Findings from this chapter show that living in a deprived neighbourhood does not have a significant effect on immigrants' mortality after controlling for household income and citizenship status. This finding is consistent across sub-groups and remain comparable for different measurements of deprivation. Immigrants with a high income and immigrants who have acquired Dutch citizenship are however less likely to pass away during the observation period. These findings contribute to a better understanding of neighbourhood effects on health. They also stress the relevance of income and citizenship as regards health outcomes. Chapter 7 concludes with a discussion of the main findings and their academic and societal contribution. This is followed by an impact paragraph that summarises the scientific as well as societal impact of the thesis.

Chapter 2

Does residential context matter? Neighbourhood migrant concentration and citizenship acquisition in the Netherlands

This chapter is under review (revise & resubmit): C. Leclerc, M. Vink and H. Schmeets. Does residential context matter? Neighbourhood migrant concentration and citizenship acquisition in the Netherlands.

2.1. Introduction

Citizenship acquisition represents an important event in an immigrant's life: becoming a citizen of a country is both a symbol of inclusion into a common system of governance and a vehicle that can stimulate societal integration (Bloemraad 2017). Formal benefits of naturalization can take various forms, such as voting rights, unlimited access to restricted public administrative jobs, and a right of abode in a given country (Vink 2017). Moreover, naturalization may act as a signalling mechanism towards employers and help reduce statistical discrimination on the job market (Bratsberg et al. 2002; Peters et al. 2017). Finally, becoming a citizen of a country may alleviate psychological stressors associated with living with a precarious legal status such as fear of forced out-migration and anxiety about the future (Menjívar 2006).

Despite the significant advantages granted by citizenship acquisition, naturalization rates remain low in much of Europe and vary greatly across countries and immigrant groups (Eurostat 2018). Given this heterogeneity, a number of studies have analyzed the different determinants of citizenship and shed light on why some immigrants naturalize while others do not. Previous studies have notably paid attention to individual determinants like age at arrival, socio-economic status, length of stay in the host country (Evans 1988; Yang 1994) as well as to origin countries' characteristics (Yang 1994; Jasso and Rosenzweig 1986; Vink et al. 2017).

As part of this research agenda of immigrant naturalization, few scholars have devoted attention to the broader environment in which immigrants reside, in particular in relation to neighborhood's migrant concentration . Moreover, studies that do pay attention to the relation between migrant concentration and naturalisation have come to contradictory conclusions, with some observing that immigrants are less likely to naturalize if they reside in migrant-concentrated areas (Yang 1994; Abascal 2015; Mossaad et al. 2018) and others finding that living among a large immigrant community increases immigrants' propensity to naturalize (Bueker 2006) or that the relationship between migrant concentration and naturalization propensity varies by immigrant group (Liang 1994; Logan et al. 2012).

This article contributes to the discussion about the relevance of neighbourhood's characteristics for immigrants' naturalisation by examining the relationship between migrant concentration at the neighborhood level and immigrants' citizenship acquisition in the Netherlands, a country where one in five residents is either an immigrant her/himself or has at least one parent born abroad (Salentin and Schmeets

2017, 4). We draw on administrative data based on Dutch registers and distinguish among four cohorts of immigrants who either could naturalize under relatively facilitated conditions (cohorts 1996 and 1997) or were required to pass a language and civic knowledge test (cohorts 2001 and 2002). All four cohorts are examined over a 14-year period (1996-2009/1997-2010/2001-2014/2002-2015). The relationship between migrant residential concentration and naturalization is assessed with a stratified Cox proportional hazard model with shared frailty. We control for self-selection into neighborhoods, due to observed characteristics with an inverse probability of treatment weighting method (IPTW).

This article starts with a review of the literature on migrant concentration and naturalization propensity and subsequently moves to the theoretical framework and hypotheses section. Information on the data, on the operationalization of variables, and on the method is provided in the data and method section. Findings are presented in the analysis section and discussed in the conclusion.

This article shows that immigrants' decision to naturalise is partly determined by the residential context in which immigrants are embedded. Since naturalization is an important part of the immigrant settlement process (Bloemraad 2017), the immediate living environment affects not only immigrants' decision to become citizens but also the settlement process as a whole. By doing so, we contribute to the literature on the determinants of citizenship acquisition, but also engage more broadly with the question of the relationship between neighborhood concentration and immigrant integration, a discussion that so far remains unsettled (Musterd, 2003; Bolt et al., 2010).

2.2. Migrant concentration and citizenship acquisition

Much of the literature on citizenship acquisition considers the decision to naturalize to be the outcome of a cost-benefit calculation (Yang 1994). Individuals examine whether the benefits of host-country citizenship supersede the cost of naturalization and take a rational decision on whether they should engage in the procedure. Following this line of reasoning, previous studies have paid attention to individual characteristics that could induce immigrants to acquire citizenship, such as age at migration, education, and socio-economic status (Evans 1988; Yang 1994). Origin-country characteristics are also identified as important predictors of citizenship acquisition (Jasso and Rossenzweig 1986; Vink et al. 2021). The presence or absence of dual citizenship laws in the origin country, for instance, particularly affects the cost of naturalization (Vink et al.

2021). Moreover, immigrants coming from politically insecure and economically unstable countries are traditionally less likely to return to their origin country and more likely to naturalize (Jasso and Rosenzweig 1986; Yang 1994; Chiswick and Miller 2009; Peters et al. 2016).

While the decision to initiate a naturalization procedure is ultimately left to the individual, immigrants who embark on the road toward citizenship do not simply act in isolation. Their decision to engage in the procedure is conditioned by the lives and events placed along immigrants' path (Peters et al. 2016). In that regard, the literature on citizenship acquisition highlights the importance of immigrants' marital status and family composition in the decision to apply for citizenship (Yang 1994; Street 2014; Helgertz and Bevelander 2017). Similarly, previous studies show that the institutional and political context in which immigrants live can shape immigrants' decisions concerning naturalization (Bloemraad 2018). Institutional forces, such as the destination country's citizenship policies, have the potential to restrict or expand immigrants' access to citizenship and, thus, have an important impact on immigrants' decision to naturalize (Peters et al. 2016). Living in an anti-immigrant or pro-immigrant political environment can, moreover, alter the way immigrants use naturalization as a mean of political empowerment and mobilization (Logan et al. 2012; Carrillo 2015). The broader social environment in which immigrants are embedded can also shape the way immigrants understand the naturalization process (Abascal 2015; Yang 1994). It is often argued in the literature that the degree of migrant concentration in a neighborhood influences immigrants' decision to naturalize through various social mechanisms (Abascal 2015; Liang, 1994; Logan 2012; Yang 1994). However, studies focusing on this issue reach contradictory conclusions (Table 1). In a pioneering study, Yang (1994) observed that living in a large community of co-nationals increased the odds of naturalization. Although he hypothesized that this relationship might be due to immigrants' improved access to naturalization-related information, his study did not test for any variables specifically related to information sharing. In line with Yang's information-sharing argument, Logan et al. (2012) observe that immigrants living in an area with a high share of naturalized migrants from the same national background are more likely to naturalise. Abascal (2015) corroborates this finding and specifies two pathways through which this relation may operate. Immigrants living among naturalized co-nationals have a higher chance of being informed about the benefits and hurdles of the naturalization procedure, since this type of information is more likely to be shared by individuals who have been through the process themselves. Moreover, having

regular contacts with immigrants who have already become citizens may act as a signal of an inclusive society and strengthen immigrants' identification with the host country. In a recent study, Mossaad et al. (2018) find that refugees who were initially placed in a location with a high presence of co-nationals were more likely to naturalize. However, their analysis does not shed any light on potential factors that could be driving this relationship.

Contrary to these arguments and findings, Liang (1994) suggested that a higher likelihood of social contacts with the majority group in the residential area and workplace increased the probability of naturalization, hence implying the existence of a negative relationship between migrant concentration and naturalization propensity. According to Liang, lower naturalization rates reflected the fact that immigrants who lacked regular contacts with natives would develop a stronger in-group identity and be less likely to integrate socially and culturally in American society. These findings were consistent across all immigrant groups, with the exception of Chinese immigrants. Similarly, Bueker (2006) observes that living in an area with a high percentage of foreign-born persons was negatively associated with naturalization in the US. She argues that native-born individuals acted as role models for non-naturalized migrants. Consequently, living in a predominantly native neighborhood encouraged non-naturalized migrants to acquire citizenship in an attempt to become more similar to the native population and as a way to be better integrated into the native community. In line with these arguments, Logan et al. (2012) find that living among immigrants with similar migration background had a slight negative effect on immigrants' naturalization propensity. However, they also indicate that 'additional research and theoretical work will be needed to understand the nature of these effects' (2012, 550).

Notwithstanding these contributions to an important research agenda, we observe that existing studies in this field suffer from three major methodological limitations. First, most studies summarised in Table 2.1 draw on cross-sectional data and are not able to determine whether immigrants acquired citizenship prior to or after having moved into their area of residency. A notable exception in that regard is Mossaad et al. (2018), who measure neighborhoods' concentration at arrival and citizenship acquisition at a later point in time. Yet the cross-sectional nature of their data does not allow them to account for the fact that individuals may have moved to different areas between these two periods. Under these conditions, it is, therefore, not possible to identify the independent effect of neighborhoods' citizenship acquisition.

Table 2. 1 Overview findings US-based studies on the effect of migrant concentration on naturalisation propensity

Study	Geo unit	Indicator	National origin differences	Effect
Yang (1994)	State	No. of co-nationals	Not differentiated	+
Liang (1994)	Metropolitan area / census tracts	Interaction index with majority group	- Mexican, Cuban, Colombian, Korean - Chinese	+ -
Bueker (2006)	Metropolitan area	% Foreign-born	Not differentiated	-
Logan et al. (2012)	Public Use Microdata Area	% Naturalised co-ethnics	Not differentiated	+
		Ethnic isolation	- Hispanics, Blacks and Whites - Asians	- +
Abascal (2015)	County	% Naturalised co-nationals	Not differentiated	+
Mossaad et al (2018)	Public Use Microdata Area	% Co-nationals (refugees)	Not differentiated	+

Second, with the exception of Mossaad et. al. (2018, 9176), who only look at refugees for whom 'decisions about initial placement are made by the US government and refugee resettlement agencies,' none of these studies consider immigrant selection into concentrated neighborhoods, beyond controlling for observable characteristics that may correlate with the location of residence. Yet, not controlling for immigrants' self-selection into concentrated neighbourhoods is problematic, as immigrants who reside in neighborhoods with higher migrant concentrations may have particular characteristics that could potentially affect their propensity to acquire citizenship. We argue that, at least potentially, not controlling for the selective nature of living in segregated neighborhoods could lead to an under or over-estimation of the effect of residential characteristics on immigrants' naturalization propensity. In our estimation strategy, we, therefore, explicitly consider immigrants' potential self-selection by controlling for self-selection into migrant-concentrated neighborhoods based on observed characteristics.

Third, and as it is apparent from Table 1, there is strong variation even among existing US-based studies (we are not aware of comparable studies outside the United States) in terms of the level of aggregation at which different studies measure migrant concentration. Geographical units in existing studies range from metropolitan areas to Public Use Microdata Areas (PUMAs) or county level and, in the case of Yang (1994), are as large as the state level. Although previous studies have shown that US residents may be aware of their county's socio-economic characteristics (Newman et al., 2015), we argue that these large-scale areas, which include one urban core of at least 50,000 people, or counties, which average over 100,000

people (and go up to 10 million in Los Angeles county), are unsuitable to analyze the hypothesised social interaction processes, such as information sharing and inter-group contact, that take place on a smaller scale in immigrants' near social environment. Hence, we argue that it is important to investigate these processes at small-scale residential contexts, such as neighborhoods, which provide a more intuitive environment to analyze the relation between residential characteristics and naturalization propensity.

2.3. Theoretical framework and hypotheses

As the preceding section showed, previous studies have largely relied on social contacts and identity building, on the one hand, and information-sharing arguments, on the other, to explain why and how residential migrant concentration could affect immigrants' naturalization propensity. In what follows, we develop two testable hypotheses based on these alternative mechanisms driving this relation.

a. The migrant enclosure hypothesis

The 'migrant enclosure' hypothesis was first applied in the context of citizenship acquisition by Liang (1994). According to Liang (1994), living in a migrant-concentrated neighborhood increased the chance of inter-group contacts and the frequency of contacts with the in-group (native citizens), which can have important implications for immigrant intentions to naturalize. As stated by Liang (1994: 410), "the more within group interactions immigrants have, the more likely their ethnic identity will be reinforced and the less likely they will be to become US citizens."

Although the migrant enclosure argument seems to be based on the idea that ethnic and national identity are situated at the two ends of the same continuum, it also relies on the more concrete assumption that between-group interactions facilitate mutual understanding and reduce inter-group prejudices (Pettigrew and Tropp 2006). The migrant enclosure hypothesis resonates with previous studies that have suggested that mobility into the out group only occurs when the boundaries between one's in-group and the target out-group are permeable (Tajfel, 1975; Hochman, 2011). In this context, it can be argued that individuals who have regular contacts with members of the out-group may be more likely to become acquainted with their culture, language and social norms which can lead to the development of more

favourable attitudes towards the out-group and can foster a desire to become a member of the out-group (Tajfel, 1975; Hochman, 2011).

While, in this article, we cannot measure ethnic identification directly, our data do allow us to proxy part of the underlying hypothesised social network mechanism. According to the migrant enclosure hypothesis, the negative relation between neighborhoods' migrant concentration and immigrants' propensity to naturalize is mainly driven by the fact that immigrants living in such areas are more likely to have regular contacts with other immigrants living in their local community. Yet, not every migrant concentrated neighbourhood offers the same opportunities for social contacts and the relation between migrant concentration and naturalisation may be prominent in neighbourhoods that have dense social networks. In this article, we use two proxies of availability of social networks at the neighborhood level that have been used in recent comparable work to measure peer effects (Bratsberg et al. 2020). First, we argue that immigrants are more likely to have regular contacts with neighborhood co-residents who share the same linguistic and cultural background. We operationalize the density of same origin-background network by looking at the proportion of persons living in the neighborhood with a migrant background from the same origin country (co-nationals). Second, we suggest that immigrants are more likely to have contacts with peers of comparable age. We measure the density of same-age network with the proportion of persons living in the neighborhood with a migrant background and who are in the same age category (more details in the empirical section on these operationalisations). Using these social network proxies, we formulate the following 'migrant enclosure' hypothesis:

H1 – Immigrants living in a residential area with a dense migrant-based social network are less likely to naturalize.

b. *The naturalisation diffusion hypothesis*

Logically, immigrants living in a migrant-concentrated neighborhood are more likely to encounter others who have completed the naturalization procedure than immigrants living in neighbourhoods with a high proportion of native citizens. Such a situation may positively affect immigrants' propensity to become citizens in two different ways. First, because naturalized migrants are more likely to be knowledgeable about the naturalization procedure, it can be argued that immigrants living in a community with many naturalised

migrants are more likely to receive information about the various aspects of the procedure, either by individuals who have gone through the procedure themselves, or by other members of their local community. Hence, we assume that going through the naturalisation procedure (or considering to apply) is a relevant social experience that migrants are likely to comment on, or to seek information about, among relevant peers. This information may relate to the financial costs, eligibility requirements, duration, or different stages of the process of becoming citizens of the destination country. Similarly, immigrants may be more likely to receive assistance throughout the process if they live among people who are familiar with the ins and outs of the procedure. Overall, we argue that living in such an environment may encourage immigrants who aspire to become citizens to start and successfully complete the procedure (Abascal 2015). Second, the relation between the size of the immigrant community and immigrants' likelihood to naturalise may operate through a mechanism of identification. Immigrants living in close proximity to other naturalized migrants may be more likely to view the host society as being inclusive, making them more likely to identify with its members and, therefore, to naturalize (Abascal 2015: 300-301). While in this article, we cannot empirically distinguish between information-sharing and identification, both hypothesized mechanisms point to the expectation that immigrants are more likely to acquire destination-country citizenship if they reside in a neighborhood with a higher proportion of naturalized migrants. We label both arguments as the 'naturalization diffusion' hypothesis:

H2 – Immigrants are more likely to acquire destination country citizenship if they live in a neighbourhood with higher rates of naturalised migrants.

2.4. Context

a. Citizenship policy in the Netherlands

Becoming a Dutch citizen can have an important impact on many aspects of immigrants' life. First, in the Netherlands, naturalisation comes with a number of formal rights, such as voting rights or access to public sector jobs that are restricted to nationals, that can help improve immigrants' integration process. Second, studies focusing on the Netherlands show that becoming a Dutch citizen can strengthen immigrants'

position in the job and housing market by reducing the risk of statistical discrimination (Peters 2020; Peters et al. 2017).

Conditions to acquire Dutch citizenship have changed in the last decades. Dutch citizenship policy took a liberal turn when the new Dutch Nationality Act came into force on the 1st of January 1985 (van Oers et al. 2013). The 1985 Act aimed to improve settled immigrants' legal position and integration by facilitating their access to Dutch citizenship. Requirements for eligibility included being at least eighteen years old, holding a permanent residence permit in the Netherlands, residing in the Netherlands for at least five consecutive years prior to the application, and willingness to renounce foreign citizenship (van Oers et al. 2013). Additionally, immigrants were required to show basic knowledge of the Dutch language and to prove their integration in Dutch society. These latter two conditions were tested during non-standardised interviews with municipal officials (van Oers et al. 2013). Renunciation requirements would subsequently be abolished in 1991, leading to an increase in the number of naturalizations (van Oers et al. 2013).

Dutch integration policy shifted toward a more assimilationist approach with the restoration of the renunciation requirements in 1997 and the establishment of stricter language and integration requirements, as implemented in the revised Dutch nationality act of 2003 (van Oers et al. 2013). Immigrants were then required to pass a formal naturalization test in which they are tested on their knowledge of Dutch society and their command of the Dutch language (van Oers et al. 2013). This resulted in a rise in the cost of the naturalization procedure and a substantial drop in the number of naturalizations after 2002 (van Oers et al. 2013).

b. Neighbourhood concentration in the Netherlands

The number of persons with a migrant background has steadily increased in the Netherlands over the last 20 years. In 2019, foreign-born residents accounted for 12.5 percent of the Dutch population. Their descendants (persons born in the Netherlands with two parents born abroad) represented 4.9 percent of the Dutch population (Statistics Netherlands)[8]. While a large majority of Dutch neighbourhoods have on average a rate of migrant concentration below 10 percent, other neighbourhoods experience high or very high rates of migrant concentration (above 30 percent and above 50 percent)[9]. Concentrated

[8] The share of children born with one foreign parent and one Dutch parent was 6.2 percent in 2019.
[9] More information can be found in the supplementary materials (Table A.1; Table A.2 and Table A.3).

neighbourhoods tend to be situated in highly populated and urban areas. The city of Amsterdam alone has for instance 111 neighbourhoods with an overtime average concentration above 50 percent for the period 1996-2016. Put together, these numbers suggest that immigrants living in the Netherlands tend to locate in neighbourhoods with a high rate of migrant concentration. A glimpse at our data confirms this impression as 44.8 percent of the immigrants from our four cohorts (1996/1997 and 2001/2002) are located in a neighbourhood with a proportion of persons of migrant background higher than 30 percent[10].

2.5. Data and method

a. Data

In this article, we use register data to analyze citizenship acquisition among foreign-born residents in the Netherlands. Available data include individual information on immigrants' date of arrival, legal status, demographic characteristics, socio-economic status and, crucially for our analysis, information about the residential context in which immigrants live.

This article focuses on foreign-born residents. We exclude the descendants of first generation immigrants and the so-called '1.5 generation' because persons born in the Netherlands, or migrating to the Netherlands at a young age, can make use of facilitated procedures to acquire citizenship (Immigration and Naturalisation Service n.d.(a)). We also exclude all immigrants born in Surinam or the Dutch Antilles, since these individuals may benefit from facilitated procedures (van Oers et al. 2013). Additionally, we exclude immigrants who naturalized within the first three years of residency, as they are likely to have been married or in a partnership with a Dutch citizen before they came to the Netherlands and, therefore, may have a specific profile in relation to naturalization (Immigration and Naturalisation Service n.d.(c)). Moreover, we remove immigrants who were naturalized before they were eighteen years old, as these immigrants likely have not acquired citizenship on their own initiative (Immigration and Naturalisation Service n.d.(b)). Finally, we exclude, for computational reasons, immigrants living in neighborhoods with fewer than 100 residents.

[10] More information can be found in the supplementary materials (Table A.4).

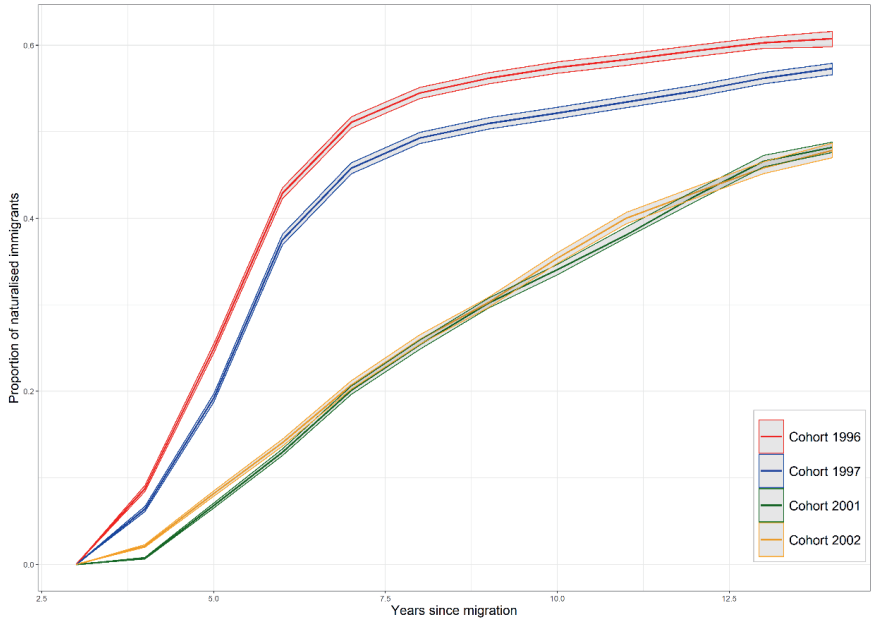
In order to make sure that we observe, for all individuals, the moment when the event occurs, we follow immigrants from the period they became eligible for naturalization until they completed the naturalization process, dropped out of the examination, or when the observation period ended. The eligibility period varies across immigrant groups. Immigrants opting for the ordinary naturalization procedure must reside in the Netherlands for a period of five years before they can start the procedure (Immigration and Naturalisation Service n.d.(a)). For these individuals, the at-risk period is set to five years after registration. Immigrants who are married or are in a registered partnership with a Dutch resident can submit their application after three years of partnership (Immigration and Naturalisation Service n.d.(c)). Therefore, the at-risk period is set to three years after registration for immigrants who declared to be in a partnership upon arrival in the Netherlands.

This article investigates four different cohorts of immigrants. The first two cohorts are composed of immigrants who registered in the Netherlands in 1996-1997. The last two cohorts include immigrants who registered in 2001-2002. We focus on these four different cohorts to include immigrants who were eligible both before and after the revision of the Dutch nationality act of 2003. Each cohort has a similar tracking period of fourteen years and is tracked per year. Altogether, the population examined in this article includes 118,591 individuals and 891,281 observations. A comparison of the naturalization rates across the four different cohorts is drawn, using Kaplan Meier analysis (Figure 2.1).

The dependent variable examined in this paper is Dutch citizenship, which is a dichotomous variable that measures whether or not an immigrant has acquired Dutch citizenship. Independent variables are measured either at the individual, the contextual or the neighbourhood level[11]. Individual-level variables cover a large range of information like gender, age at migration, migration motive, citizenship status of the partner, and employment status. The migration motive variable distinguishes five categories of migration: labour migration, asylum, family migration, student migration, and other motive. Citizenship status of the partner includes three categories referring to immigrants with no partner, immigrants in a partnership with a Dutch citizen and immigrants in a partnership with a foreign partner. Employment status makes the distinction between employed and unemployed migrants.

[11] Further descriptive statistics can be found in the supplementary materials (Table A.5 – A.9). These include more information on the variables included in the analysis as well as on the average time under observation.

Figure 2.1 Cumulative naturalization rates by cohorts. Kaplan-Meier estimates (with 95% Cis) based on migration cohorts 1996, 1997, 2001 and 2002 with observation period until 2016



Contextual-level variables refer to the origin country's characteristics. We control for the origin country's development level, measured with the Human Development Index, and level of political stability, using the Kauffman index. Additionally, we control for dual citizenship acceptance in the origin country (Vink et al. 2015), in conjunction with the applicable rules in the Netherlands.[12]

Several neighborhood-level variables are included in our analysis. The main variable of interest, migrant concentration, is analyzed at the neighborhood (*buurt*) level. After ZIP code street level units, neighborhoods are the second-smallest spatial units in the Dutch population register data. They correspond to mid-size residential areas and are composed, on average, of approximately 1,300 inhabitants (Statistic Netherlands, our analysis). Neighborhoods constitute well-defined territories that are drawn along clear and homogeneous socio-economic and geographical lines (Statistics Netherlands 2018). This level of measurement has the advantage of capturing characteristics linked with immigrants' close living

[12] We acknowledge that these two measures may not account for all variations at the origin-country level. Therefore, we also include, as a robustness check, an additional analysis in which we stratify our main models by origin country. Results of these models (Tables A.18 and A.19) are very similar to those obtained in our main analysis.

environment, including daily interactions with neighbors (i.e. at the street level), as well as social processes taking place in a slightly wider, but still immediate living environment, such as those around local shops, schools, restaurants and parks in the neighborhood.

We determine migrant concentration by looking at the proportion of persons of migrant background, including both foreign-born immigrants *and* children born with two foreign parents, in a specific neighborhood to capture social network dynamics that likely cover not just foreign-born residents but also persons of migrant descent.[13] As our data do not allow us to directly measure immigrants' personal relationships, we proxy the availability of social networks in a certain neighborhood with two measures that aim to determine the migrant community's degree of homogeneity: the proportion of co-nationals living in a neighborhood and the proportion of persons with a migrant background within the same age category. Both measures have been used in the past to proxy availability of social networks (Bratsberg et al. 2020). As regards the proportion of co-nationals, we determine the origin-country background of first-generation (i.e., foreign-born) immigrants by their birth country and the background of their descendants by looking at the birth country of their parents. If the parents were born in two different countries, we use the mother's birth country. Co-nationals, thus, refer to individuals who were born, or whose parents were born, in the same country. While being not a perfect measure of migrant background, origin country is typically used as the best available proxy based on survey or administrative data capturing shared experiences with those who came from the same country, who have settled in the same community, and who have their race and ethnic background' (Logan et al 2012: 536).

We construct our measure of proportion of persons with a migrant background within the same age category, using four different age categories: 18 to 30 years old, 30 to 45 years old, 45 to 60 years old, and more than 60 years old. These three indicators of migrant concentration were originally measured as ratio variables but were then divided in quartiles and transformed into categorical variables with four categories to identify possible non-linear relationship patterns (c.f., Mossaad et al. 2018, 5). We test the empirical validity of these proxies by linking our register-based neighborhood network proxies with

[13] We also performed similar regression models using an alternative measure of persons of migrant background and co-nationals. In contrast with our main models, we coded this time immigrants' descendants born with a Dutch parent according to the country code of their foreign parent. Using this alternative measurement did not substantially change the value of our estimates (Table A.15).

individual-level survey data from the first wave of the "New immigrant survey – The Netherlands" (Lubbers et al. 2018). This survey covers immigrants from four selected origin countries and includes questions on immigrants' social integration and, more specifically, on immigrants' frequency of contacts with people from the same origin country. For immigrants from Turkey, one of the largest groups in the Netherlands (Salentin and Schmeets 2017), we cross-tabulate our two register-based proxies of social networks and the survey-based measure of contacts. These results show that Turkish immigrants living in a neighborhood with a high proportion of co-nationals or with a high proportion of same age-persons with a migrant background are more likely to have more regular contacts with other persons of Turkish origin (Table A.10).

In addition, we test the naturalization diffusion hypothesis with a variable referring to the proportion of foreign-born residents who have acquired Dutch citizenship.[14] This variable only covers foreign-born residents who have acquired Dutch citizenship because their descendants who have become Dutch citizens may have had to go through a different procedure. Therefore, they are not relevant for our measurement of accessibility to information related to the naturalization procedure. This variable is a ratio variable categorized across quartiles. In addition, we account for the socio-economic characteristics of immigrants' environment by controlling for the urbanisation rate and the percentage of employment of the municipality in which they live. The degree of urbanisation is a categorical variable ranging from very low urbanization (less than 500 inhabitants per square kilometers) to very high urbanization (more than 2,500 inhabitants per square kilometers). The percentage of employment was originally expressed as a ratio variable but was then transformed into a categorical variable cut across quartiles.

b. Method

We examine the relation between neighbourhoods' migrant concentration and naturalisation propensity using survival analysis (Box-Steffensmeier & Jones, 1997). In our study, the event under investigation is citizenship acquisition, a clearly defined and only rarely reversed event (Vink & Luk, 2016). We employ a Cox proportional hazard model, a type of survival model which does not assume a parametric form for the

[14] One could argue that measuring the proportion of naturalized migrants among co-nationals or among immigrants from the same age category would better capture processes of information sharing and identification (c.f., Abascal 2015, who, however, measures contextual effects at the US county level, p. 307). However, as the number of naturalized co-nationals living in the same neighbourhood is often very small due to many neighborhoods with a very low number of co-nationals, the percentage of naturalized migrants (i.e., foreign-born residents) of a neighborhood provides a more robust measure that generally covers a larger number of individuals.

distribution of time and allows the inclusion of time varying covariates. For an individual (i), with a vector of covariates X, the Cox proportional hazard model expresses a hazard rate that takes the form of:

$$(1) \quad h(t|x) = h0(t)\exp(\beta' kXi)$$

The Cox proportional hazard model assumes that the effect of the covariates on the hazard will remain the same across time, regardless of the form of the distribution. This is commonly referred as the proportionality assumption. Violation of the proportionality assumption is a common issue with Cox proportional hazard modelling and can lead to biased estimates and standard errors (Hosmer et. al., 2011). This paper addresses any violation of the proportionality assumption using a stratification method[15]. The idea behind stratification is to divide the sample into various strata for the variables whose effects are not proportional over time and, as a consequence, to allow the baseline function to vary across these sub-groups. Stratifying hence provides an unbiased estimation of the coefficients for the variables that do not violate the assumption. Since tests showed that immigrant cohort violates the proportionality assumption, we stratify all analyses by this variable.

We subsequently deal with two important issues: the nested data structure and selection into neighbourhoods. First, in order to accommodate for the nested data structure, where individual immigrants are nested within neighbourhoods, we apply a multilevel survival analysis with shared frailty (Austin, 2017). As with conventional regression models, survival analysis assumes that observations in the sample are unrelated to one another. If individuals are clustered within larger units, the failure time of these individuals may be correlated. Shared frailty models constitute a specific case of mix-effects models that are designed to control for this within-cluster homogeneity by adding a random factor, or shared-frailty term, that will account for unmeasured group homogeneity.

Second, with the exception of asylum seekers, immigrants' choice of place of residence unlikely follows a random process. Previous studies have shown that immigrants tend to move to segregated neighbourhoods upon arrival due to the presence of migrant networks established prior to migration or to restrictions in the housing market. This choice can also be driven by fear of prejudice and discrimination (Zorlu & Mulder, 2008). In other words, immigrants moving to segregated neighbourhoods may have

[15] More information on how we control for any violation of the proportionality assumption can be found in the supplementary materials (Table A.24).

certain characteristics that could be related to their determination to integrate into the host society and, hence, to their propensity to naturalise. In order to ensure that an observed association between neighbourhood characteristics and the propensity to naturalise does not reflect an omitted variable that relates both to residence and naturalisation, it is therefore necessary to control for selection into neighbourhoods. Beyond Mossaad et al. (2018), who only look at refugees precisely because their place of residence is randomized, we are not aware of any study on residential characteristics and naturalisation propensity that includes such a control. In this paper we control for self-selection into neighbourhood due to observed characteristics using an inverse probability of treatment weighing method (IPTW); (Austin & Stuart, 2015). IPTW estimation is based on individuals' propensity scores to receive the treatment (understood here as the level of migrant concentration of the neighbourhood upon arrival). We estimate the propensity scores with a multinomial regression in which the exposure to the treatment variable is regressed on a range of observed covariates. In this paper, we follow the suggestion of Caliendo and Kopeinig (2008, p. 6) and only include in our propensity score model variables that influence simultaneously the treatment variable (the level of migrant concentration of a neighbourhood) and the outcome variable (naturalisation). The propensity score regression therefore controls for socio-demographic characteristics (age at arrival, gender, number of children within the household), for economic factors (employment status, and standardized household income), for origin countries' characteristics (EU citizenship and level of development of the origin country) and for various indicators of integration (citizenship status of the partner and home ownership). It is important to note that propensity scores are only measured on the basis of observed characteristics. Bias may therefore remain if unobserved characteristics causing self-selection into neighbourhoods are also linked to naturalisation propensity[16].

[16] More information on how the IPTW were constructed can be found in the final section of the supplementary materials (Table A.20; Table A.21; Table A.22). In order to check for the robustness of these findings, we also run the regression models with another measure of IPTW that takes into account neighbourhoods' proportion of co-nationals. The outcome of these regressions can be found in the supplementary materials (Table A.16 and Table A.17).

2.6. Analysis[17]

The first part of our analysis aims at testing the migrant enclosure hypothesis. To do so, we start by estimating the relevance of living in a neighborhood with a higher proportion of persons of migrant background for immigrants' naturalization propensity. We observe that this relation is negative and significant, all other covariates held constant (Figure 2.2, M1).[18] For both the second quartile with medium-low levels of immigrant concentration (neighborhoods with 12.6 to 24.4 percent of persons of migrant background) and the third quartile with medium-high levels of immigrant concentration (24.4 to 41.4 percent), we found that immigrants were about 10 percent less likely to naturalize (HR = 0.90), compared to immigrants living in neighborhoods with the lowest proportion of persons of migrant background. Immigrants living in the most migrant-concentrated neighborhoods (> 41.4 percent) were 13 percent less likely to naturalize (HR = 0.87), all else constant. The variance of the random effect indicates that on average, there is limited variance in naturalization propensity at the neighborhood level, but with a substantial standard deviation (variance of the random effect = 0.07; standard deviation of the random effect = 0.27, Table A.11, M1).

While the results of model 1 suggest that living in a migrant-concentrated neighborhood is associated with a lower propensity to naturalize among immigrants, the negative effect of living in a migrant-concentrated neighborhood virtually disappears when we add, in model 2, two proxies of availability of social networks: the proportion of co-nationals and the proportion of persons with a migrant background within the same age category (Figure 2.2, M2). With these two network controls included in the model, immigrants were marginally less likely to naturalize when they reside in low-medium migrant-concentrated neighborhoods remained (HR: 0.97) and marginally more likely to do so in medium-highly (HR = 1.03; Figure 2.2, M2) or highly immigrant concentrated neighbourhoods (HR = 1.04; Figure 2.2, M2).

Further inspection of the results from model 3 (visualised in Figure 2.3) show that network availability was negatively associated with naturalization. Immigrants living in a neighborhood with a very

[17] All regression models can be found in the supplementary materials.

[18] Adding the IPTW reduces the coefficients' value for the third and fourth quartile of persons of migrant background (compare results M0 and M1, Table A.11).

high proportion of co-nationals (fourth quartile) were 40 percent less likely to naturalize (HR = 0.60), while immigrants living in a neighborhood with a very high proportion of persons with a migrant background within the same age category were 16 percent less likely to become Dutch citizens (HR = 0.84; Figure 2.3, M2). Overall, the results of our model with social network proxies (model 2) suggest that the negative effect of migrant concentration is mainly driven by the density of the migrant-based social network. This corroborates the migrant enclosure hypothesis (H1).

The next step in our analysis is to assess whether the negative association between network availability and naturalisation propensity is driven by the largest immigrant groups, especially Moroccans (8.6 percent) and Turks (9.1 percent) who jointly present around 18 percent of our research population and up to 68 percent (Moroccans, 32.2 percent; Turks, 35.8 percent) of the population residing in neighborhoods in the Netherlands with a high degree of co-nationals (fourth quartile). These two long-established communities in the Netherlands maintain a strong sense of national community identification (SCP/WODC/CBS 2005, p. 108; cf. Gijsberts and Dagevos 2007) and are known to have strong same-national origin social networks, especially among foreign-born immigrants living in immigrant concentrated areas (Van Tubergen 2015). To identify to what extent the results of our main model are driven by these two large immigrant groups, we ran an additional model in which we excluded immigrants born in Morocco or Turkey from the analysis. Doing so reduced the effect of living in a neighborhood with a high and very high proportion of co-nationals (Figure 2.3, M3). Although denser co-national social networks in the neighbourhood remain negatively and significantly associated with naturalisation propensity, a substantial part of the downward effect was clearly driven by an overrepresentation of Moroccan or Turkish migrants in those neighbourhoods. Living in a neighborhood with a high proportion of persons with a migrant background within the same age category remains negatively associated with naturalization at comparable levels, even after excluding these two groups (Figure 2.3, M3). We also look at German and Belgian immigrants residing in neighborhoods, particularly at the respective Eastern and Southern borders of the Netherlands, that were predominantly composed of members of the Belgian or German communities. The percentage of naturalization is very low among these two immigrant groups, who are mainly composed of cross-border workers. Excluding these groups from the sample did not substantially change the coefficients' value (Figure 2.3, M4).

Figure 2.2 Effect of neighbourhood concentration of persons with a migrant background (in quartiles from lowest to highest concentration) on the risk of naturalisation among immigrants in the Netherlands. Dots denote hazard ratios and horizontal lines correspond to 95% CIs, from Cox regression with shared frailty and IPTW. Model 1 excludes control for share of co-nationals and share of same-aged persons of migrant background; otherwise both models include full controls and are stratified by migrant cohort. Full model output in Table A.11.

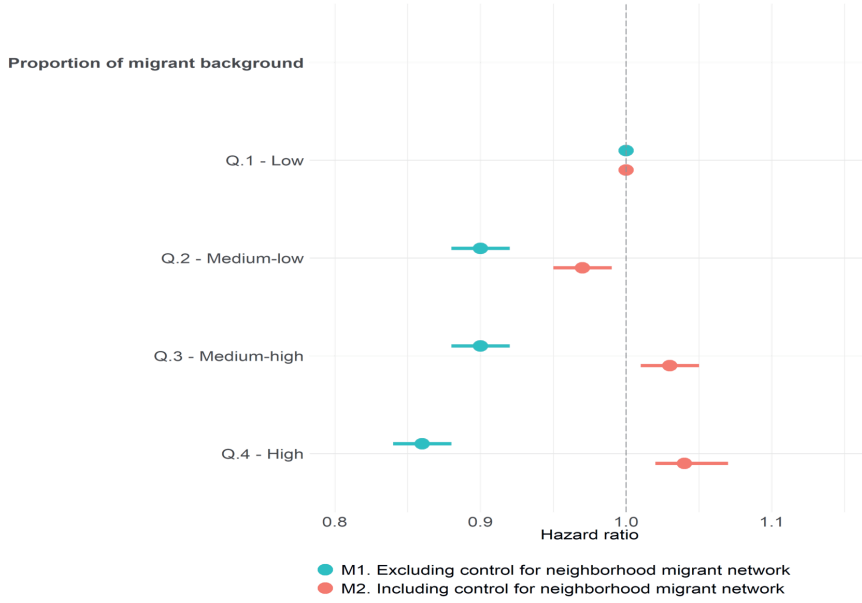
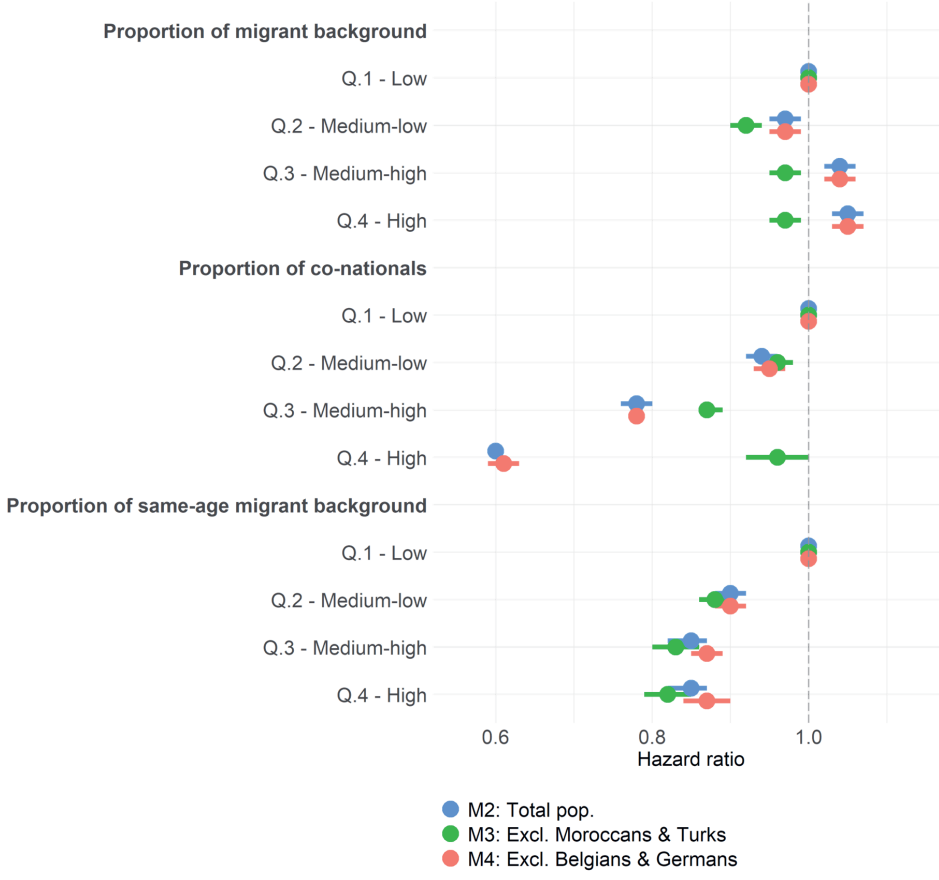


Figure 2.3 Heterogeneous effects of neighbourhood characteristics on the risk of naturalisation among immigrants in the Netherlands, full sample and subsamples (migrants from Turkey and Morocco, resp. Belgium and Germany excluded). Dots denote hazard ratios from Cox regression and horizontal lines correspond to 95% CIs. All models include full controls and are stratified by migrant cohorts. Full model output in Table A.11 and Table A.12



There may also be heterogeneity across different types of immigrants and, more specifically, between immigrants who came to the Netherlands with different migration permit types or derived motives. To account for this heterogeneity, we ran separate analyses for sub-groups of the three main registered migration types. The results of these analyses reveal that living in a neighborhood with a high concentration of co-nationals was negatively associated with immigrants' naturalization propensity for family and labor immigrants (Figure 2.4, M5, M7). For asylum migrants, we observe a negative effect of living in a

neighborhood with a high share of co-nationals, but not with medium-high or medium low levels (second and third quartile, Figure 2.4, M6). This may be due to overall high rates of naturalisation among asylum migrants, who typically are more prone to receive legal advice as part of the asylum determination procedure and thus may be less subject to local network effects, especially at intermediate levels of network density. An explanation, however, may reside in the fact that refugees are, on average, more mobile than other groups (Table A.9) and may, therefore, not be impacted by their local community to the same extent as other immigrant groups (cf. De Hoon et al. 2020). To check whether indeed residential mobility among asylum migrants explains why network density is relevant only at higher, but not at intermediate levels, we conducted an additional analysis based only on asylum migrants who stayed in the same location during the whole observation period. We find a significant, but weak negative effect of neighborhood co-national density among these immobile asylum migrants (HR: 0.95-0.97; Table A.13, M9), suggesting that greater residential mobility is only a limited part of reduced relevance of intermediate levels of social density network for naturalization propensity. Living in a neighborhood with a higher share of migrants in the same age category was negatively associated with naturalization propensity, regardless of the migration type (Figure 2.4), although the magnitude of this association was stronger for labor migrants (Figure 2.4, M7). Overall, this sub-group analysis shows that our findings are largely consistent across groups of immigrants by migration type.

Next, we look at the relevance of higher proportions of naturalized immigrations in the neighborhood. First, we observed that immigrants were more likely to acquire destination-country citizenship if they live in a neighborhood with a higher proportion of naturalized migrants. As shown in Table 2.2 (Model 10), immigrants living in a neighborhood with a high proportion of naturalized migrants (fourth quartile) were 74 percent more likely to naturalise than immigrants who live in neighborhoods where less than half of immigrants have acquired Dutch citizenship (0 – 52% of naturalised migrants).

Subsequently, we interacted this measure of the proportion of naturalized migrants with our measure of migrant concentration to test whether the positive association between the proportion of naturalized migrants and naturalization was conditioned by migrant concentration (Table 2.2, M11 and M13). We measure here migrant concentration, alternatively, with the proportion of persons with an immigrant background and the proportion of co-nationals. For simplicity's sake, we recode both measures

into dichotomous variables and set the cut-off points to the median values. This analysis shows that when the share of naturalised immigrants is low, immigrants living in a neighbourhood with a high proportion of persons with an immigrant background and a high proportion of co-nationals are, respectively, 10% (model 11) and 34% (model 13) less likely to naturalise, compared to when they reside in less migrant concentrated areas. However, looking at the interaction coefficient we can see that this negative effect of immigrant concentration decreases in neighbourhood with a higher share of naturalised immigrants. Thus, immigrants living in a neighborhood with a high concentration of persons with an immigrant background and a high share of naturalised migrants (fourth quartile) are 13% (model 11) more likely to naturalise in comparison to immigrants living in a neighborhood with a high concentration of persons with an immigrant background and a low share of naturalised migrants (first quartile). Similarly, immigrants living in a neighborhood with a high proportion of co-nationals and a high proportion of naturalised migrants (fourth quartile) are 24% (model 13) more likely to naturalise compared to immigrants living in a neighborhood with a high proportion of co-nationals and a low proportion of naturalised immigrants (first quartile).

Overall, these findings suggest that living in areas with higher proportions of naturalized immigrants can offset the overall negative effect of migrant concentration. This compensation effect of high proportions of naturalized immigrants is stronger for immigrants residing among high proportions of co-nationals (Table 2.2, Model 13). These findings support hypothesis H2 and suggest that immigrants' propensity to acquire destination country citizenship is positively affected by the presence of other immigrants who have successfully completed the naturalization procedure. As stated in the theoretical section, this finding may be driven by the fact that naturalized migrants can share information about the naturalization procedure but also by the fact that those living among naturalized individuals may be more likely to perceive the host society as being inclusive (Abascal 2015). Future studies will need to disentangle these two mechanisms.

Figure 2.4 Heterogeneous effects of neighbourhood characteristics on the risk of naturalisation among immigrants in the Netherlands, subsamples by registered migration motive (Family migrants/Asylum applicants/Labour migrants). Dots denote hazard ratios from Cox regression and horizontal lines correspond to 95% CIs. All models include full controls and are stratified by migrant cohorts. Full model output in Table A.13.

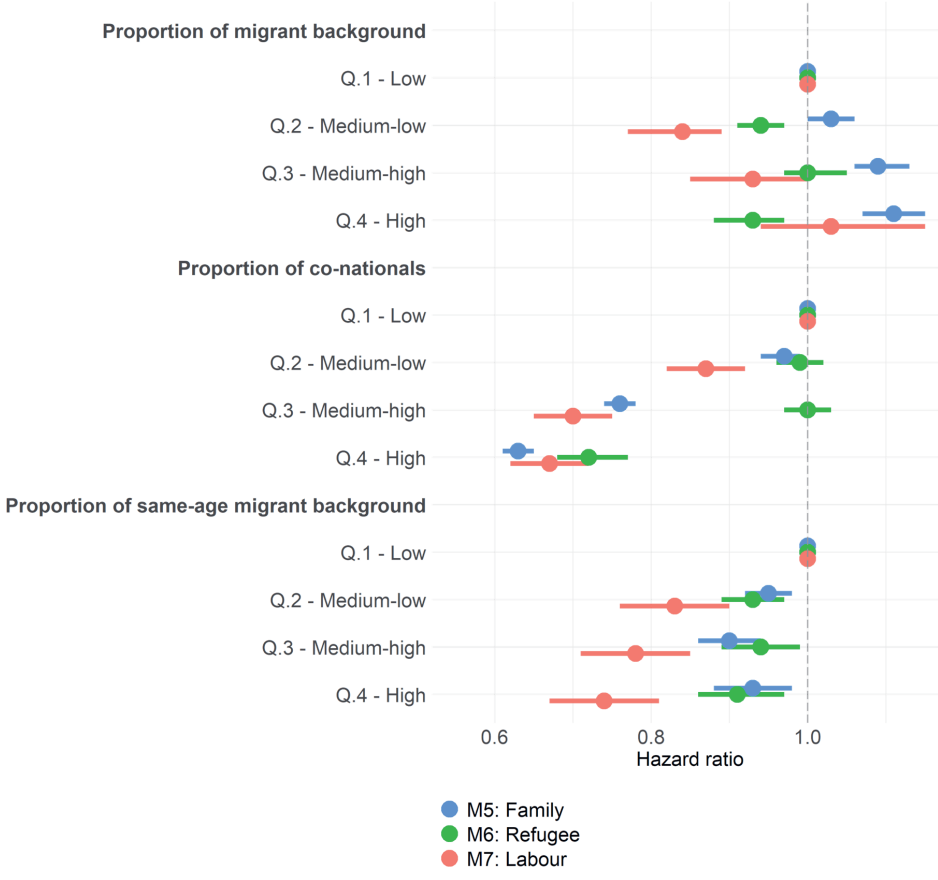


Table 2.2 Effect of neighbourhood rate of naturalised migrants on the risk of naturalisation among immigrants in the Netherlands, interaction with neighbourhood migrant concentration (proportion of persons with a migrant background and proportion of co-nationals). Estimates based on Cox regression with shared frailty and IPTW, stratified by migrant cohort. All controls included, see Table A.14 for full model output.

		Model 10		Model 11		Model 12		Model 13	
		Exp(Coeff)	Std. Err.	Exp(Coeff)	Std. Err.	Exp(Coeff)	Std. Err.	Exp(Coeff)	Std. Err.
Proportion of naturalised migrants	First quartile (0 – 52%)	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	Second quartile (> 52 - 62%)	1.42***	0.02	1.34***	0.02	1.38***	0.01	1.33***	0.01
	Third quartile (> 62 – 69%)	1.49***	0.02	1.47***	0.02	1.45***	0.02	1.34***	0.02
	Fourth quartile (> 69 – 100%)	1.74***	0.02	1.69***	0.02	1.70***	0.02	1.55***	0.02
Proportion of persons with a migrant background	Low proportion (below the median value)	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	High proportion (below the median value)	0.95***	0.02	0.90***	0.01	-	-	-	-
Proportion of co-nationals	Low proportion (below the median value)	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	High proportion (below the median value)	-	-	-	-	0.75***	0.01	0.66**	0.01
Rate of naturalised migrants*Proportion of persons with a migrant background	First quartile*High proportion	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	Second quartile*High proportion	-	-	1.05**	0.02	-	-	-	-
	Third quartile*High proportion	-	-	1.07***	0.02	-	-	-	-
	Fourth quartile*High proportion	-	-	1.13***	0.03	-	-	-	-
Rate of naturalised migrants*Proportion of co-nationals	First quartile*High proportion	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	Second quartile*High proportion	-	-	-	-	-	-	1.10***	0.02
	Third quartile*High proportion	-	-	-	-	-	-	1.19***	0.02
	Fourth quartile*High proportion	-	-	-	-	-	-	1.24***	0.03
Standard deviation of the random effect = 0.23; Variance of the random effect = 0.05									

Source: Statistics Netherlands. *p < .05; **p < .01; ***p<0.001.
All controls included

2.7. Conclusion and discussion

The topic of citizenship acquisition has received much academic attention over the past decades, contributing to a better understanding of the individual determinants of citizenship acquisition (Abascal 2015; Logan 2012; Peters et al. 2016; Yang 1994). Yet we have limited and contradicting empirical knowledge of how neighborhood factors could affect immigrants' decision to naturalize. This article addresses this gap by examining the relationship between migrant concentration and immigrants' citizenship acquisition in the Netherlands. In contrast with previous studies that used large-scale levels of aggregation (Abascal 2015; Liang 1994; Logan et al 2012; Mossaad 2018; Yang 1994), we were able to investigate this relationship at small-scale residential contexts, providing a more intuitive and suited environment to analyze social interaction processes taking place in immigrants' immediate environment. We tested two hypotheses, previously used in the context of cross-sectional studies only (Yang 1994; Liang 1994; Abascal 2015) and drew on longitudinal administrative data that allowed us to follow four immigrant cohorts over fourteen years after entering the Netherlands. We applied a stratified Cox proportional hazard model with shared frailty to account for the multilevel structure of our data and employ propensity score matching to control for potential self-selection into neighborhoods, due to observed characteristics.

Our analysis of the frailty models highlights the importance of controlling for within-neighborhood homogeneity. Moreover, our Cox proportional hazard regressions show that living in a migrant-concentrated neighborhood was negatively associated with naturalization propensity. Using two proxies of social networks availability, we observe that this negative association was driven by a higher density of migrant-based networks in these neighborhoods. These results confirm the expectations derived from migrant enclosure theory (Liand 1994), using fine-grained neighborhood measures and after controlling for compositional biases and selection mechanisms.

At the same time, we demonstrated that living in a neighborhood with a high proportion of naturalized migrants increased immigrants' propensity to naturalize, which provides evidence that the assumption of the local diffusion of naturalization, previously tested using large-scale geographical units of measurements, is also relevant at the local level (Abascal 2015). This relation may operate through an information-sharing mechanism according to which naturalized migrants are better able to provide information about the naturalization procedure to aspiring citizens. It may also be driven by the fact that

immigrants who have regular contacts with naturalized migrants are more likely to view the host society as being inclusive, which could stimulate their identification process and their desire to naturalize.

Altogether, these findings reveal a complex picture that contrasts with often de-contextualized cost-benefit theories applied in much of the literature on citizenship acquisition (Yang 1994). This article emphasizes the need to move beyond individual predictive factors and suggests that we should turn attention to the broader residential context in which immigrants are embedded. More specifically, just as it is well established that people are influenced by those they meet on a daily basis or live close by (Elder 1994), our analyses show that immigrants' living environment has a significant impact on their likelihood to become a citizen in the destination country. We find that greater migrant concentration in the neighborhood is associated with lower naturalization rates, especially among two large immigrant groups from the Middle East and North Africa, providing support for the migrant enclosure hypothesis. This negative effect can, however, be offset by a positive spillover of higher rates of naturalized migrants in the neighborhood.

This article not only contributes to the literature on the determinants of citizenship acquisition but also speaks to a broader debate on the potential effect of neighborhoods' migrant concentration for immigrant integration (Musterd, 2003; Bolt et al., 2010). We encourage future studies at the cross-section of these fields to add to our work by addressing some of its limitations. First, while we are the first to address potential endogeneity between residential environment and naturalization outcomes explicitly, our empirical strategy only allowed us to control for self-selection due to observed characteristics (Mossaad et al. 2018). Second, while we were able to link our administrative data to survey data and partially validate our two proxies of social networks availability at the neighborhood level, in our main analyses, we did not directly measure immigrants' social contacts. In a similar way, we were not able to directly measure the relationship between inter-group contacts and in-group identity. Future research could test these mechanisms, using indicators of personal relationships, including, for instance, the frequency of contacts with other immigrants or with natives, as well as survey data related to identity. Nevertheless, we think that the whole-population and detailed household information from administrative registers used here have a strong appeal in terms of generalizability, large samples, and longitudinal nature.

Third, in this era of big-data analysis, we look forward to seeing studies using more dynamic contextual units, such as GPS-activity data, that can record people's activities and routes more systematically.

Such data would provide a finer-grained measure of immigrants' social networks and test the theoretical mechanisms developed in this article in a more dynamic manner. Finally, neighborhoods with large immigrant communities may be more likely to have active immigrant civil organizations or more welcoming local politicians and bureaucrats that could help immigrant groups during the naturalization process. As our data do not allow teasing out these mechanisms, further studies are needed to better understand this relationship.

This study fills an important gap in the study of citizenship acquisition and neighbourhood context. By applying a design that uses low-scale fine-grained geographical units and controls for self-selection into concentrated neighborhoods, we are able to overcome a number of limitations identified in previous studies and able to test several alternative hypotheses in a robust manner. These findings speak both to the study of immigrant naturalisation propensity as well as the migration literature at large, by contributing to a better understanding of the role played by residential context within immigrants' post-migration settlement process.Third, in this era of big data analysis, we look forward to seeing studies using more dynamic contextual units, such as GPS-activity data, that can record people's activities and routes more systematically. Such data would provide a more fine-grained measure of immigrants' social networks and allow testing the theoretical mechanisms developed in this paper in a more dynamic manner.

Finally, neighbourhoods with large immigrant communities may be more likely to have active immigrants civil organisations or more welcoming local politicians and bureaucrats that could help immigrant groups during the naturalisation process. As our data do not allow teasing out these mechanisms, further studies are needed to better understand this relationship.

Chapter 3

Citizenship acquisition and spatial stratification: analysing immigrant residential mobility in the Netherlands

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3.1. Introduction

It is a well-known phenomenon that in European destination countries, newcomers tend initially to live in urban areas with high concentrations of immigrants due to employment opportunities, the presence of pre-established ethnic networks, and restricted financial resources (Zorlu & Mulder, 2008). Living in a neighbourhood with large numbers of other immigrants may have various implications for immigrants' life outcomes. Although living with other immigrants can facilitate access to valuable information (Abascal, 2015) and can lead to better life satisfaction (Knies et al., 2016), it is also considered to reinforce socio-economic inequality, especially for those living in areas of economic deprivation. Previous studies have stressed that living in an immigrant-concentrated neighbourhood may have a detrimental effect on immigrants' educational achievement and access to the labour market (Ihlanfeldt & Sjoquist, 1998; Overman, 2002). Moreover, ethnic concentration is often associated with lower social-cultural integration (Bouma Doff, 2007; Gijsberts & Dagevos, 2007), though this claim remains debated in the literature (Bolt et al., 2010; Musterd, 2003).

Various studies shed light on why some immigrants stay in immigrant-concentrated neighbourhoods while others move over time to neighbourhoods dominated by native-born citizens. According to spatial assimilation theory, immigrants tend to move to wealthier neighbourhoods with fewer migrants as they integrate socially and economically in the host country (Lieberson, 1961; Logan & Alba, 1993). Other structural factors, however, such as housing market discrimination, impede immigrants in their mobility and prevent this process of spatial assimilation. This phenomenon is described in the literature as spatial stratification (Alba & Logan, 1991; Logan &Alba, 1993; van Ham & Feijten, 2008).

This paper focuses on legal-status discrimination in the housing market as a crucial factor limiting spatial mobility. Studies focusing on European countries show that housing market discrimination is often based on ethnic and religious grounds (Ahmed & Hammarstedt, 2008; Carlsson & Eriksson, 2015; Heylen & van den Broek, 2016). Even though some studies have included citizenship status in their models of residential mobility (South et al., 2005, Vogiazides, 2018), very little attention has been paid in the literature to legal status-based discrimination in the context of immigrants' residential conditions. We intend to fill in this gap by analysing the effect of naturalisation on immigrants' mobility outside of migrant-concentrated neighbourhoods in the Netherlands. We argue that discrimination on the grounds of citizenship hinders

certain immigrant groups in their mobility. Because possessing Dutch citizenship often acts as a positive signal for all actors in the housing sector, including landlords, real estate agents and mortgage lenders, naturalised immigrants will be less likely to suffer from discrimination in the Dutch housing market and will therefore be less constrained in their residential mobility.

The Netherlands is a country with a significant proportion of persons with a migrant background and where there is evidence of an over-representation of ethnic minorities in the biggest cities (Karsten et al., 2006, p. 231; Salentin & Schmeets, 2017, p. 4; van Ham & Feijten, 2008, p. 4). Using administrative data drawn from Dutch registers, we follow immigrants from their arrival in 2003, 2004 and 2005 until 2016 and analyse the relation between naturalisation and mobility using a statistical technique called survival analysis.

Although the aim of this paper is to find evidence of a citizenship premium in the housing market in the Netherlands, it is important to note that, due to data restrictions, we are not able to directly measure housing market discrimination. The following hypotheses therefore aim at testing the relation between citizenship and housing market discrimination by examining whether our data is consistent with particular corollaries of housing market discrimination. In that sense, this paper should be distinguished from previous studies that have aimed at measuring housing market discrimination with experimental designs (Ahmed & Hammarstedt, 2008; Heylen & van den Broek, 2016).

Our paper starts with a review of the literature that has contributed to explaining immigrants' spatial mobility outside of neighbourhoods that contain many other immigrants. The next sections outline a theoretical framework for our analysis of the role played by naturalisation in residential mobility, followed by a discussion of the data and methods used in the analysis. Results of the analysis are presented in the empirical sections.

3.2. Theoretical framework and hypotheses

The topic of immigrant residential mobility has been extensively covered in the literature. Finding its roots in the Chicago School's ecological tradition, which views residential mobility as a consequence of acculturation and social mobility, the spatial assimilation theory expects immigrants to initially move to migrant-concentrated neighbourhoods before relocating to predominantly native neighbourhoods as they integrate into the host country (Logan & Alba, 1993, Massey, 1985, Andersen, 2016). This is based on the

assumptions that immigrants will first settle in migrant-concentrated neighbourhoods and that changes in integration will affect their residential preferences. Previous studies have confirmed that spatial assimilation explains housing inequalities and ethnic concentration to a substantial degree (Andersen, 2016; Logan & Alba, 1993). Focusing on the Netherlands, Zorlu & Mulder (2008) found that immigrants tend to settle upon arrival into migrant-concentrated neighbourhood and move towards less concentrated neighbourhoods if they are in a better socio-economic position. Bolt & van Kempen (2010) reached a similar conclusion regarding immigrants' relocation.

Yet, disparities in residence patterns between ethnic groups often remain even after accounting for factors related to spatial assimilation (Vogiazides, 2018). This has led scholars to question some of the assumptions of the assimilation theory and consider two alternative explanations. First, immigrants may not all share the desire to leave migrant-concentrated neighbourhood and may hold a preference for ethnic enclaves (Bolt & van Kempen, 2010; Vogiazides, 2018). Second, even when spatial assimilation takes place, it can be disrupted by cultural prejudice and discrimination in the housing market, a phenomenon that is defined as spatial stratification (Alba & Logan, 1991).

Housing market discrimination can take place at different stages of a person's search for housing, and involves different types of actor, including mortgage lenders, real estate agents, landlords, and local authorities (Bengtsson et al., 2012; Bolt & van Kempen, 2010; Bosch et al., 2010; Dill & Jirjahn, 2014; Ross & Tootell, 2004). Scholars traditionally distinguish between two types of housing market discrimination: taste-based discrimination and statistical discrimination (Van der Bracht et al., 2015). Taste-based discrimination usually involves preferences for certain ways of doing things and prejudices against certain minority groups. Statistical discrimination, on the other hand, occurs when economic actors have imperfect information about an individual's characteristics and compensate for this lack of information with stereotypes or group averages.

No study has, to our knowledge, analysed the relevance of citizenship acquisition to immigrants' residential mobility and to housing market discrimination in the Netherlands. While it is hard to see how citizenship acquisition could be relevant in regard to taste-based discrimination, there are reasons to believe that naturalisation may help to reduce several types of statistical discrimination encountered in the Dutch housing market. Starting with the rental market, we can expect citizenship acquisition to positively affect

the risk-calculation of landlords and real estate agents. Because rent in neighbourhoods with low numbers of migrants is often relatively expensive, lessors and real estate agents may prevent immigrants from entering such neighbourhoods if they expect them to have problems paying the rent. Naturalisation may, however, send a positive signal to landlords and estate agents and be considered a marker of economic integration into the host country. Moreover, naturalisation is often associated with permanent settlement and an intention to stay in the host country which may suggest greater long-term commitment for landlords and real estate agents. Finally, landlords may perceive naturalised immigrants as more traceable if they leave the Netherlands with a rent debt which may also be taken into consideration in the risk calculations of landlords and real estate agents.

Naturalisation may also positively affect the chances of immigrants to be granted a mortgage and can therefore facilitate immigrants' mobility through homeownership. As outlined in previous studies, discriminatory practices can be observed among mortgage lenders who believe that persons with a migrant background present a future risk of non-payment, a process that is sometimes defined as 'redlining by ethnicity' (Aalbers, 2007). But possessing the citizenship of the host country may signal to lenders an intention to invest resources in that country and greater integration into the labour market. Naturalisation may, therefore, favourably weigh on the risk calculations of lenders (Peters, 2019). Naturalisation, then, is important to explanations of spatial mobility. Because we expect citizenship acquisition to act as a positive signal for real estate actors, we expect naturalised citizens to be more likely to move outside of migrant neighbourhoods. This leads us to the first hypothesis of this paper:

H1 – Citizenship acquisition has a positive effect on the probability of moving out of migrant-concentrated neighbourhoods.

Other factors complicate the issue, however. Real estate agents, landlords and lenders apply strict financial standards that may hinder the mobility of the most vulnerable immigrant groups. It is therefore important to make a distinction between immigrants who are in a precarious economic situation and immigrants who are financially stable. Because financial stability is a very important criterion for housing market actors when it comes to risk calculation, it is probable that housing applicants who have a very low income, and therefore fall within the category of high risk applicants, will see their loan or rent application turned down, regardless of their nationality. Similarly, naturalisation may be viewed by landlords and lenders

as less important for immigrants who have a high income as these immigrants represent a very low risk. On the other hand, we might expect mid-risk applicants to see their applications fall under stronger scrutiny, hence increasing the risk of arbitrary assessment and statistical discrimination (Aalbers, 2007). Possessing Dutch citizenship may therefore matter more for them than for others. This leads us to our second hypothesis:

H2 – The positive effect of naturalisation on the probability of moving out of migrant-concentrated neighbourhoods is stronger for immigrants whose household income is situated around the median value.

Household income is not the only criterion taken into account in risk-assessments. Mortgage lenders, landlords and real estate agents often also assess an applicant's job contract, as this offers additional information about the source and security of their income. Being employed on a permanent contract suggests financial stability over the long term, while a fixed contract provides less insight into a person's future. Previous research shows that having a permanent job contract increases the odds of securing a mortgage (Aalbers, 2007, p. 8). A similar mechanism may also apply to actors in the rental market. Following this line of reasoning, we argue that applicants with a permanent contract are less likely to be in the high-risk category and are therefore more likely to see their housing applications approved. This leads to our third hypothesis:

H3 – The positive effect of naturalisation on the probability of moving out of migrant-concentrated neighbourhoods is stronger for immigrants who have a permanent job contract.

As mentioned, we have reasons to believe that citizenship acquisition can help reducing housing market discrimination. Yet, a common view is also to consider naturalisation a marker of cultural integration. If this is the case, we would expect, in line with spatial assimilation theory, naturalised immigrants to leave concentrated neighbourhood not only because they face a lower degree of housing market discrimination, but also because they share a desire to break away from migrant-concentrated neighbourhoods. While we cannot entirely rule out this possibility, we use different strategies to control for immigrants' cultural integration and self-selection into naturalisation. This is further discussed in the method section.

3.3. The Dutch context

a. Discrimination on the Dutch housing market

The Netherlands has a highly segmented and peculiar housing market. The rules and procedures for the allocation of dwellings greatly vary between the different housing sectors. While landlords and real estate agencies have some freedom in the choice of potential tenants, dwellings in the social housing sector are allocated on the basis of clear and transparent local and national criteria including income, length of residency, family situation and urgency. On the other hand, mortgages are mostly allocated based on economic indicators, although other requirements, such as the possession of permanent residence status, also apply in the case of a mortgage backed by the Dutch National Mortgage Guarantee (NHG). Banks may also use discretionary criteria for mid-risk borrowers such as "judgment, routines, common knowledge, rules of thumb", (Aalbers, 2007, p. 8).

Although research focusing on discrimination in the Dutch housing market remains relatively scarce in comparison to other European countries, there is growing evidence that taste-based and statistical discrimination do take place in the Netherlands. Previous studies suggest that immigrants seeking to secure a mortgage may sometimes be confronted with statistical discrimination (Aalbers, 2007). As regards discrimination in the rental market, a report from the Netherlands Institute for Social Research (SCP) from 2009 found marginal evidence of discrimination in the private rental sector and no evidence in the case of social housing Sociaal en Cultureel Planbureau, 2009). In contrast, reviews of legal cases show that discrimination in the rental market on the basis of skin colour (College voor de Rechten van de Mens, 2018) or on the basis of religious faith (College voor de Rechten van de Mens, 2016b) occasionally occurs. A recent study furthermore suggests that discrimination in the private rental market based on ethnicity may in reality be substantial (De Groene Amsterdammer, 2018).

We have very little knowledge as to how much housing market discrimination can be attributed to nationality in the Netherlands. Although discrimination on grounds of nationality in the field of housing is strictly prohibited in the Netherlands by the General Equal Treatment Act (Algemene Wet Gelijke Behandeling), landlords, real estate agents and mortgage lenders often request information about their clients' nationality during the registration process. While it is not always clear what they do with this

information, recent legal cases show that nationality may sometimes be used as a source of direct discrimination. This applies to both actors in the private rental sector and mortgage lenders. There is, however, no evidence of discrimination on the basis of nationality in the social housing sector. This may be due to the fact that social housing is allocated on the basis of transparent and objective criteria (Sociaal en Cultureel Planbureau, 2009).

b. Citizenship policy in the Netherlands

Immigrants who settle in the Netherlands must fulfil different criteria in order to become eligible for naturalisation. Requirements for eligibility generally include being at least eighteen years old, holding a permanent residence permit in the Netherlands, residing in the Netherlands for at least five consecutive years prior to the application and willingness to renounce his or her foreign citizenship. Since the revised Dutch nationality act of 2003, immigrants are additionally required to pass a formal naturalisation test that will assess their knowledge of Dutch society and their command of the Dutch language. Naturalisation was then viewed as the crown of the completed integration process, rather than a facilitator of integration. This led to an increase of the cost of the naturalisation procedure and a decline in the number of naturalisations (van Oers et al., 2013).

3.4. Data and methods

a. Data

We analyse the relation between naturalisation and immigrants' residential mobility using Dutch register data from Statistics Netherlands. Our focus is on foreign born immigrants (first generation) who moved to the Netherlands and registered in a Dutch municipality in 2003, 2004 or 2005. We decided to focus on this time period because all immigrants from the three cohorts were eligible for citizenship under the same conditions. We follow immigrants from their arrival in the Netherlands until they move out of a migrant-concentrated neighbourhood or until the end of the observation period. Individuals are tracked annually until 2016 over a maximum period of 13 years.

First generation immigrants are defined in this paper as immigrants who are born abroad and have two parents born abroad. We exclude immigrants born in Suriname before 1975 and those born in the Dutch Antilles, since these immigrants are Dutch citizens by birth. We also do not include EU citizens who may be less subject to discrimination in the housing market than other immigrant groups. Because we are interested in individuals who move outside of migrant-concentrated neighbourhoods out of their own initiative, we reduce the possibility of including immigrants living with their parents by looking only at individuals who are 25 years old or older. Given the way we measure the concentration of immigrant neighbourhoods (percentage of individuals with an immigrant background living in a specific area), we also exclude immigrants living in a neighbourhood with fewer than 100 individuals in order not to categorize neighbourhoods with few immigrants as concentrated. In order to limit cases of informed right-censoring, we additionally exclude immigrants who left migrant-concentrated neighbourhoods by leaving the Netherlands entirely. Finally, since we are interested in immigrants' first move outside of immigrant-concentrated neighbourhoods, we only take into consideration immigrants who moved to a concentrated neighbourhood upon arrival. In total, we have data on 29,400 individuals, spanned across 234,912 observations, including 64,240 observations censored after a person moved out of a migrant-concentrated neighbourhood (our 'event' of interest).

The unit of measurement of the neighbourhoods is the *buurt*. The *buurt* is the second smallest spatial unit in the Dutch population register data. It is composed on average of 1,300 inhabitants and is sufficiently small to be able to zoom into specific economic and social processes taking place in individuals' close environment. We measure migrant concentration by looking at the proportion of persons of migrant background living in a specific neighbourhood. This means that our measure of migrant concentration covers not just first-generation migrants but also individuals of migrant descent (so called 'second generation'). We chose to include individuals of migrant descent in our measurement of ethnic concentration because they significantly differ from the Dutch population in terms of socio-economic outcomes (Statistics Netherlands, 2018). The threshold we use to determine concentrated neighbourhoods is set at the average proportion of individuals with an immigrant background living in the Netherlands over time in our data (20%). Thus we define a 'migrant-concentrated neighbourhood' as one in which at least

20% of the inhabitants have a migrant background. Our data base covers all concentrated neighbourhoods located in the Netherlands.

We control for various characteristics at the individual, household, contextual and neighbourhood level. Individual level variables include gender, type of job contract, marital status, age at migration, migration motive and individuals' type of housing. At the household level, we control for the number of children living in the household, and we include a measure of standardized household income. Our measure of household income is cut across quartiles. The quartiles categories are based on the immigrant population in our data base. The first quartile corresponds to low income individuals while the second and third quartile are referred to as medium low and medium high income. The fourth quartile constitutes the high-income category. Contextual-level variables refer to characteristics of the country of origin. We thus control for the level of development of the origin country as measured by the Human Development Index. As regards neighbourhood characteristics, we control for the level of urbanisation and the proportion of individuals with an immigrant background living in the municipality. Based on register data alone, we are not able to directly measure immigrants' housing preferences. However, we also control for three neighbourhood characteristics that we think can be related to immigrants' desire to stay in or leave a certain neighbourhood: the level of employment, the average income level, and the degree of ethnic homogeneity of the migrant community. Further information on the different variables used in the analysis can be found in table 3.1.

b. Method

Modelling strategy

We examine the relation between immigrants' naturalisation and mobility outside of concentrated neighbourhoods using survival analysis. Survival analysis is commonly used to estimate the timing and occurrence of a specific event. In contrast with other forms of traditional regression-based methods, it has the advantage of controlling for right censoring which is particularly important in this case as we observe individuals for a limited period of time (Box-Steffensmeier & Jones, 1997). It also accommodates for the longitudinal nature of our data. This paper employs a Cox proportional hazard model, which is a specific type of survival analysis. This model does not assume a parametric form for the distribution of time and allows an easier inclusion of time varying covariates. We argue that the probability of being in a certain

neighbourhood at time t depends on an individual's situation at a previous time (t-1). Therefore, all time varying covariates are expressed at t-1 with a lagged variable. For an individual (i), with a vector of covariates X, the Cox proportional hazard model expresses a hazard rate that takes the form of:

(1) h(t|x)=h0(t)expf0(β^′ Xi).

We control for any violation of the proportionality assumption using time interactions but also with a stratification method that controls by stratification for each predictor that does not satisfy the proportionality assumption (Borucka, 2014). Predictors that violate the assumption are not included in the model. Instead, the model is estimated across different strata that are defined as the different categories of the variables violating the assumption. If Z equals the number of stratified covariates, using stratification leads to the following changes in the Cox Proportional Hazard equation:

(2) hg(t|x)=h0g(t)expf0 (β^′ Xi)

(3) g = 1, 2, 3, …, k, strata defined from Z*

In order to analyse different types of mobility, we run competing risk models that allow us to distinguish between mobility through homeownership (1) and mobility through renting (2). We follow the cause-specific approach in which individuals experiencing the competing event are treated as censored (Noordzij et al., 2013).

Table 3.1 Variable description

Variable name	Description
Citizenship	0 = Not Naturalised 1 =Naturalised
Income	1 = Income within the first quartile of the immigrant population 2 = Income within the second quartile of the immigrant population 3 = Income within the third quartile of the immigrant population 4 = Income within the fourth quartile of the immigrant population
Type of job contract	1 = Unemployed 2 = Temporary contract 3 = Permanent contract
Gender	1 = Male 2 = Female
Settlement year	1 = 2003 2 = 2004 3 = 2005
Age at arrival	1 = 25 – 34 years old 2 = 35 – 44 years old 3 = 45 – 59 years old 4 = 60 years old or older
Migration motive	1 = Family migration 2 = Asylum 3 = Labour migration 4 = Student migration
Type of housing	1 = Home owner 2 = Rent with housing benefits 3 = Rent without housing benefits
Number of children living in the household	0 = No children 1 = One child 2 = Two Children 3 = Three children 4 = More than three children
Partner status	0 = No Partner 1 = Dutch partner 2 = Non-Dutch partner
Citizenship dummy	0 = Did not naturalise during the observation period 1 = Naturalised during the observation period
Mobility	Number of neighbourhoods in which an individual has lived
Human Development Index	Level of human development of the origin country
Employment rate	Proportion of employment in a neighbourhood
Income level	Average income in the neighbourhood
Homogeneity of the immigrant community	Proportion of individuals with a migration background from the same country of origin in a neighbourhood
Municipal immigrant concentration	Proportion of individuals with a migration background living in the municipality
Urbanisation	1 = < than 500 inh. per sq. km. 2 = Between 500 and 1000 3 = Between 1000 and 1500 4 = Between 1500 and 2500 5 = > than 2500

Controlling for the endogenous effects of naturalisation

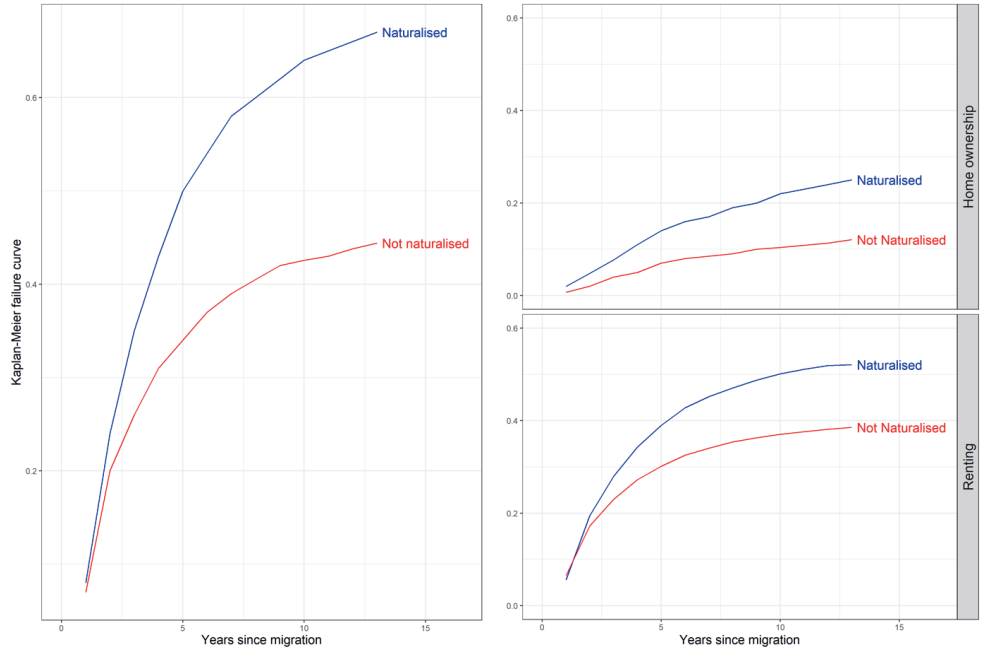
Because naturalisation is not a random process, immigrants who choose to embark on the road towards citizenship have specific cognitive, cultural or material characteristics that other immigrants do not necessarily have. In the context of this research, it can be argued that some of these characteristics such as better resilience, motivation or ability to learn a foreign language are positively related to the decision to move out of migrant-concentrated neighbourhoods. We control for self-selection into naturalisation due to observed and unobserved characteristics by including in our models a time-invariant citizenship acquisition dummy variable that indicates whether an individual has acquired Dutch citizenship at any time during the observation period . Our models will therefore include both a time variant and a time invariant variable of citizenship.

Moreover, if naturalisation is an indicator of better cultural integration, we might assume, according to the spatial assimilation theory, that immigrants who decide to acquire Dutch citizenship share a common desire to break away from migrant enclaves. We account for cultural integration by controlling for whether someone is in partnership with a Dutch partner.

3.5. Results

Descriptive statistics show that 39.2 % of the individuals in our data set moved out of a migrant-concentrated neighbourhood during our observation period. The move was achieved either by purchasing a home (7.9%) or renting (31.3%). Immigrants who naturalised during our examination period show a higher rate of mobility outside of concentrated neighbourhoods (65.7%). Looking specifically at types of mobility, naturalised immigrants show lower survival rates for both mobility via homeownership (16.7%) and mobility via renting (49.0%). In other words, they move away from migrant-concentrated areas sooner than non-naturalised immigrants. These findings are reflected in the Kaplan and Meier curves (Figure 3.1)

Figure 3. 1 Proportion of individuals who move outside of concentrated neighbourhoods

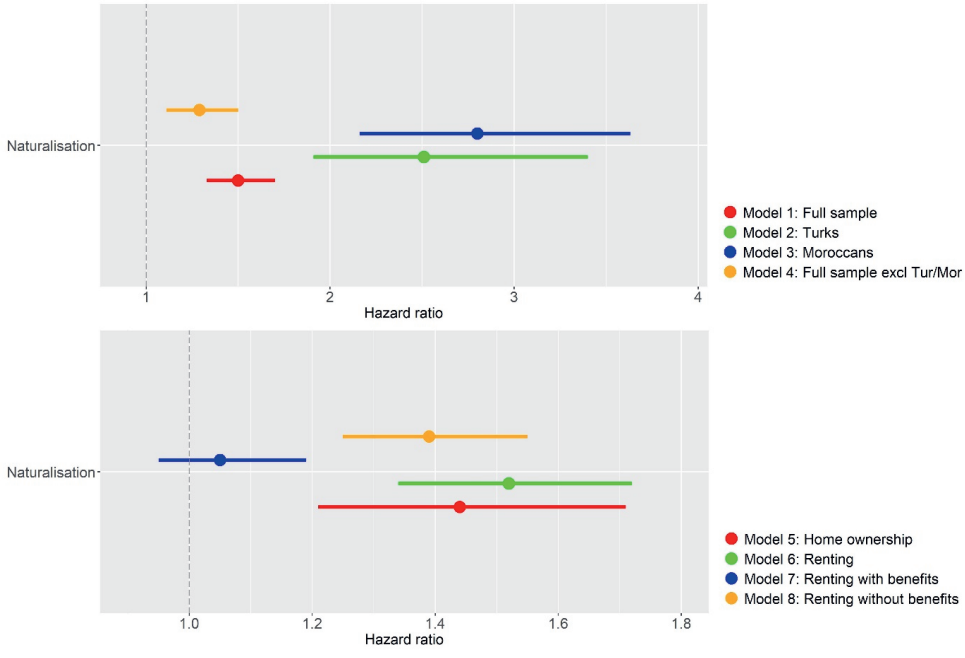


This is confirmed with the outcome of the first regression (model 1) that suggests that naturalisation is positively associated with mobility outside of migrant-concentrated neighbourhoods. Overall, being a Dutch citizen increases the odds of mobility by 50 percent, ceteris paribus. Looking at inter-group differences, it is interesting to note that possessing Dutch citizenship is particularly relevant for Turkish and Moroccan immigrants (model 2 and 3), the two largest immigrant groups in our data base. While our analysis does not allow us to draw any inferences on why this is the case, one explanation could be that Turkish and Moroccan immigrants are more likely to be confronted with discrimination (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2019). Excluding members of the Turkish and Moroccan communities leads to a reduction in the effect naturalisation has on mobility out of migrant-concentrated neighbourhoods (Hazard ratio: 1.29); (model 4). However, the effect remains positive and statistically significant, thus suggesting that naturalisation is also relevant for other immigrant groups.

Models 5 and 6 take this analysis one step further by focusing on how this mobility is actually achieved. For this, we distinguish between two types of mobility: mobility via homeownership and mobility

via renting. The outcome of these two models indicates that naturalisation is relevant for mobility in the rental market (1.51) but also for mobility achieved by purchasing a home (1.44). Additionally, we perform two separate competing risk models in which we distinguish immigrants who receive housing benefits to help pay the rent from those who do not. Although we are not able to draw a clear line between renting in the private or public sector, we assume here that immigrants who receive housing benefits will be more likely to be renting in the social housing sector. As noted earlier, we expect discrimination to occur more prominently in the private sector than in the social housing sector. Model 7 confirms this assumption and shows that naturalisation does not have a significant effect on mobility for those renting with housing benefits, while model 8 shows that naturalisation is particularly relevant for immigrants who rent a place without housing benefits. Overall, this analysis confirms our assumption that naturalised immigrants are more likely to move out of concentrated neighbourhoods (hypothesis 1), with the exception of immigrants who benefit from housing benefits after they achieve mobility through renting (Figure 3.2).

Figure 3. 2 Hazard ratios (Model 1 to 8)



To further analyse the effect of naturalisation on residential mobility, we test whether the importance of naturalisation holds for all income groups and all types of job contract (Table 3.2). We start our analysis with two Cox proportional hazard models (models 9 and 10), pooling together both types of mobility. For individuals with a low income (first quartile), model 9 suggests that naturalisation does not have a significant effect on mobility. However, the effect of naturalisation increases for individuals who are situated in the low-medium and high-medium income categories in comparison to individuals who are in the first quartile (interaction term of respectively 1.47 and 1.59). This is in line with our second hypothesis. Regarding type of job contract, model 10 shows that the effect of naturalisation is positive and statistically significant for unemployed individuals (HR: 1.42). Yet, it becomes stronger for individuals holding a permanent contract (interaction term of 1.20). This lends support to our third hypothesis.

Looking at specific forms of mobility gives a more nuanced picture. As shown in model 11, naturalisation does not seem to matter for low income individuals who have made the transition out of migrant-concentrated areas through homeownership (HR: 1.03). In line with our hypothesis, the value of the interaction term indicates that the importance of naturalisation increases for individuals situated in the second category of income (interaction term of 2.18). However, contrary to our expectations, the effect of naturalisation on mobility through homeownership is not conditioned by the type of job contract held by a migrant (model 12). Put together, these two findings may suggest that income is viewed by mortgage lenders as a better indicator of low financial risk than the type of job contract one holds. Regarding mobility through renting, model 13 shows that naturalisation does not have a significant effect on mobility for individuals who are within the lowest income quartile. However, it becomes more relevant for individuals situated within the second and third income quartiles (interaction coefficients of respectively 1.42 and 1.74). As regards type of job contract, the effect of naturalisation rises significantly for individuals who have a permanent contract (model 14). Overall, these findings corroborate our second hypothesis. Our third hypothesis is however only validated for individuals who have moved within the renting sector.

Table 3.2 Cox proportional hazard model – Mobility outside of concentrated neighbourhoods

		Model 9 and 10: All types of mobility		Model 11 and 12: Mobility through homeownership		Model 13 and 14: Mobility through renting	
		Exp(Coeff) (std. err.)	Exp(Coeff) (std. err.)	Exp(Coeff) (std. err.).	Exp(Coeff) (std. err.)	Exp(Coeff) (std. err.)	Exp(Coeff) (std. err.)
Naturalisation	Not naturalised	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
	Naturalised	1.17	1.42***	1.03	1.51***	1.26	1.52***
		(0.08)	(0.11)	(0.29)	(0.20)	(0.11)	(0.14)
Income	Low income (first quartile)	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
	Medium-low income (second quartile)	0.62***	0.63***	1.00	1.10	0.59***	0.61***
		(0.02)	(0.03)	(0.11)	(0.11)	(0.02)	(0.02)
	Medium-high income (third quartile)	0.67***	0.69***	1.18*	1.24*	0.60***	0.63***
		(0.02)	(0.03)	(0.11)	(0.11)	(0.03)	(0.02)
	High income (fourth quartile)	0.82***	0.82***	1.53***	1.56***	0.70***	0.70***
		(0.03)	(0.03)	(0.14)	(0.14)	(0.03)	(0.03)
Type of contract	Unemployed	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
	Temporary contract	0.91*	0.91*	1.05	1.08	0.91*	0.89*
		(0.03)	(0.03)	(0.07)	(0.08)	(0.04)	(0.04)
	Permanent contract	0.92*	0.92*	1.20*	1.20*	0.84***	0.83***
		(0.03)	(0.03)	(0.07)	(0.08)	(0.04)	(0.04)
Income *Naturalisation	Nat*Low income (first quartile)	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
	Nat*Medium-low income (second quartile)	1.47***	-	2.18*	-	1.42*	-
		(0.21)		(0.72)		(0.23)	
	Nat*Medium High income (third quartile)	1.59***	-	1.48	-	1.74***	-
		(0.21)		(0.46)		(0.27)	
	Nat*High income (fourth quartile)	1.12	-	1.23	-	1.19	-
		(0.16)		(0.37)		(0.21)	
Type of contract *Naturalisation	Nat*Unemployed	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
	Nat*Temporary contract	-	1.00	-	0.79	-	1.18
			(0.11)		(0.15)		(0.16)
	Nat*Permanent contract	-	1.20*	-	1.00	-	1.22*
			(0.12)		(0.16)		(0.16)
		Obs. = 140,783		Obs. = 186,736		Obs. = 156,333	
		Events = 8,568		Events = 2,034		Events = 6,534	

The models additionally control for gender, age at arrival, settlement year, mobility, number of children, migration motive, type of housing, legal status of the partner, naturalised within the examination period, level of development of the origin country, homogeneity of the immigrant community in the neighbourhood, neighbourhood's employment rate, urbanisation rate, average income of the neighbourhood and the size of the immigrant community in the municipality (see appendix C).

3.6. Conclusion

It has been widely observed that immigrants who wish to change neighbourhoods are constrained in their mobility by housing market discrimination (Alba and Logan, 1991). Most studies focusing on this issue have paid particular attention to taste-based discrimination, often disregarding statistical discrimination based on nationality. This paper has addressed the latter by investigating the relation between citizenship acquisition and immigrants' mobility outside of migrant-concentrated neighbourhoods. Drawing on literature that highlights the signalling effect that naturalisation has for employers and mortgage lenders in the job and housing markets (Peters et al., 2018; Peters, 2019), we have argued that naturalisation can act as a positive signal for landlords, real estate agents and mortgage lenders and help to reduce statistical discrimination in the housing market. As a result, it can facilitate immigrants' mobility outside of concentrated neighbourhoods. Because we expected statistical discrimination to occur more often for mid-risk applicants for mortgages and rental housing, people whose applications often fall under intensive scrutiny, we hypothesised that the effect of naturalisation would be stronger for individuals who have an income situated around the median value. Moreover, we argued that housing market actors would be more likely to rule out applicants who do not hold a secure job. From this perspective, we expected the impact of naturalisation to be stronger for immigrants who have a permanent contract.

Overall, we find that naturalised immigrants are 50 percent more likely to move out of a concentrated neighbourhood, all covariates held constant. This effect is stronger for Turkish and Moroccan immigrants, two groups that commonly suffer from discriminatory practices (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2019). The outcome of the competing risk models moreover implies that naturalisation is viewed positively by landlords, real estate agents and mortgage lenders. Conversely, our findings suggest that possessing Dutch citizenship may be less relevant for immigrants moving into social housing. This seems to be in line with previous studies that do not report cases of discrimination in the social housing sector (Kulbeerg et al., 2009). Further studies offering a better estimation of the distinction between public and private housing will however be needed to confirm these latter findings.

As we hypothesised, naturalisation matters more for immigrants with an income situated around the median value. However, possessing a permanent job contract is only a relevant condition for individuals moving in the renting sector. This implies that the way the effect of naturalisation is conditioned by an

individual's economic situation depends on the kind of housing market actors the person has to deal with. It also suggests that income may be considered by mortgage lenders a better indicator of economic stability than the type of job contract.

Our results corroborate previous studies that have found evidence of the existence of a citizenship premium in the Dutch housing and labour market (Peters et al., 2018; Peters, 2019). The paper also contributes to the literature on immigrant mobility in the Netherlands (Bolt & van Kempen, 2010; Zorlu & Mulder, 2008). Overall, our findings support the idea that naturalisation should not only be viewed as the crown of the completed integration process but should also be considered a facilitator of integration. At a time when the Netherlands is considering to increase the language requirement for naturalisation, which may significantly delay the naturalisation procedure for already vulnerable immigrants, these findings raise questions regarding the appropriateness of such restrictions.

This paper is the first to analyse the relation between naturalisation and immigrants' propensity to move out of migrant-concentrated neighbourhoods. We have outlined an original theoretical framework, drawn from prior literature on citizenship and residential mobility. Further research will be needed to refine the argument we have developed in this paper. It would be interesting, for instance, to see if the relation between naturalisation and mobility holds in the long run for naturalised immigrants who leave concentrated neighbourhoods but decide at a later point to return to live among members of their own ethnic community. Moreover, it is important to point out that, due to data restrictions, we do not control for several factors that can possibly affect immigrants' moving decision, such as market buoyancy, public services provision, and crime rates. We also do not include information on the range of possible destinations as it is traditionally done in the literature focusing on market equilibrium (Kuminoff et al., 2013). Finally, the empirical strategy of this paper aims to analyse the extent to which hypothesized relationships are in line with the data but is not geared towards causal inference. Hence we invite further research to establish the causal effect of citizenship on residential mobility among immigrants.

Chapter 4

Immigrant earnings and mobility to higher income neighbourhoods: the conditioning role of citizenship

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4.1. Introduction

Foreign born individuals hold a precarious position in the housing market and are more likely to live in poorer neighbourhoods (OECD, 2015). Studies suggest that living in a poor neighbourhood can negatively affect immigrants' integration and well-being. Neighbourhood poverty is often associated with an insufficient provision of public services and a substandard physical living environment (Chi et al., 2016; McKenzie et al., 2013; Stuart et al., 2009; Wen et al., 2003). Living in a poor neighbourhood also has a detrimental effect on residents' labour market performance by limiting their access to job information. Because residents of poor neighbourhoods mostly have contacts with other unskilled and low income individuals, they often lack the necessary weak ties with educated and affluent people that could help them escape their precarious position (Pinkster, 2009). The lack of role models may lead to a greater acceptance of deviant behaviour (Friedrichs & Blasius, 2003) and influence the development of deviant norms that negatively affect residents' chances of employment (Pinkster, 2007). Studies also find that living in a distressed area increases the risk of psychological stress (Joshi et al., 2017; Klijs et al., 2016) and is related to a higher risk of mortality when combined with a low degree of social integration (Marcus et al., 2016).

There is a rich literature on the factors influencing immigrants' mobility outside of distressed areas. Proponents of the spatial assimilation theory argue that immigrants tend to initially locate in poor neighbourhoods before to move to wealthier locations as they integrate economically in the host country (Andersen, 2016). Yet, this argument is only partially validated in the literature and studies show that immigrants remain more likely to live in deprived areas even after controlling for assimilation related factors (Vogiazides, 2018). According to the spatial stratification theory, this can be explained by the fact that immigrants have to overcome important barriers in their search for better housing (Alba & Logan, 1993), such as discrimination from mortgage lenders and rental agents (Bengtsson et al., 2012; Bosch et al., 2010; Dill & Jirjahn, 2014).

In order to contribute to this debate, several studies have compared the effect of income mobility on neighbourhood quality between immigrant groups and natives (Bolt & van Kempen, 2003; Lersch, 2013; Vaalavuo et al., 2019). If the spatial assimilation theory holds truth, income mobility should translate into a similar degree of residential mobility for both immigrants and natives, net of other assimilation factors. Conversely, a greater effect of income among natives would be an indication of spatial stratification. Overall,

these studies have come to contradictory conclusions (Bolt & van Kempen, 2003; Lersch, 2013; Schaake et al., 2014; Vaalavuo et al., 2019; Wessel et al., 2017), depending on the institutional context, on immigrants' countries of origin and on empirical strategies. In this paper, we investigate one source of potential heterogeneity that has so far received limited attention in studies on earnings and residential mobility: the conditioning role of immigrants' citizenship status. We build on the recent observation that immigrants' residential mobility may be obstructed by discrimination on the ground of nationality (Peters, 2020). In this context, we argue that becoming a Dutch citizen can potentially reduce housing market discrimination in the Netherlands and can, as a result, condition the relationship between immigrants' income and their upward residential mobility. If naturalised immigrants are less exposed to housing market discrimination, they should benefit more from income gains than non-naturalised migrants. The contribution of this paper is therefore twofold. First, this paper engages with the literature on residential mobility and offers a new perspective on how the residential divide between immigrants and natives could be reduced in the Netherlands. Second, this paper offers evidence of the relevance of naturalisation for immigrants' integration in the housing market and, by doing so, contributes to a growing field of literature that views citizenship as a catalyst for further integration (Hainmueller et al., 2017; Peters et al., 2020; Peters et al., 2018), rather than as the crown on an already completed integration process.

Our empirical strategy draws on approaches implemented in studies on the effect of naturalisation on immigrants' economic integration that use individual fixed effect regressions to control for potential bias due to unobserved time invariant characteristics (Bratsberg et al., 2002; Peters et al., 2018). Using register data from statistics Netherlands, we follow individuals who arrived in the Netherlands in 2003 and 2004 and track them for a maximum period of 12 years.

We focus on the Netherlands for three reasons. First, the Netherlands is a country with a significant proportion of persons with a migrant background[19] (Salentin & Schmeets, 2017) and where immigrants are often considered to hold a disadvantaged position in the housing market (OECD, 2015). Second, there is growing evidence that taste-based and statistical discrimination do take place in the Netherlands in the private renting sector but also mong mortgage lenders (Aalbers, 2007; De Groene Amsterdammer, 2018;

[19] Persons with a migration background (first generation migrants and persons born in the Netherlands with two parents born abroad) account for 17.42% of the Dutch population in the Netherlands. This number goes up to 23.6% if we include persons born in the Netherlands with one foreign parent only.

Sociaal en Cultureel Planbureau, 2009). Third, we can benefit from the richness of the Dutch register data base that includes information on a range of individual and neighbourhood characteristics.

This paper starts with a theoretical framework in which we explain the link between income, citizenship acquisition and immigrants' spatial mobility. This is followed with a short discussion of the Dutch context and a section focusing on the data and methods used in the analysis. Results of the analysis as well as a discussion of the findings are presented in the empirical section and the conclusion.

4.2. Theoretical framework and hypotheses

- *Understanding immigrants' spatial mobility: spatial assimilation and spatial stratification theories*

There is a vast literature on immigrants' residential mobility. Sociologists from the Chicago School already debated this question early in the 20th century when they developed the *spatial assimilation theory* (Burgess, 1925). Spatial assimilation theory initially argued that newcomers would locate upon arrival in densely populated, ethnically concentrated and poor neighbourhoods that are situated at the centre of urban areas. They would subsequently move towards predominantly native and wealthier neighbourhoods, situated in the suburbs, as they integrate economically in the host country. While the original focus of the theory was on immigrants' mobility from city centre to suburbs, spatial assimilation theory has also recently been used in the literature to explain the dynamics of economic segregation (Vogiazides, 2018; Vaalavuo et al., 2019) in American and European cities. Following the spatial assimilation argument, economic segregation should be entirely explained by socio-economic factors. In other words, immigrants who are integrated in the job market should show similar housing outcomes as natives. Several studies partly validated this argument and found that economic integration explains a substantial part of housing inequality between natives and foreign born individuals (Andersen, 2016; Vogiazides, 2018). Yet, immigrants remain on average more likely to live in distressed neighbourhoods, even after controlling for spatial assimilation related factors (Vaalavuo et al., 2019; Vogiazides, 2018). According to the *spatial stratification theory*, this is explained by the fact that immigrants are hampered in their mobility by housing market discrimination (Alba & Logan, 1993) and, as a consequence, are not able to move into desirable neighbourhoods, even when they improve their socio-

economic position. The literature traditionally distinguishes between two types of housing market discrimination: taste-based discrimination and statistical discrimination (Van der Bracht et al., 2015). Taste-based discrimination takes place when housing market actors hold prejudices against certain minority groups. Statistical discrimination, on the other hand, occurs when housing market actors have insufficient information about an individual and compensate with statistical information about the group they belong to. Housing market discrimination may occur at different stages of the housing process and may have different motivations (Bengtsson et al., 2012; Bosch et al., 2010; Dill & Jirjahn, 2014) and may be particularly prevalent in the case of expensive rental offers (Ahmed & Hammarstedt, 2008; Ondrich et al., 2003).

- *Testing spatial assimilation v. spatial stratification: how citizenship conditions upward residential mobility*

A traditional way to test this theoretical framework is to investigate the role of income in the spatial mobility of immigrants and natives. If we follow the spatial assimilation argument, the effect of income on residential mobility should be the same for immigrants and natives. Yet, if immigrants are obstructed in their mobility by housing market discrimination, it will be harder for them to translate their income gains into greater residential mobility. In this case, we would expect the effect of income to be greater for natives than for foreign individuals. Studies that have analysed this question in the European context have reached conflicting conclusions. In the Netherlands, no evidence of spatial stratification was found. Bolt and van Kempen (2003) notes a stronger effect of income among Turkish, Moroccan and Surinamese migrants than among Dutch natives while Schaake et al. (2014) did not identify any statistically significant differences between Caribbean, Moroccan and Turkish immigrants and Dutch natives. Similarly, in the German context, Lersch (2013) found no significant differences between immigrants and Germans. Focusing on Stockholm and Malmo, Vogiazides (2018) identified a stronger effect of income for natives than for immigrants, hence suggesting evidence of spatial stratification. In the same vein, Vaalavuo et al. (2019) found that that the effect of income is larger among Finish natives than among immigrants. Finally, Wessel et al. (2017) showed that income gains translate into different residential mobility patterns for natives and immigrants across Nordic cities. These inconsistent findings can partly be explained by the fact that these studies look at different institutional contexts and focus on different immigrant groups. Moreover, they also implement various empirical strategies and therefore differ in the way they approach the question of causality. Studies that have analysed this relation in the Dutch context only focus on the biggest immigrant groups and use

cross-sectional designs that do not control for unobserved heterogeneity at the individual level (Bolt & van Kempen, 2003; Schaake et al., 2014). On the contrary, studies that have analysed this relation outside of the Netherlands have used longitudinal data analyses (Lersch, 2013; Vaalavuo et al., 2019; Vogiazides, 2018).

Notwithstanding their contribution to the literature, one source of potential heterogeneity that is typically overlooked is immigrants' citizenship status; i.e. these studies tend not to differentiate between naturalised and non-naturalised migrants[20]. Yet, there are reasons to believe that the effect of income on spatial mobility may not be the same for naturalised and non-naturalised immigrants. As argued by Peters (2019), becoming a citizen of the host country can act as a positive signal of integration for various housing market actors. By doing so, it can reduce the risk of discrimination on the ground of nationality and thus the risk of spatial stratification. This paper aligns with this line of argumentation and claims that naturalised immigrants run a lower risk of being exposed to housing market discrimination as they are more likely to translate income gains into greater spatial mobility. Hence, we expect that the positive effect of income gains on immigrants' propensity to live in higher-income neighbourhoods is stronger for naturalised migrants (H1).

If naturalisation affects the relation between income and residential mobility by reducing the risk of discrimination on the basis of nationality, this implies that immigrants who are more at-risk of being discriminated would benefit more from citizenship acquisition. We test these mechanisms by zooming into two additional factors that we think condition immigrants' exposure to nationality-based discrimination in the Dutch housing market, namely the type of housing market actors that immigrants have to deal with and immigrants' country of origin.

Starting with housing market actors, we expect, in line with spatial stratification theory, that discrimination on the ground of citizenship derives from attitudes among actors in the homeownership market as well as in the private renting sector. Concerning homeownership, we expect naturalisation to reduce the risk of discriminatory practices among mortgage lenders, a process sometimes defined as 'redlining by ethnicity' (Aalbers, 2007). Because naturalisation is a sign of economic integration but also the indication of an intention to invest resources in the host country; it may favourably influence the risk-

[20] The only exception is Vogiazides (2018) who controls in her regression for immigrants' citizenship status. However, she does analyse the potential moderating role of citizenship in the effect of income on mobility.

calculation of lenders (Aalbers, 2007; Peters, 2020). Regarding the rental market, we expect citizenship acquisition to have a positive influence on the risk-calculation of landlords and private real estate agents. First, lessors and real estate agents may prevent immigrants from entering reputable neighbourhoods if they associate them with a risk of non-payment. In this context, naturalisation may be considered a marker of economic integration into the host country and may affect the decision of landlords and real estate agencies. Second, citizenship acquisition also signals an intention to stay in the host country. Finally, landlords may expect naturalised immigrants to be easier to track if they leave the Netherlands without paying their rent. We only expect to observe these patterns of discrimination in the private renting sector as there is no evidence of discrimination on the basis of nationality in the Dutch social housing sector (Sociaal en Cultureel Planbureau, 2009). This could be explained by the fact that the allocation of social dwellings is more strictly regulated. Due to data restrictions, we are however not able to distinguish individuals renting in the private renting sector from individuals renting in social housing. Given that social housing occupies a very large section of the Dutch rental sector, this entails that the interaction coefficient of naturalisation will certainly be underestimated in the case of immigrants moving in the rental market. As a result, we expect the positive effect of income gains on immigrants' propensity to live in wealthier neighbourhoods to be stronger for naturalised migrants who move through homeownership than for naturalised migrants who remain in the renting sector (H2).

We argue that immigrants' propensity to be confronted with nationality-based discrimination also depends on their country of origin. More specifically, we argue that immigrants coming from non-EU countries will be more likely to face discrimination in the housing market. The logic for this is threefold. First, non-EU immigrant may be more stigmatized in the housing market, either because they are associated with a risk of non-payment or because of taste-based discrimination. Second, landlords and real estate agents dealing with EU citizens may be less concerned with potential lack of traceability. This can weigh favourably in the decision of housing market actors. Third, EU citizens can benefit from anti-discrimination disposition in EU law and are therefore less at risk to suffer from discrimination. Overall, we therefore expect the moderating effect of naturalisation to be stronger for non-EU migrants than for EU migrants (H3).

4.3. Institutional context

The Netherlands has a fragmented housing market with both a large share of public housing and a substantial proportion of homeowners. In the private renting sector, the rules for the allocation of dwellings remain rather flexible and landlords and real estate agencies have some discretion when it comes to choosing potential tenants. This is different from the public sector in which dwellings are allocated on the basis of transparent local and national criteria. Such criteria include income, length of residency, family situation and degree of urgency. Banks, on the other hand, should in theory base the decision to grant a mortgage solely on economic factors. Additional criteria, such as the possession of a permanent residence status, are required in the case of a mortgage backed by the Dutch National Mortgage Guarantee (NHG). In practice, studies found however that banks may sometimes use arbitrary criteria such as "judgment, routines, common knowledge, rules of thumb", (Aalbers, 2007, p. 8).

There is growing evidence that taste-based and statistical discrimination exist in the Netherlands. Regarding the homeownership sector, previous studies suggest that immigrants are sometimes exposed to statistical discrimination when seeking to secure a mortgage (Aalbers, 2007). The situation is however more nuanced as regards the renting sector. While there is no evidence of discrimination in the public housing sector (Sociaal en Cultureel Planbureau, 2009), reviews of legal cases also suggest that taste-based discrimination on the basis of ethnic origin, skin colour and faith, occurs in the Dutch private rental market (College voor de Rechten van de Mens, 2016b; College voor de Rechten van de Mens, 2018). This was recently confirmed by a study showing that discrimination in the private rental market based on ethnicity may be substantial (De Groene Amsterdammer, 2018).

Discrimination on the ground of citizenship in the field of housing is strictly prohibited in the Netherlands by the General Equal Treatment Act (Algemene Wet Gelijke Behandeling). Yet, applicants often need to provide information about their nationality when applying for a dwelling or a mortgage. While it remains to be seen how this information is being used by various actors in the housing sector, recent legal cases show that landlords, real estate agencies and mortgage lenders may use nationality as a ground for direct discrimination.[21] There is however no evidence of such practices in the social housing sector.

[21] The Netherlands Institute for Human Rights has found several cases of discrimination on the ground of nationality over the last years. These cases involved rental companies (College voor de Rechten van de Mens, 2011; College voor

4.4. Data and method

This paper uses Dutch register data from Statistics Netherlands. Our analysis focuses on foreign born immigrants who were born from two foreign parents and arrived in the Netherlands in 2003 and 2004. Individuals are tracked for a maximum period of 12 years. Both cohorts could naturalise under the same conditions, namely the conditions set out by the reform of April 2003. Our analysis includes individuals who were between 25 and 65 years old upon arrival in the Netherlands. This is done with the aim of focusing on immigrants who are part of the active labour population. Following the same logic, we also remove immigrants who came to the Netherlands for study related purposes. Moreover, we do not include immigrants born in Suriname before 1975 and those born in the Dutch Antilles as these immigrants acquired Dutch citizenship by birth. Finally, we restrain our analysis to immigrants who remained in the Netherlands for a duration that is at least long enough to become eligible for naturalisation. Overall, our population includes 30,442 individuals spanned across 215,027 observations[22].

The dependent variable is the high-income nature of neighbourhoods in which migrants reside, measured by the percentage of all residents of a neighbourhood who are situated within the top six income deciles at a certain point in time in the Netherlands. This measure has the advantage of directly controlling for inflation and is therefore an accurate measure of a neighborhood's economic situation at a certain point in time. Neighbourhoods (*buurt*, in Dutch) here refer to spatial units that are composed on average of 1.300 individuals and correspond to mid-size areas that are delimited around clear geographical lines. The main two predictors used in our analysis are household income and naturalisation. Household income is a standardized measure of income that accounts for the number of individuals living in the household. In order to achieve an even distribution, we divide this measure of income into ten categories, cut across deciles, and use in our regressions this recoded variable as a continuous measure. Naturalisation is a dummy variable indicating whether someone has acquired Dutch citizenship at a certain point in time. Additionally, our analyses include a range of control variables that are measured at the individual and neighbourhood level, including three indicators that have been associated with immigrants' assimilation in the literature:

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de Rechten van de Mens, 2012), landlords (College voor de Rechten van de Mens, 2019) and mortgage lenders (College voor de Rechten van de Mens, 2016a).

[22] More information on our population distribution can be found in the supplementary materials.

partner status, length of stay and job status. Other neighbourhood characteristics such as employment rate, rate of first-generation migrants and rate of co-nationals are also controlled for[23]. In order to test our second hypothesis, we divide our population into several geographical groups. We make a distinction between and EU and non-EU migrants but also identify immigrants coming from countries that joined the EU before and after 2003. Finally, we also look at the specific case of Turkish and Moroccan migrants. As regards our third hypothesis, we distinguish immigrants who have become homeowners at some point during the observation from those who always remained in the renting sector throughout the observation period.

` We test our hypotheses with an individual fixed effects design. Individual fixed effects regression focuses on the variance within each individual over time (Allison, 2009). This has the advantage of controlling for unobserved time-invariant heterogeneity, such as characteristics related to gender, migration, country of origin or migration motive. However, because fixed effects regressions do not estimate the effect of higher level variance, including variance between individuals, this method is unable to assess the effect of time-invariant variables. For an individual *i* at time *t*, where Y_{it} expresses the high income nature of the neighborhood in which an individual lives, X_{it} is the value of individuals' household income, N_{it} is a dummy variable referring to whether an individual possesses Dutch citizenship, Z_{it} is a set of control variables and $\mu_1$is the individual fixed effects. Our main coefficient of interest is α_2, which measures the effect of interaction between income and naturalisation on the share of high-income residents of an immigrants' residential neighbourhood. As we do not necessarily expect the relationship between income and residential mobility to be linear, we also include a quadratic term of income (α_3) in order to model a non-linear relationship. Overall, the econometric equations without and with the quadratic terms of income read as follows:

(1) $Y_{it} = \alpha_0 X_{it} + \alpha_1 N_{it} + \alpha_2 X_{it} N_{it} + \delta Z_{it} + \mu_1 + \varepsilon_t$

(2) $Y_{it} = \alpha_0 X_{it} + \alpha_1 N_{it} + \alpha_2 X_{it} N_{it} + \alpha_3 X^2{}_{it} + \alpha_4 X^2{}_{it} N_{it} + \delta Z_{it} + \mu_1 + \varepsilon_t$

Immigrants who intend to naturalise need to complete a civic integration test in which they will be tested on both their knowledge of the Dutch language and their knowledge of the Dutch society. In this

[23] More information on the variables used in our analysis can be found in the supplementary materials.

context, one could argue that the moderating effect of naturalisation is actually driven by a higher degree of social and cultural integration rather than by a lower risk of being exposed to housing market discrimination. In order to account for this potential bias, we include in our models a variable indicating whether someone is in a partnership with a Dutch national, a measure of the number of children living in the household as well as a measure of duration of stay. These measures are commonly used in the literature to control for social and cultural integration (Macpherson & Strömgren, 2013; South & Crowder, 1998; Vogiazides, 2018). Moreover, it is important to mention that, since January 2010, immigrants who apply for a permanent residence permit or for a temporary residence permit for family reunification purposes, also need to complete a civic integration exam. Naturalised immigrants may therefore not show a higher level of integration than other immigrants who had to pass a similar test in a different context. Social and cultural integration are however not the only form of biases related to self-selection into naturalisation. Given the complexity of the naturalisation procedure, it is also plausible that individuals who complete the procedure have particular personal traits, such as a higher resilience and a higher motivation to integrate into Dutch society, that could be related to immigrants' residential mobility. Our individual fixed effect strategy partly accounts for this bias by controlling for unobserved time-constant heterogeneity.

4.5. Analysis

We find that upwards earning mobility has a stronger effect on residential mobility for naturalised migrants[24]. Figure 4.1. visualises this interaction, based on the marginal effects of income and predicts neighbourhood's wealth by income for naturalised and non-naturalised immigrants. Looking at the whole population (Model 1), the two slopes between non-naturalised and naturalised immigrants start to diverge for individuals who have an income situated in the fifth decile and above. This implies that earnings gains translate more strongly into upward residential mobility among naturalised migrants, than among those who do not acquire Dutch citizenship from the fifth income decile onwards (higher than 15 460 euros per year). Overall, among non-naturalised immigrants, moving from the fifth to the tenth income decile only results in a one percentage

[24] More information about the regression coefficients can be found in the supplementary materials (Table C.8 and C.9).

point growth in terms of share of high-income residents in a neighbourhood. Among naturalised immigrants, however, mobility from the fifth to the tenth income decile results in a 2.5 percentage point increase of high-income residents in a neighbourhood which shows a higher degree of residential mobility[25]. Altogether, these findings validate our first hypothesis (H1).

In order to investigate whether naturalisation matters more for individuals moving within the homeownership sector, we distinguish between individuals who have never become homeowner, and therefore remained in the renting sector during the whole observation period, and individuals who became homeowner at some point during the observation period. Our sub-group analysis shows that naturalisation significantly moderates the relationship between income and residential mobility for individuals who have become homeowners (Figure 4.1; Model 2). Similarly with what we observed with the whole population, our marginal effects plot shows that the effect of income on residential mobility becomes stronger for naturalised migrants after the fifth decile of income. Overall, moving from the fifth to the highest income decile leads to a residential mobility of 2.11% for naturalised immigrants who have become homeowners. As expected, citizenship status does not appear to play a significant role for immigrants who stayed in the renting sector (Figure 4.1.; Model 3). Although, income mobility seems to be associated with greater residential mobility in the case of naturalised immigrants, the difference remains very marginal. The direction of the slopes, which diverge in favour of naturalised immigrants after the fifth deciles of income, seems to suggest that naturalisation matters more for high income individuals, who are also more likely to rent in the private sector. This is in line with the idea that citizenship-based discrimination is more likely to occur in the private rental sector and leaves interesting avenues for further research. Altogether, these findings corroborate our second hypothesis (H2).

[25] Although a growth of 2.5% in terms of share of high-income residents in a neighbourhood may seem marginal, it can have important implications for the well-being of the individuals moving. According to our data, moving to a neighborhood with 52% to 55% of high income residents was also correlated in 2016 with a decrease of 5% of criminal rate (measured here as crime against goods).

Figure 4. 1 Prediction of neighbourhood's percentage of high income residents by income decile for non-naturalised and naturalised migrants with 95% CI – Whole population

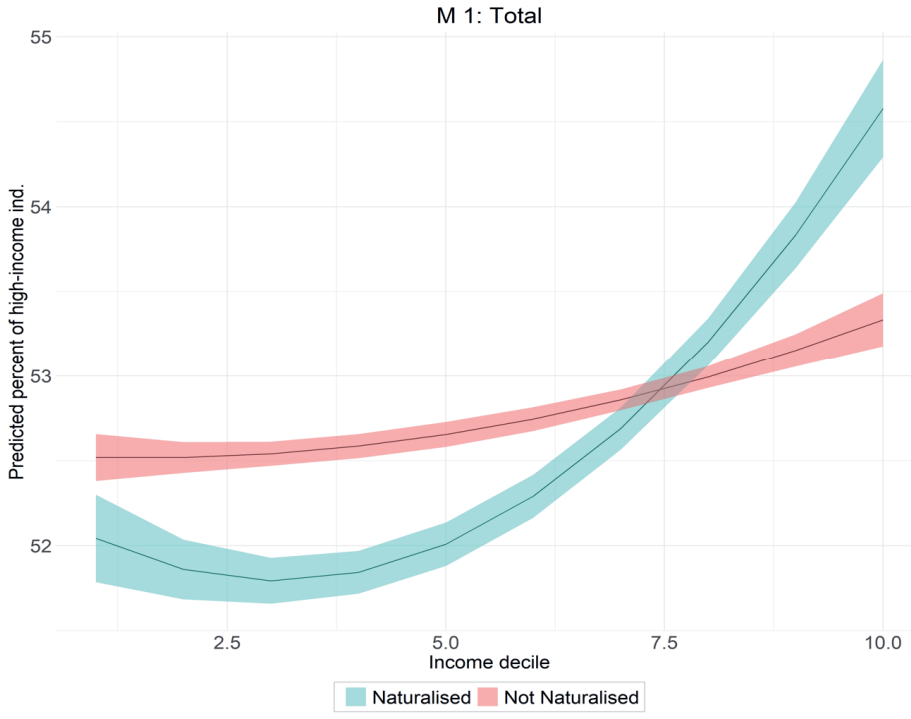
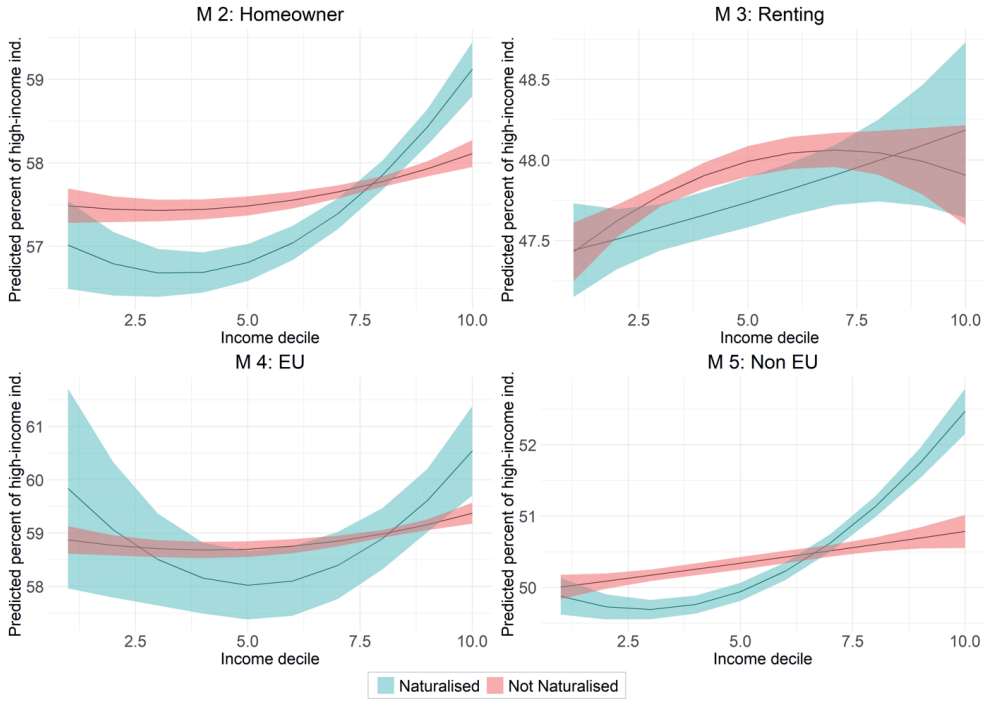


Table 4. 1 Linear individual fixed effects regression

		Model 0: Whole population(1)		Model 1: Whole population (2)		Model 2: Became a homeowner		Model 3: Never became a homeowner		Model 4: EU migrants		Model 5 Non-EU migrants	
		Coefficients	Std Err.	Coefficients	Std. Err.	Coefficients	Std. Err.	Coefficients	Std. Err.	Coefficients	Std. Err.	Coefficients	Std. Err.
Income (deciles)		0.12***	0.01	0.08***	0.01	0.06****	0.01	0.08***	0.02	0.05**	0.02	0.08***	0.01
Naturalisation	Did not naturalise	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
	Naturalised	-0.29*	0.06	-1.35***	0.12	-1.44***	0.23	-0.18	-0.15	-0.74	0.59	-1.09***	0.13
Income (deciles)*Naturalisation		-	-	0.20***	0.02	0.20***	0.03	0.01	0.03	,	0.08	0.20***	0.02
		Observations = 215,027 Individuals = 30,442		Observations = 215,027 Individuals = 30,442		Observations = 106,899; Individuals = 14,950		Observations = 108,128; Individuals = 15,492		Observations = 50,323 Individuals = 7,356		Observations = 164,704 Individuals = 23,086	

Source: Statistics Netherlands. *p < .05; **p < .01; ***p<0.001

Figure 4. 2 Prediction of neighbourhood's percentage of high income residents by income decile for non-naturalised and naturalised migrants with 95% CI – Homeowner/Not Homeowner/EU/Non-EU

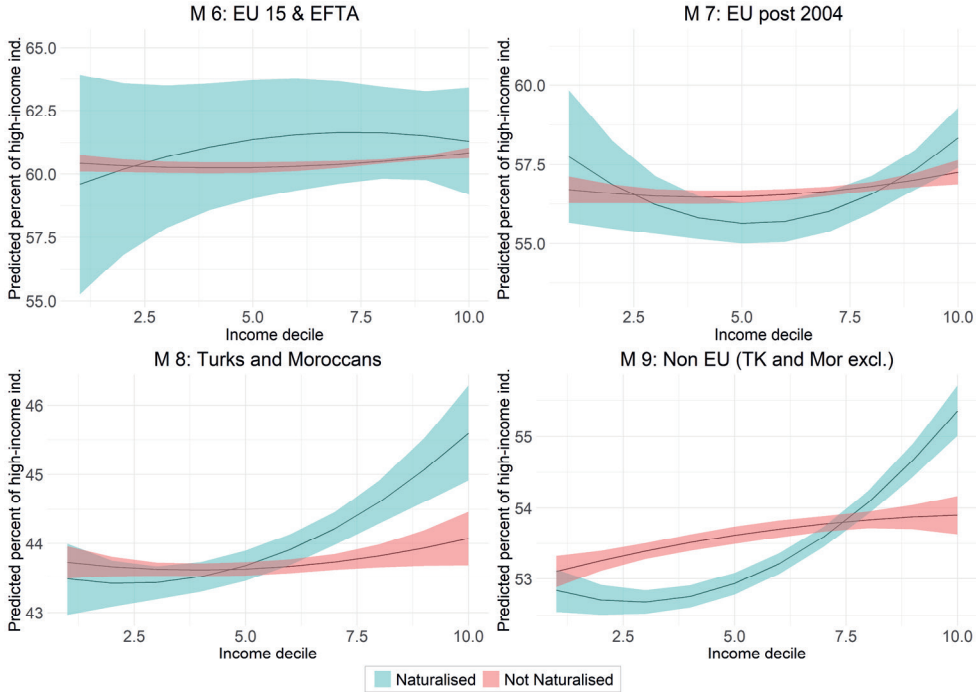


As noted in the theoretical section, we expect naturalisation to matter more for immigrants coming from stigmatized countries. In order to test this hypothesis, we make a distinction between EU and non-EU immigrants, two groups that we argue are not equally exposed to housing market discrimination. Our analysis confirms our expectations and shows that the interaction effect of naturalisation is only statistically significant in the case of non-EU migrants[26].(Figure 4.2; Model 4 and Model 5); (H3). It must be noted, however, that EU and non-EU immigrants do not constitute two homogeneous groups, especially when it comes to exposure to discriminatory practices. Although all EU immigrants are protected by EU law against discrimination on the ground of nationality, immigrants coming from poorer and more stigmatized EU countries may be more at risk to face discrimination in the housing market. In order to look at this potential heterogeneity, we conduct an additional subgroup analysis in which we differentiate immigrants originating from countries that joined the EU before 2004 or countries that are members of the European Free Trade Association from countries that joined the EU after 2003. As regard the non-EU group, we also pay particular attention to Turkish and Moroccan immigrants, the two biggest immigrant groups in our data base, that are considered to be among the most discriminated groups in the Netherlands (Ramos et al., 2019; Verkuyten, 2002). Our analysis partly confirms our assumption. As expected, we find that the effect of income is not conditioned by citizenship acquisition for immigrants coming from countries that were part of the EU before 2004 and EFTA countries (Figure 4.2, Model 6). Conversely, the slopes for naturalised and non-naturalised migrants seem to diverge after the seventh income decile in the case of immigrants coming from countries that joined the EU after 2004. However, the residential mobility of this group remains limited even for naturalised immigrants. Looking at Moroccan and Turkish migrants, we observe a large difference between naturalised and non-naturalised immigrants. As shown in figure 4.3 (Model 8), Moroccan and Turkish immigrants who do not acquire Dutch citizenship fail to translate their income gains into greater residential mobility. The opposite situation can be observed for naturalised Turkish and Moroccan immigrants who are expected to live in a neighbourhood with a rate of high-income individuals of 43.48% if they have a very low income and in a neighbourhood with a rate of high-income individuals of 45.58% if they have a very high income. Overall, this may reflect the fact that these two groups are more

[26] More information about the regression can be found in the supplementary materials (Table C.12; Table C.13).

likely to be discriminated in the housing market and may therefore benefit to a larger extent from citizenship acquisition.

Figure 4. 3 Prediction of neighbourhood's percentage of high income residents by income decile for non-naturalised and naturalised migrants with 95% CI - EU 15 and EFTA/EU Post-2004/Turks and Moroccans/ Non-EU migrants Turks and Moroccans excluded



Overall, these findings confirm that the relationship between income and residential mobility is conditioned by immigrants' citizenship status. This suggests that immigrants are better able to translate their income gains into greater residential mobility if they have acquired Dutch citizenship. This provides evidence of spatial stratification but also shows the signalling potential of citizenship acquisition in the Dutch housing market. These findings however also indicate that this relationship is not straightforward. In line with our second hypothesis, we found that the effect of income on mobility is only conditioned by citizenship status for immigrants who have become homeowners during the observation period, which may suggest that citizenship-based discrimination is less prominent in the renting sector. Moreover, becoming a Dutch citizen

seems to play a stronger role for the residential mobility of immigrants coming from countries that tend to be more stigmatized in the housing market. Finally, it also seems to be particularly relevant for individuals who have an income situated above the Dutch median value. This illustrates the difficulties that low-income immigrants face in their housing trajectory.

4.6. Conclusions

Understanding immigrants' ability to move out of deprived neighbourhood is key to understanding their well-being and integration process. Although this topic has been vastly studied in the literature, important questions remain as to what factors may improve or hinder immigrants' residential mobility. This paper relates to this debate by analysing the relation between income gains, naturalisation and residential mobility. By doing so, we contribute to the literature on income and residential mobility (Bolt & van Kempen, 2003; Lersch, 2013; Vaalavuo et al., 2019; Vogiazides, 2018; Wessel et al., 2017) but also engage with previous studies that identified the signalling potential of citizenship acquisition in the Dutch housing market (Peters, 2020). We argue that the relation between income gains and residential mobility is conditioned by immigrants' citizenship status. Because naturalisation can act as a positive signal to housing market actors, naturalised immigrants are less likely to be confronted with housing market discrimination and, therefore, are more likely to translate their income gains into greater spatial mobility. We hypothesize that this signalling potential of naturalisation applies particularly to immigrants moving within the homeownership sector sectors and to non-EU immigrants.

Although we observe that income mobility is generally positively related to immigrants' propensity to live in a wealthier neighbourhood, we find this effect to be stronger among naturalised immigrants, and this especially for those who are above a certain level of income. This could indicate that housing market actors often apply strict financial requirements that hinder the spatial mobility of low income immigrants, regardless of their citizenship status. As we hypothesised, the moderating effect of citizenship acquisition is only significant for immigrants who have become homeowners at some point during the observation period. The lack of significance in the case of immigrants who remained in the renting sector could be due to the fact that we are not able to identify whether immigrants rent in the public or private sector. As we expect

housing market discrimination to be more prevalent among actors in the private sector, this may lead to an underestimation of our interaction coefficient. Further research should therefore distinguish between private and social housing in order to shed more light on this particular phenomenon. Finally, our analysis shows that naturalisation matters only for non-EU migrants. This is in line with the idea that immigrants coming from stigmatized countries tend to benefit the most from citizenship acquisition.

Overall, our findings have several implications. First, they suggest that immigrants' spatial assimilation is obstructed by housing market discrimination, hence giving support to the spatial stratification theory. This corroborates previous studies that also reached similar conclusions (Vaalavuo et al., 2019; Vogiazides, 2018). Second, these findings bring a new perspective on the relation between immigrants' income gains and residential mobility by showing the importance of controlling for the moderating effect of immigrants' citizenship status, something that has always been overlooked in the literature (Bolt & van Kempen, 2003; Lersch, 2013; Vaalavuo et al., 2019; Vogiazides, 2018; Wessel et al., 2017). Third, our analysis provides new evidence of a citizenship premium in the housing market. This is in line with previous studies that have identified the signalling potential of citizenship in the Dutch housing market (Peters, 2020) but also speaks to a growing field of research that views citizenship acquisition as a catalyst for further integration rather than as the crown on the integration process (Hainmueller et al., 2017; Peters et al., 2018).

This study is the first to analyse the complex relationship between income gains, naturalisation and spatial mobility. In order to do so, we have developed an original analytical framework that we hope unites two separate fields of research – studies of immigrants' residential mobility and citizenship studies – that seldom engage with one another. More research will be needed to further develop this argument and to overcome some of the limitations of this paper. First, the use of register data comes at the expense that we have no subjective information on individuals' housing preferences and on individual' cultural capital. Variables such as preferences for renting versus homeownership or language proficiency could for instance help understanding some of the between group differences we identified in our analysis. Second, given that previous studies have found no evidence of discrimination in the Dutch public housing sector, it is important for future research to accurately distinguish between renting in the private and the public sector. Third, it must be noted that the design of this paper does not allow to directly measure housing market discrimination. Future research could therefore measure the effect of citizenship acquisition on housing

market discrimination using experimental designs (Ahmed & Hammarstedt, 2008; Bosch et al., 2010; Van der Bracht et al., 2015).

Chapter 5

Neighbourhood economic deprivation and immigrants' all-cause mortality: residential context or compositional characteristics?

This chapter is under review (revise & resubmit): C. Leclerc, M. Vink and H. Schmeets. Neighbourhood economic deprivation and immigrants' all-cause mortality: residential context or compositional characteristics?

5.1. Introduction

Health disparities within developed nations are often said to follow geographic patterns with poor health outcomes related to high poverty concentration. Living in an economically deprived neighbourhood is associated with poorer mental and physical health (Drukker & van Os, 2003; Joshi et al., 2017; Klijs et al., 2016; Schulz et al., 2012) and with a higher risk of mortality (Do et al., 2013; Marinacci et al., 2017). These contextual factors may take different forms. Neighbourhood deprivation correlates with a substandard physical living environment (McKenzie et al., 2013) and with a higher concentration of air pollution (Fecht et al., 2015). Deprived areas also show lower levels of social cohesion (Tolsma et al., 2009) and higher rates of criminality, which may have a detrimental effect on the psychological well-being of the residents.

Foreign-born residents are particularly prone to be subject to neighbourhood factors. In Europe, immigrant groups tend to be overrepresented in economically disadvantaged neighbourhoods (OECD, 2015) and are therefore more exposed to neighbourhood-level stressors. Moreover, immigrants, and most particularly refugees, are confronted with psychological stressors prior, during and after the migration process (Karunakara et al., 2004; Li et al., 2016; Porter & Haslam, 2005; Steel et al., 2002; Torres & Young, 2016) and may be particularly sensitive to their social and physical environment. Overall, it has been shown that immigrants living in an economically deprived neighbourhood are more likely to show poorer health outcomes (Agyemang et al., 2007; Chang et al., 2012; Raphael et al., 2020). Neighbourhood deprivation is also positively associated with immigrants' mortality (Denney et al., 2018; Hajat et al., 2010; Pruitt et al., 2016).

The relation between neighbourhood and health may be driven by compositional factors, as individuals living in deprived neighbourhoods have particular characteristics that possibly relate to their health status. Yet, limited attention has been paid in the literature to the potential confounding role of individual-level variables in the relation between neighbourhood's deprivation and health, especially in the case of migrant populations. As a result, we argue, that the relevance of neighbourhood characteristics for immigrants' health is not well-established and requires further attention. Our empirical strategy is designed to identify the relevance of neighbourhood's economic deprivation on immigrants' health independently

from compositional characteristics. Using administrative register data from Statistics Netherlands, we control for two types of socio-economic resources that arguably drive, at least to a considerable degree, the relation between neighbourhoods' poverty and immigrants' health, namely immigrants' household income and citizenship status. Hence, we argue that economically deprived neighbourhoods tend to be populated by individuals with lower financial capabilities, who in turn are confronted with stressors that are associated with poorer health outcomes (Matthews & Gallo, 2011). Moreover, following a spatial assimilation approach, we argue that immigrants residing in poor neighbourhoods may be less likely to be Dutch citizens. This is relevant because, as shown in the literature, having a secured legal status may decrease some of the psychological stressors immigrants are confronted with (Aranda et al., 2014; Bernhard et al., 2007; Robertson & Runganaikaloo, 2014) and may also facilitate their use of health care services and thus determine their health outcomes.

We follow immigrants who have arrived in the Netherlands between 1985 and 1995 at an age between 18 and 60 years old and track them for a maximum period of 31 years. We measure exposure to neighbourhood's deprivation by looking at the proportion of unemployment benefits recipients of the neighbourhood in which individuals reside at a certain year. This is measured at the *buurt* level, a small-scale spatial unit of measurement that captures the immediate residential environment. We operationalise immigrants' health by looking at all-cause mortality. This measure is commonly used in the literature to analyse the long-term structural health effect of economic deprivation (Denney et al., 2018; Li et al., 2015; Marcus et al., 2016; Marinacci et al., 2017).

We focus on the Netherlands for two reasons. First, the Netherlands is a country with a significant number of foreign born nationals (Salentin & Schmeets, 2017) and where first generation immigrants tend to be concentrated in low-income neighbourhoods (OECD, 2015). Second, the richness of Dutch administrative register data allows us to track immigrants over a long period and to use accurate micro-level administrative data to control for potential compositional characteristics.

The paper is structured as follows. The paper starts with a literature review and outlines a theoretical framework and our main hypotheses. This is followed by a data and method section. We then discuss the results of our statistical models, including a set of robustness checks. In the conclusion we reflect on the

implications of these findings and outline how they contribute to an ongoing research agenda on the nexus between residential context and the migrant life course.

5.2. Literature review and theoretical framework

- *Explaining the relation between neighbourhood's economic deprivation and immigrants' health*

Over the last thirty years, a growing number of scholars has studied the association between neighbourhood deprivation and health. These studies show that individuals living in deprived neighbourhoods are at greater risk to develop depressive disorders (Joshi et al., 2017; Klijs et al., 2016) and show poorer mental and self-rated health (Drukker & van Os, 2003). Neighbourhood deprivation is also associated with a higher prevalence of allostatic loads (Schulz et al., 2012) and a higher risk of mortality (Do et al., 2013; Marinacci et al., 2017). The causal pathways driving this relationship are multifaceted. First, economically deprived neighbourhoods often show a lower provision of local amenities, such as parks and recreation facilities which can affect residents' chances to take part in sports activities (McKenzie et al., 2013). Second, economically deprived neighbourhoods are often associated with higher air pollution levels (Fecht et al., 2015), which can have adverse implications on the health of exposed populations. Third, studies suggest that neighbourhoods' economic conditions shape neighbourhoods' social cohesion (Tolsma et al., 2009) and, by doing so, play a role in individuals' likelihood to develop symptoms of psychological distress (Erdem et al., 2015). Finally, residents of poorer neighbourhoods are at greater risk of being exposed to psychosocial stressors related to higher criminality and insecurity. This can also have a negative impact on their health (Agyemang et al., 2007).

The question of neighbourhood's factors applies most particularly to immigrants, as they are more likely to reside in deprived neighbourhoods than natives (OECD, 2015). This may be due to a lack of financial resources, to housing market discrimination, or driven by the fact that newcomers are heavily dependent on their ethnic network to find housing (Bolt & van Kempen, 2010). Moreover, foreign-born individuals constitute a particularly vulnerable group when it comes to mental health. Immigrants coming from politically and economically unstable countries may endure distressing experiences before and during migration and suffer from different forms of post-traumatic stress (Karunakara et al., 2004; Steel et al.,

2002). They are also confronted with post-migration stressors, such as lack of economic opportunities, loss of socio-economic status, acculturative stress, legal status precarity or exposure to discrimination (Li et al., 2016; Porter & Haslam, 2005; Torres & Young, 2016), that can take a toll on their psychological well-being. As a consequence, they rely to a greater degree on neighbourhood-level resources to meet their needs and pursue their life goals (Bakker et al., 2017; Ryan et al., 2008) and may show a greater susceptibility to the environment in which they live. Studies that have focused on the relation between neighbourhood's deprivation and immigrants' health tend to draw a similar picture as those focusing on the general population. Immigrants living in economically deprived areas show a greater prevalence of diabetes (White et al., 2016), gastric cancer (Chang et al., 2012), depression and anxiety (Raphael et al., 2020) and a higher risk of hypertension and blood pressure (Agyemang et al., 2007). Living in a deprived neighbourhood environment has also been associated with immigrants' mortality in the US (Denney et al., 2018; Pruitt et al., 2016) and in New Zealand (Hajat et al., 2010). Based on this literature, we expect that immigrants living in deprived neighbourhoods will be more likely to show poorer health outcomes. We measure immigrants' health status by looking at rates of all-cause mortality, a measure that has often been used to study the relation between neighbourhoods' conditions and long-term health outcomes (Do et al., 2013; Marcus et al., 2016; Marinacci et al., 2017; Mode et al., 2016; Van Lenthe et al., 2005) and draw the following hypothesis:

> **H1** – Immigrants living in a deprived neighbourhood have a higher risk of all-cause mortality than immigrants who do not live in such areas.

- *Contextual factors or compositional characteristics: controlling for immigrants' socio-economic resources*

A crucial challenge for studies investigating neighbourhoods' factors is to disentangle the unique effect of contextual factors from that of compositional characteristics. Different types of neighbourhoods may have different types of residents who may be at lower or higher risk of being confronted with health issues. Therefore, it is essential to account for individuals' socio-economic characteristics that are plausibly associated with both residential mobility and health. Studies focusing on the Dutch population have traditionally controlled for individuals' financial resources using self-reported measures of income (Agyemang et al., 2007; Klijs et al., 2016) and deprivation (Boelens et al., 2020). Studies that have investigated

the relation between neighbourhood deprivation and mortality among immigrant groups outside of the Netherlands typically rely on self-reported measures of income (Denney et al., 2018; Hajat et al., 2010). In the context of this study, we argue that the relevance of neighbourhoods' deprivation on immigrants' mortality may be partly driven by two types of socio-economic resources that are likely to be associated with immigrants' location decision and health, namely immigrants' household income and citizenship status.

Because housing prices tend to be lower in economically disadvantaged areas, these neighbourhoods are predominantly populated by low-income individuals. Yet, individuals with low financial capabilities are at greater risk of being exposed to stress and adversity (Matthews & Gallo, 2011). Having a low income is often associated with substandard housing conditions and family turmoil (Evans, 2004) and is also related to stress and distress in the workplace (Wamala et al., 2000). These factors have been associated in the literature with poorer mental health outcomes, such as depression and anxiety, and with major physical health issues (Matthews & Gallo, 2011). They are also linked to unhealthy life styles including excessive alcohol consumption and smoking (Mainous et al., 2010). Looking at the Dutch context, Knoops and van den Brakel (2010) have found discrepancies in healthy life expectancy across income categories. As they observe, individuals in the lowest income class tend to live 17.9 years shorter in good perceived health than individuals in higher income categories. Kalwij et al. (2013) came to a similar conclusion and found that the life expectancy of 65 years old Dutch men and women with a low income was 2.5 years less than that of high-income individuals. The effect of poverty on health outcomes may be particularly strong for foreign-born persons who are often confronted with important pre- and post-migration stressors and who are on average likely to show higher rates of post-traumatic disorders and depression (Li et al., 2016). Therefore, we argue, that controlling for immigrants' household income is required to isolate the unique relevance of neighbourhood's poverty.

Besides household income, we argue that immigrants' citizenship status is another potentially important socio-economic confounder of the relation between neighbourhood deprivation and health outcomes, as immigrants residing in disadvantaged areas are less likely to be Dutch citizens. From a spatial assimilation perspective, this can be explained by the fact that immigrants tend to move out of poor neighbourhoods as they integrate socially, economically and culturally in the destination country (Andersen, 2016). This upward mobility is at least partially associated with higher employment and earnings that can be

attributed to the acquisition of citizenship (Hainmueller et al., 2019; Peters et al., 2018; Peters et al., 2020). Moreover, studies focusing on citizenship acquisition have shown that naturalisation may reduce some of the barriers immigrants face in the housing market, thus helping them to leave particular types of neighbourhoods (Leclerc et al., 2021; Peters, 2020). Yet, naturalisation has also been associated in the literature with a decreased risk of all-cause mortality (Minsart et al., 2013; Riosmena et al., 2015). Controlling for citizenship status also reduces the frailty differences between old-aged immigrants and non-immigrants (Walkden et al., 2018). Several factors may explain this relationship. Research focusing on undocumented immigrants and their families but also on immigrants with temporary legal statuses show that living in a state of legal precariousness is associated with pervasive feelings of fear and exclusion but also anxiety about the future (Aranda et al., 2014; Bernhard et al., 2007; Gonzales et al., 2013; Robertson & Runganaikaloo, 2014). Moreover, having a secured legal status may increase immigrants' use of health services. Research focusing on immigrants in the US and in Europe show that immigrants living with an unsecured status may be reluctant to get in contact with public agencies for fear that this could lead to a risk of deportation or, in the case of chronic sickness, that this could jeopardize their chance to become citizens (Aung et al., 2010; Dias et al., 2008; Javier et al., 2010; Ortega et al., 2007; Tarraf et al., 2014; Winters et al., 2018). Although socio-economic resources may matter to different degrees for different immigrant groups, we expect that omitting to control for immigrants' household income and citizenship status will generally lead to an overestimation of the relevance of neighbourhood's poverty. We therefore posit the following hypothesis:

> **H2** – The negative association between living in a deprived neighbourhood and immigrant all-cause mortality is reduced but remains statistically significant after controlling for socio-economic resources.

5.3. Data and method

- *Population and data description*

This paper uses administrative register data from Statistics Netherlands. Our analysis focuses on foreign-born residents who arrived in the Netherlands between 1985 and 1995 and were between 18 to 60 years of age at the moment of migration. Since we only have register data from 1995 onwards (Salentin & Schmeets,

2017), we follow individuals from their 10th year of residency onwards to ensure that the observation period starts at the same moment for each cohort. Individuals are tracked until the moment of their death or until the end of the observation period in 2016 which implies that earlier cohorts are on average observed for a longer period. This results in a maximum follow up period of 31 years after the year of migration. Individuals who leave the Netherlands before the end of the observation period, and therefore drop out of our data base, are right-censored. Individuals who leave during the first 10 years, either due to outmigration or because of death, are not observed. Immigrants from Suriname are excluded since these individuals may benefit from a facilitated access to citizenship. We also exclude persons from the Dutch Antilles, which is part of the Kingdom of the Netherlands and whose residents typically have Dutch citizenship at migration.

Our event of interest is all-cause mortality. Mortality is a traditional measure of health that has often been used to study the relation between neighbourhoods' conditions and health in the US (Do et al., 2013; Marcus et al., 2016; Mode et al., 2016) and in Europe (Marinacci et al., 2017; Van Lenthe, et al., 2005; White et al., 2016). In contrast with survey measures of health, mortality has the advantage of being an objective measure of health that it is well-suited to study the long-term effects of health factors. Furthermore, it is a measure that can be unambiguously identified with register-based data. We construct this variable based on the date of death of individuals who passed away during their stay in the Netherlands.

Our main independent variable is neighbourhoods' deprivation. Neighbourhoods are measured at the *buurt* level*,* which refers to the second smallest spatial unit in the Dutch registry system. Smaller than municipalities, but also larger than street level-units of measurement, neighbourhoods include on average 1,300 inhabitants. Using this small-scale unit of measurement allows us to have a good understanding of the economic and social dynamics taking place in individuals' immediate living environment. We measure neighbourhoods' deprivation by looking at the percentage of unemployment benefits recipients living in the neighbourhood in which immigrants reside at a specific year, a measure that has been used in the past to capture neighbourhood effect (Agyemang et al., 2007). To achieve an even distribution, we cut this variable across quartiles and treat it in our analysis as a categorical variable. As a robustness check, we use two alternative measurements of deprivation, the percentage of individuals with paid employment living in the neighbourhood, an indicator that we measure from high employment level – low deprivation – to low

employment level – high deprivation, and the percentage of individuals in a neighbourhood situated within the lowest four deciles of Dutch household income[27].

We control for two types of socio-economic resources: standardized household income and citizenship acquisition. We measure immigrants' household income with a time invariant measure, adjusted for differences in household size and composition, indicating individuals' average standardised disposable household income overtime. We use the mean household income measured over the whole observation period in order to capture the long-term health effects of neighbourhood deprivation and structural socio-economic resources.[28]. Standardized household income is an objective measure provided by the Dutch tax authorities that aims to capture financial capabilities beyond the mere income from employment and encompasses immigrants' savings. Using such measure, we distinguish ourselves from previous studies that have mostly used survey-based measures of income (Agyemang et al., 2007; Klijs et al., 2016). Such measure may be biased among low-income individuals (Figari et al., 2012) and sensitive to income volatility. Citizenship acquisition is measured with a time constant dummy variable referring to whether individuals have acquired Dutch citizenship within their first 10 years of residency.

We add several control variables at the individual, household and neighbourhood level[29]. At the individual level, we control for time constant socio-demographic measures that have been found to be important predictors of health: age – measured with age at migration – and gender. Following spatial assimilation theory, we expect immigrants living in deprived neighbourhoods to show a lower degree of cultural integration. Yet, cultural integration has been shown to be associated with health in various ways (Riosmena et al., 2015). We control for this potential cofounding factor using a time variant indicator of whether immigrants are in a partnership with a Dutch citizen. Furthermore, we add a time variant measure of type of housing, a variable that captures household wealth beyond income and which has been found to be related with mortality (Laaksonen et al., 2009). This variable distinguishes between immigrants who are

[27] Due to missing information about income before 2003, we impute this information for the years 1995-2002 based on neighbourhoods' income level in 2003.

[28] Due to data restrictions, we are only able to measure immigrants' household income from 2003 onwards. Immigrants who arrived earlier will therefore have resided for a longer period of time in the Netherlands at the time when income measures become available. Since this may lead to an upward bias as they will have a higher average income due to better integration in the job market, we add a control for year of settlement.

[29] More information on the variables, their operationalization and descriptive statistics can be found in the supplementary materials (Table D.1 – Table D.3).

homeowners, immigrants renting with housing benefits and those renting without benefits[30]. Neighbourhoods' economic deprivation is often associated with a high degree of ethnic density and urbanisation. Previous studies have however observed a positive association between ethnic density and immigrants' mental health (Das-Munshi et al., 2010; Halpern & Nazroo, 2000). Moreover, living in a highly urban area may facilitate access to health services and may therefore be indirectly related to health. We control for these two factors by adding in our models a measure of rate of co-nationals living in the neighbourhood and a measure of urbanisation of the municipality. Both indicators are measured annually and are therefore time variant. Finally, to account for any cohort effects and heterogeneity at the origin country level, we stratify our models by year of arrival in the Netherlands and country of birth (for stratification, see explanation of shared frailty model below).

- *Data description*

We observe that immigrants living in poorer neighbourhoods tend to have a lower household income (Table 5.1.). While 34.3% of immigrants living in neighbourhoods with a very low level of economic deprivation (first quartile) are in the highest quartile of household income, this number goes down to 18% for individuals living in highly deprived neighbourhoods (fourth quartile). Individuals who have naturalised within 10 years of residency are more likely to reside in deprived areas (Table 5.1.), which is likely driven by other compositional factors as immigrants living in highly deprived areas are more likely to be non-EU immigrants and asylum seekers, two groups that show on average higher rates of naturalisation (Vink et al., 2020) [31]. As shown in the Kaplan-Meier estimates, the overall mortality risk after 31 years is 5.5%. Differences of survival rates across categories of neighbourhood deprivation overall appear to be marginal with comparable mortality rates for immigrants living in highly deprived neighbourhoods (fourth quartile, 5.9%) and those living in neighbourhoods with a very low rate of deprivation (first quartile, 6%). Important variations can however be observed across income categories and citizenship status. Thus, immigrants in the lowest

[30] Because information on type of housing is only available from 2003, we include a "No information" category for the period 1995-2003.

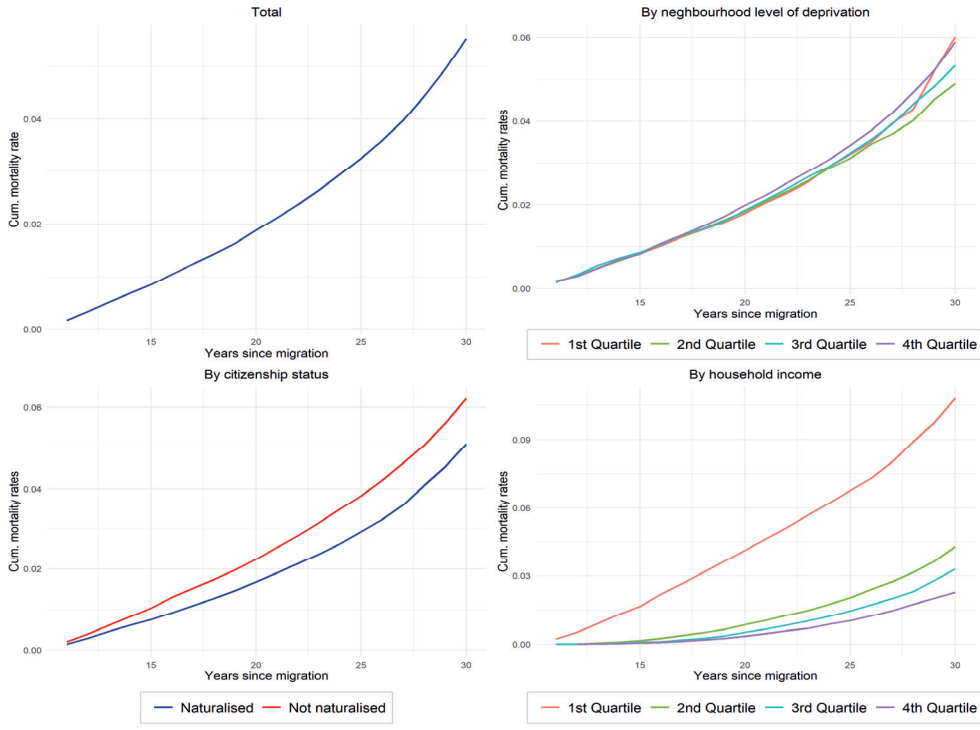
[31] 21.6% of immigrants living in neighbourhoods with a very low rate of economic deprivation are asylum seekers. This number increases to 28.1% for neighbourhoods with a very high rate of economic deprivation. In the same vein, the proportion of EU immigrants is lower in deprived areas than in areas with a very low rate of economic deprivation. Asylum seekers show a rate of naturalisation after 10 years of residency of 77.7% while non-EU immigrants show a rate of 71%. Both figures are higher than the general average rate of naturalisation after 10 years (63.6%).

quartile of household income show the highest risk of mortality (10.8%) and individuals in the highest income category the lowest risk of mortality (2.3%). Immigrants who have naturalised within 10 years also show a low rate of mortality (5.1%) in comparison to individuals who have not naturalised within 10 years (6.2%). We now proceed with outlining how our design takes into account the longitudinal and nested structure of our data.

Table 5. 1 Standardised disposable household income level and naturalisation rates across categories of neighbourhood deprivation

	Low economic deprivation (< 1.09%)	Medium-low economic deprivation (1.09 – 1.51%)	Medium-high economic deprivation (1.51 – 1.99%)	High economic deprivation (> 1.99%)	Total (%)
First quartile income (< 13,595 eur)	19.6	24.5	26.9	28.9	100
Second quartile income (13,595 – 17,574 eur)	21.4	24.6	26.3	27.7	100
Third quartile income (17,574 – 23,056 eur)	24.7	24.9	25.0	25.5	100
Fourth quartile income (> 23,056 eur)	34.3	25.9	21.8	18.0	100
Not naturalised within 10 years	26.5	25.1	24.6	23.8	100
Naturalised within 10 years	24.1	25.0	25.2	25.7	100

Figure 5. 1 Cumulative all-cause mortality rates among immigrants in the Netherlands by years since migration. Kaplan–Meier failure function curves based on migration cohorts 1985-1995 with observation period 1995-2016



- *Empirical strategy*

We analyse the relation between exposure to neighbourhood's deprivation and immigrant's health with a multilevel survival analysis with shared frailty. Survival analysis has been developed to measure the timing and occurrence of a specific event and is well-suited for the analysis of longitudinal data (Box-Steffensmeier & Jones 1997). This method is commonly used in medical and sociological research to estimate the risk of death. In this paper, we employ a Cox Proportional Hazard Model, which is a particular type of survival model. This approach offers two main advantages. First, unlike accelerated failure time models, it does not assume a parametric form for the distribution of time. Second, it is better suited for the inclusion of time-varying covariates. Because individuals in our data base are clustered within neighbourhoods and may share particular characteristics induced by their residential context, we additionally include in our models a shared frailty term that allows to adjust for the fact that individuals located in the same neighbourhoods may share

common characteristics and may not be independent from one another (Austin, 2017). For an individual (i), with a vector of covariates X and a frailty term Z, the Cox proportional Hazard Model expresses a hazard rate that takes the form of:

$$(1)\ h(t|Z)=Zh0(t)\exp(\beta'X)$$

The most important assumption of the Cox Proportional Hazard Model is the assumption of proportionality. The proportionality assumption stipulates that the effect of the co-variates on the hazard must remain the same across time. We control for any possible violation of this assumption with a stratification method in which we stratify each predictor that does not satisfy the assumption (Borucka, 2014). Hence, we estimate the model across different strata constructed along the different categories of the variables violating the assumption. If W equals the number of stratified covariates[32], using stratification leads to the following changes in the Cox Proportional Hazard equation:

- $(2)\ hg(t|x)=h0g(t)\exp\ (\beta'Xi)$
- $(3)\ g = 1, 2, 3, \ldots, k^*$, strata defined from W

A second assumption of the Cox Proportional Hazard Model is the absence of informative censoring. Informative censoring occurs when participants drop out of the study for reasons that are related to the risk of the event being analysed. Controlling for the issue of informative censoring is particularly important in this research as we cannot rule out the possibility that out-migration is related to a higher incidence of death. As some studies have observed, immigrants who are gravely ill may be tempted to move back to their home country in order to spend the last days of their life with their loved ones (Abraído-Lanza et al., 1999), a phenomenon that is labelled as the "Salmon bias". Therefore, out-migration could be in some cases related to the risk of mortality. To control for this potential bias, we exclude immigrants who have left the Netherlands before the end of the observation period.

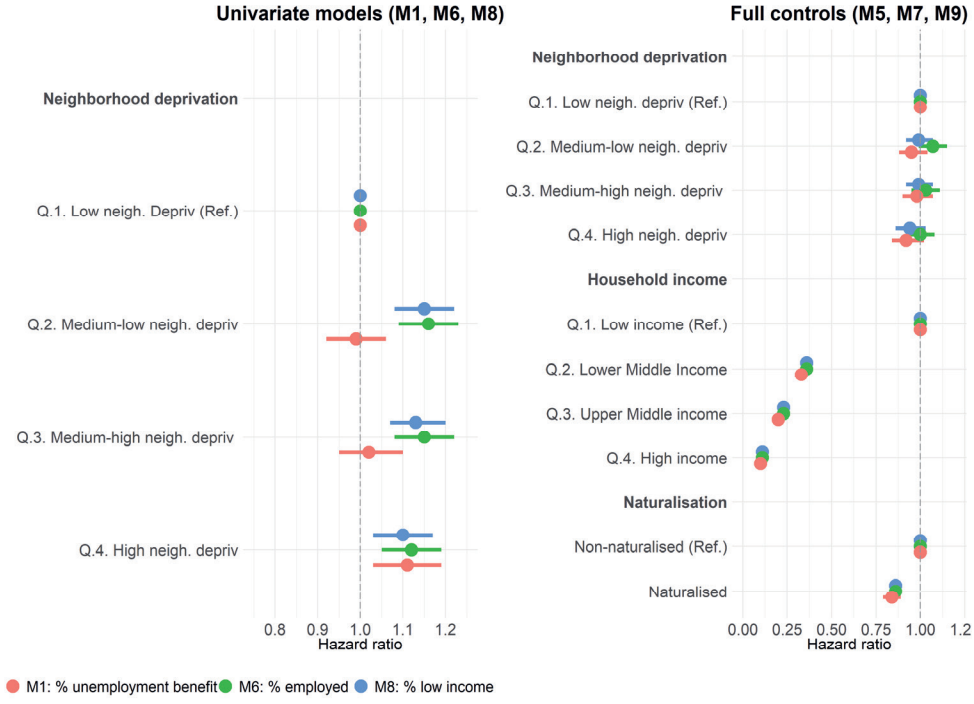
[32] All models are stratified by year of arrival.

5.4. Analysis

We start our analysis with a univariate model that only includes a measure of neighbourhood deprivation (Figure 5.2. M1). First, looking at the variance of the random effect, we observe that only a small share (0.06) of the variance in mortality can be attributed to the neighbourhood level (Table D.4. M1). We do find, however, that immigrants residing in the most deprived neighbourhoods have an 11% higher all-cause mortality risk, relative to those living in the least deprived areas. This is in line with H1, based on previous studies that have observed stronger mortality risk in economically deprived neighbourhoods in Europe (Marinacci et al., 2017). Yet, as discussed, we should expect this relationship to be driven at least partially by compositional factors, and more specifically by the fact that immigrants living in deprived neighbourhoods are more likely to have fewer socio-economic resources. We therefore control in our main models for immigrants' household income and citizenship status, plus additional individual, household and neighbourhood controls. Overall, findings from our full model show that there is no significant association between neighbourhoods' deprivation and mortality once potential confounders are included (Figure 5.2. M5; Table D.4. M5). This goes against findings from previous studies (H2) that have found a significant association between neighbourhoods' deprivation and immigrants' mortality, even after controlling for immigrants' socio-economic characteristics (Denney et al., 2018; Hajat et al., 2010).

To check whether our findings are sensitive to different operationalisations we run the same analysis with two alternative measurements of neighbourhoods' deprivation (Figure 5.2). The results of these models are comparable with those based on our main model. First, univariate models using these two alternative measurements suggest that living in a deprived neighbourhood, including in those with medium levels of deprivation, is positively associated with a higher mortality risk (Figure 5.2. M6, M8; Table D.5. M6, M8) which gives further support to our first hypothesis. Moreover, we also observe that neighbourhood deprivation is in both cases no longer significantly associated with a higher mortality risk after we add all the control variables (Figure 5.2. M7, M9; Table D.5. M7, M9). Overall, these findings show that living in a deprived neighbourhood is not associated with a higher hazard of mortality after controlling for immigrants' socio-economic resources, regardless of the measurement of neighbourhood deprivation.

Figure 5. 2 Effects of alternative operationalizations of neighborhood's deprivation on all-cause mortality risk among immigrants in the Netherlands, univariate models (models 1, 6, 8) and models with full controls, incl. socio-economic resources (models 5, 7, 9). Dots denote hazard ratios from Cox regression and horizontal lines correspond to 95 per cent CIs. See Tables D4-D5 for full model output, including additional stepwise models



Beyond differences in the operationalization of deprivation, stepwise models indicate that household income is a main confounder of the relation between living in a deprived neighbourhood and immigrants' mortality (Table D.4. M2). This suggests that patterns of mortality in deprived neighbourhoods are driven by individuals' low financial resources rather than by contextual factors. Focusing on the coefficients of household income, we observe that the risk of mortality is much higher for immigrants with a household income situated within the first quartile. This aligns with previous studies that have observed a higher risk of mortality for low income categories in the Netherlands (Kalwij et al., 2013; Knoops & van den Brakel, 2010)[33]. Moving to citizenship status, we see that having acquired Dutch citizenship after 10 years diminishes

[33] The association between income and mortality may however be overestimated due to the fact that we do not control for immigrants' education level, a variable that has been associated in the literature with unhealthy behaviours including smoking, alcohol consumption and drug use (Miech et al., 2011). As income and education are likely to be colinear, it is plausible that the strong coefficient of household income is partly driven by the fact that individuals with a low

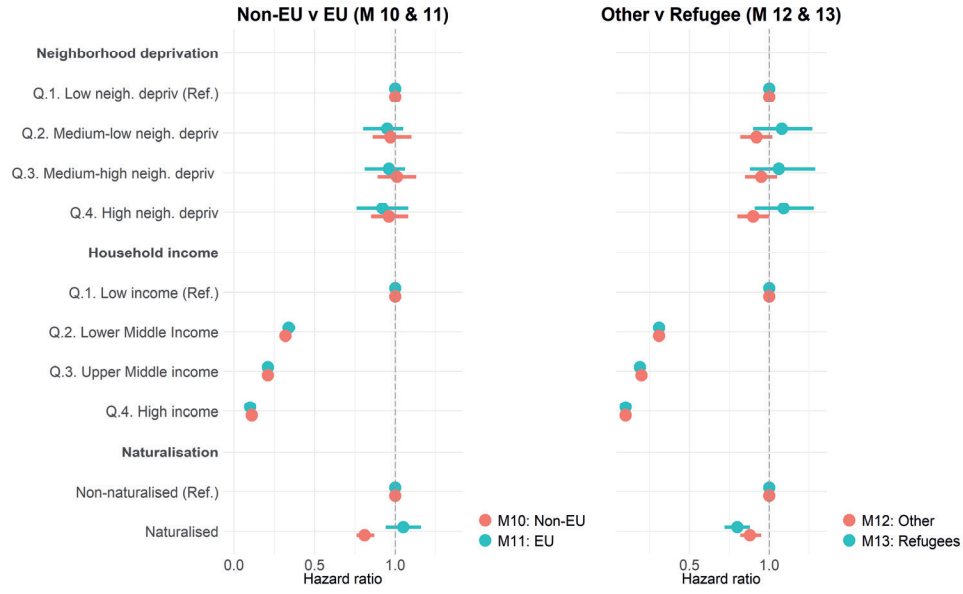
the risk of mortality by 23% (Table D.4. M3), the strength of this coefficient slightly decreases after we add all the other control variables (Figure 5.2. M5). This suggests that having a secured legal status is positively associated with immigrants' health, ceteris paribus, and aligns with previous studies that have stressed the relevance of citizenship status for immigrants' health outcomes (Minsart et al., 2013; Riosmena et al., 2015). The coefficients for income and citizenship acquisition remain virtually similar across the models with different operationalization of neighbourhood deprivation (Figure 5.2. M7, M9, Table D.5. M7, M9)

Living in a deprived neighbourhood may not affect all immigrant groups equally. More specifically, the relation between neighbourhood's economic deprivation and health may be conditioned by psycho-social stressors that immigrants are confronted with before, during and after the migration process. Immigrants who are put under greater psychological strain may be more susceptible to suffer from contextual factors related to insecurity, high criminality and lack of social cohesion. Immigrants' exposure to psycho-social stressors may partly be related to their migration motive and their country of origin. As shown in the literature, asylum seekers are more at risk of experiencing traumas before and during the migration process (Karunakara et al., 2004; Silove et al., 1997; Steel et al., 2002) and often show higher rates of psychological disorders such as post-traumatic stress, anxiety, and depression (Silove et al., 1997). Exposure to post-migration stressors may also depend on whether immigrants are in possession of an EU citizenship. EU citizens are allowed to permanently stay and work in the Netherlands and may be less at risk of being confronted with discriminatory practices. When running equivalent analyses on sub-samples of these migrant groups, our findings remain consistent across all sub-groups. As shown in model 10 to 13 (Figure 5.3, Table D.6. supplementary materials), we observe that living in a deprived neighbourhood is not significantly related with mortality, either for EU and non-EU immigrants or for refugees and non-refugees. Similarly, having a higher household income is consistently associated with a lower risk of mortality in all four sub-groups. However, when looking at the relevance of socio-economic resources, we find that citizenship acquisition is not significantly associated with mortality risk among EU migrants. This may be due to the fact that EU citizens have a secure legal status and are allowed to permanently stay and work in

income are more likely to have a low education level. The reason for not controlling for education level in our main model is that our measure of education includes a high number of missing values (87.2%). However, based on a sub-sample of more recently arrived migrants for which this information is available, we control for education level in a robustness check to check the extent to which the coefficient of income may be driven by education. We observe that adding education into the model does not alter the value of the coefficients for household income (Table D.8. Model A.3 and A.4).

the Netherlands even if they do not become Dutch citizens. These findings confirm our conclusion that there is no positive and significant association between neighbourhood deprivation and immigrant mortality in the Netherlands after controlling for socio-economic resources.

Figure 5. 3 Effects of neighbourhood's deprivation and socio-economic resources on all-cause mortality risk among immigrants in the Netherlands by sub-groups, models with full controls. Dots denote hazard ratios from Cox regression and horizontal lines correspond to 95 per cent CIs. See Tables A6 for full model output



5.5. Discussion and conclusion

Numerous studies have observed an association between neighbourhood's deprivation and immigrants' poor health. Yet, these studies generally pay little attention to the complex interplay between neighbourhoods' contextual and compositional factors. In order to contribute to this discussion, we study the relation between neighbourhood's deprivation and immigrants' mortality in the Netherlands using an empirical strategy designed to disentangle the relevance of neighbourhoods' contextual factors from that of compositional characteristics. Using administrative register data from Statistics Netherlands, we control for two important types of socio-economic resources, household income and citizenship status, that we argue

could be driving the relationship between neighbourhoods' deprivation and mortality and follow foreign born residents for a maximum period of 31 years.

We find that, once potential confounders are taken into account, living in a deprived neighbourhood does not increase the hazard of mortality. These findings hold irrespective of our measurements of neighbourhood deprivation and remain consistent across sub-groups. Overall, this suggests that patterns of mortality may be driven by the fact that individuals living in such neighbourhoods have fewer financial resources, while citizenship acquisition does not seem to act as a confounding factor of the relationship between neighbourhoods' deprivation and health. These results are in contrast with previous studies that have observed a positive association between deprivation of the residential context and immigrants' mortality in the US (Denney et al., 2018) and in New Zealand (Hajat et al., 2010).

This discrepancy may be partly due to methodological limitations of previous studies that, we argue, our paper is able to overcome, and partly also to the specific empirical context of our study. First, previous studies have used self-reported measures of income, a type of measurement that is prone to measurement error, especially among low-income individuals (Figari et al., 2012). By measuring income as well as household wealth more generally with register data, we are able to determine immigrants' financial means more accurately. Second, in contrast with previous studies that only used a cross-sectional approach (Denney et al.; Hajat et al., 2010), we are able to follow individuals for a significant period of time and could therefore account for potential bias to due informative censoring.

Third, these different results could also be explained by institutional factors and, more specifically, by the nature of the Dutch welfare state. The Netherlands, in general, has a low rate of people at risk of poverty or social exclusion by European standards (Eurostat, 2018), which means that even in the relatively most deprived areas, individuals still enjoy (absolutely) high living standards. For example, the potential relevance of neighbourhoods' contextual factors may be attenuated by the fact that all immigrants living in the Netherlands have access to health care and this at a relatively low cost. This may explain findings that contrast with those from, e.g., the US context. Further research conducted in European countries would, however, be needed to confirm to what extent these findings hold across other contexts with highly developed welfare states. In addition, we find that having a higher standardized household income strongly decreases the risk of passing away during the examination period. This confirms the results of previous

studies that have identified important differences in mortality rates across income categories (Kalwij et al., 2013; Knoops & van den Brakel, 2010). We also find that becoming a Dutch citizen significantly decreases the risk of death for non-EU migrants. This is in line with our theoretical expectations and highlights the detrimental role played by legal status precariousness on health outcomes. Further research is needed to better understand and measure the mechanisms driving this relationship.

This paper constitutes one of the first attempts to study the relation between neighbourhood deprivation and immigrant mortality in a European country using register data and, by doing so, contributes to both the literature on neighbourhood effects and immigrant health. We engage with the literature on neighbourhood effects by showing that the geographic patterns of mortality in deprived neighbourhoods in the Netherlands are on average limited and mainly driven by the fact that immigrants living in such neighbourhoods have fewer socio-economic resources. It also contributes to a better understanding of immigrants' health in the Netherlands and stresses the relevance of immigrants' individual socio-economic resources as regards health outcomes. This, however, does not necessarily imply that neighbourhood characteristics do not matter for immigrants' health. First, due to data restrictions, we were not able to identify immigrants' cause of death. Further research making the distinction between natural, accidental, homicidal and self-inflicted death should help to better understand the mechanisms driving the patterns we observed in this paper. Moreover, using mortality, it is likely that we were not able to identify all the health effects of contextual factors. Previous studies based in the Dutch context have shown that living in a deprived neighbourhood may be related to immigrants psychological well-being (Drukker & van Os, 2003; Klijs et al., 2016), obesity rates (De Wilde et al., 2019) and blood pressure and hypertension (Agyemang et al., 2007).

Chapter 6

Conclusion

When looking at the immigrant naturalisation literature, it is difficult to escape the impression that citizenship acquisition is mostly a story of individual-level factors. The decision to naturalise is traditionally considered through a cost-benefits analysis in which immigrants assess the pros and cons of naturalisation before to decide on whether or not they want to engage in the procedure (Yang, 1994). Following this line of reasoning, the literature puts emphasis on individual determinants of naturalisation such as age at arrival, socio-economic status and length of stay in the destination country (Peters et al., 2016; Yang, 1994). Moreover, studies that investigate the effect of citizenship acquisition on immigrants' settlement process explore the relation between naturalisation and individual-level indicators of economic integration. Following the citizenship premium argument, it is often argued that naturalised immigrants are less likely to be confronted with statistical discrimination and are therefore better able to integrate into the job market (Hainmueller et al., 2019; Peters et al., 2018; Peters et al., 2020).

Yet, individuals do not live in isolation. Rather, their life choices are influenced by the social structures in which they are embedded. This includes the family context (Helgertz & Bevelander, 2017), the institutional conditions of the destination country (Peters et al., 2016) and the characteristics of the living environment. In this thesis, I argue that important resources, which are relevant for immigrants' post-settlement trajectory, can be found at the neighbourhood level (Ryan et al., 2008). As shown in the literature, the type of neighbourhood in which immigrants live conditions the type of social interactions immigrants have on a daily basis which matters for immigrants social and economic integration (Bolt & van Kempen, 2010; Bouma-Doff, 2007; Gijsberts & Dagevos, 2007; Musterd & Ostendorf, 2009; Pinkster, 2007, 2009). Moreover, the residential context may also be associated with immigrants' well-being and health outcomes which can also affect immigrants' post-settlement process (Agyemang et al., 2007; Chang et al., 2012; Denney et al., 2018; Hajat et al., 2010; Pruitt et al., 2016; Raphael et al., 2020). In this context, I develop a framework that moves beyond the individual-level and explores the question of naturalisation in relation to immigrants' residential context; a perspective that, with a few exceptions (Abascal, 2017; Hochman, 2011; Liang, 1994; Yang, 1994), is generally overlooked in the literature. With that aim, this dissertation addressed the following research question: *How do the residential environment and immigrant naturalisation interrelate in immigrants' post-settlement process in the Netherlands?*

This thesis investigates the relation between immigrants' residential environment and naturalisation within the framework of spatial assimilation theory, a theoretical framework that has been used in the past to study immigrants' residential mobility and various dynamics of ethnic segregation. Using this framework, I look at three aspects of this relation, namely the relevance of neighbourhoods for immigrants' propensity to naturalise, the relevance of naturalisation for immigrants' residential mobility and the endogenous role of naturalisation in the study of neighbourhood effects.

This study focuses on first generation immigrants living in the Netherlands. The mechanisms are tested using register data from Statistics Netherlands which allows to follow almost all foreign-born individuals residing in the Netherlands for a significant period of time.

6.1 Summarizing the empirical results

Findings from the four empirical chapters

The research question is answered in four empirical chapters. Chapter 2 investigates the effect of neighbourhoods' migrant concentration on immigrants' propensity to naturalise. This chapter contributes to a growing field of literature that explores the individual and neighbourhood-level determinants of citizenship acquisition (Liang, 1994; Logan et al., 2012; Mossaad et al., 2018; Peters et al., 2016). Using register data from Statistics Netherlands, I can overcome most of previous studies' limitations and offer a design that allows to accurately estimate the effect of neighbourhoods' factors. This chapter tests two theoretical approaches that have been developed in the literature to explain the relation between migrant concentration and naturalisation. The first theoretical argument tested in this chapter, *the ethnic enclosure* hypothesis, argues that living in a concentrated neighbourhood reduces the frequency of contacts with Dutch natives and increases the chances of within-group interactions which can negatively affect immigrants' likelihood to become citizens (Liang, 1994). The second argument tested in this paper is labelled the *naturalisation diffusion* hypothesis. This hypothesis takes a different position and argues that immigrants living in migrant concentrated neighbourhoods are more likely to gather information about the ins and outs of the naturalisation process and more likely to perceive the host country as more inclusive if these neighbourhoods also include a high share of naturalised immigrants (Abascal, 2015; Logan et al., 2012). This

can positively affect their decision to become citizens. Findings from this chapter show that immigrants living in concentrated neighbourhoods are less likely to become Dutch citizens, a relation that seems to be driven by a greater availability of migrant networks in concentrated neighbourhoods. These findings corroborate the *ethnic enclosure* theory. The size of this effect is comparable for family and labour migrants but is, however, weaker for refugees. A potential explanation could be that refugees show a high degree of residential mobility and may therefore be less receptive to their residential environment. Furthermore, I observe that living in a neighbourhood with a high proportion of naturalised migrants is positively associated with naturalisation. In addition, the relevance of migrant concentration appears to be significantly reduced if the neighbourhood also includes a high share of naturalised immigrants. Altogether, these two findings validate the *naturalisation diffusion* argument. Overall, analyses from this chapter stress the relevance of neighbourhood level factors for immigrants' decision to naturalise and highlight the importance of social networks' availability in this process. It also reveals a complex picture that somewhat goes beyond the simplified nature of the frameworks developed in the past to explain the relation between neighbourhood concentration and citizenship acquisition. Further research will be needed to confirm the robustness of these findings. Using an IPTW method, I am only able to control for self-selection due to observed characteristics. Therefore, potential bias due to self-selection could remain.

The third chapter of this dissertation takes a different perspective and explores the potential positive association between citizenship acquisition and immigrants' propensity to leave migrant concentrated neighbourhoods. This chapter expands upon the citizenship premium argument, that was initially developed to explain the positive effect of naturalisation on immigrants' economic integration (Bratsberg et al., 2002; Peters et al., 2018, 2020), and applies it to the specific case of housing market actors. It also engages with the literature on immigrants' residential mobility and contributes to the debate on spatial assimilation and place stratification theories (Andersen, 2016). This chapter argues that naturalisation may be viewed by housing market actors as a positive signal of economic integration and intention to stay, thereby reducing the risk of nationality-based discrimination. This relevance of naturalisation may, however, be conditioned by immigrants' economic situation. Immigrants in a precarious economic situation may see their housing application being denied, regardless of their citizenship status. On the contrary, immigrants with a medium income and a stable job contract may fall under stronger scrutiny and may benefit more from the signalling

potential of citizenship. Findings from this chapter show that naturalised immigrants are more likely to leave migrant concentrated neighbourhoods. This effect appears to be stronger for Turkish and Moroccan migrants, two groups that are often considered more at risk of being discriminated. However, it does not apply to immigrants moving into social housing. As expected, the relevance of citizenship acquisition is conditioned by immigrants' economic situation. Yet, this interaction effect is not straightforward and depends on the kind of housing market actors that immigrants have to deal with. While both income and type of job contract matter for immigrants moving within the renting sector, income seems to be the only relevant economic indicator for immigrants moving through homeownership. Overall, these findings are in line with my expectations and suggests that becoming a Dutch citizen improves immigrants' integration in the housing market. This supports the idea that naturalisation should not only be considered a symbol of integration but should also be seen as a facilitator of integration. By becoming Dutch citizens, immigrants may be better able to leave certain types of neighbourhoods which can ultimately affect their post-settlement trajectory. It also provides further evidence that immigrants may be impeded in their mobility by housing market discrimination and, by doing so, validates the place stratification argument. Further research that directly measures housing market discrimination, for instance using experimental designs, is needed to confirm these findings.

Chapter 4 directly follows up on these findings and investigates the role played by citizenship acquisition for immigrants' propensity to live in higher-income neighbourhoods. Yet, it does so with a different empirical strategy that, instead of assessing the association between citizenship acquisition and immigrants' residential mobility, explores the relevance of citizenship in moderating the relation between income and the economic characteristics of the neighbourhood in which immigrants live. Building on previous studies that have established the signalling potential of citizenship acquisition (Bratsberg et al., 2002; Peters, 2019; Peters et al., 2018, 2020), and also upon previous research that have examined the effect of income on immigrants' residential mobility (Bolt & van Kempen, 2003; Lersch, 2013; Schaake et al., 2014; Vaalavuo et al., 2019; Wessel et al., 2017), this chapter argues that naturalised immigrants are less likely to be confronted with discrimination practices and, as a result, are more likely to translate their income gains into greater residential mobility. This relation may be particularly relevant for immigrants who are more at-risk of being discriminated. In order to look into this, I examine two additional factors that may shape

immigrants' exposure to nationality-based discrimination in the Dutch housing market: the type of housing market actors that immigrants have to deal with and immigrants' country of origin. Findings show that immigrants with a higher income are generally more likely to live in a wealthier neighbourhood. Yet, this relation appears to be stronger for a specific category of immigrants: naturalised immigrants who are above a certain level of income. This provides further evidence of the signalling potential of naturalisation, but also draws attention to the fact that low-income individuals are obstructed in their housing trajectory, regardless of their citizenship status. Partly in line with my expectations, I observe that the moderating effect of citizenship acquisition only applies to immigrants who have become homeowners at some point during the observation period, which tends to confirm the idea that nationality-based discrimination is less likely to occur in the social housing sector. It is also only significant for non-EU immigrants, a group that is considered more at risk of being confronted with discrimination in the housing market. Overall, results from this empirical chapter are in line with those of chapter 3. They illustrate the signalling potential of naturalisation and provide evidence of the existence of housing market discrimination in the Netherlands. This gives support to the place stratification theory. In addition, this chapter contributes to a better understanding of the relation between immigrants' income gains and residential mobility by showing the importance of adjusting for immigrants' citizenship status, an aspect that has always been disregarded in previous studies (Bolt & van Kempen, 2003; Lersch, 2013; Vaalavuo et al., 2019; Vogiazides, 2018; Wessel et al., 2017).

Finally, Chapter 5 takes a different perspective and adds a new conceptual dimension to this dissertation, namely that of immigrants' health. In contrast with previous chapters, the focus is here not so much on citizenship acquisition, but rather on the relationship between neighbourhoods' characteristics, and more specifically neighbourhoods' economic deprivation, and immigrants' health, measured with all-cause mortality. In this chapter, citizenship acquisition is considered a potential endogenous factor, along with immigrants' household income, that could potentially be driving the relationship between neighbourhood deprivation and immigrants' mortality. This chapter builds upon previous research that have investigated whether geographical patterns of poor health may be due to neighbourhoods' contextual factors or to neighbourhoods' compositional characteristic (Van Kamp et al., 2004). In line with previous studies that have demonstrated the association between neighbourhoods' deprivation and immigrants' poor health

(Agyemang et al., 2007; Chang et al., 2012; Denney et al., 2018; Hajat et al., 2010; Pruitt et al., 2016; Raphael et al., 2020), I argue that immigrants' living in a deprived neighbourhood are more likely to pass away within the examination period. Yet, I expect this relation to be partly driven by two immigrants' socio-economic resources, immigrants' household income and citizenship status, that I argue are related to both residential mobility and health. To investigate this question further, specific attention is also paid to immigrant groups that are often put under greater psychological strain and may therefore be more susceptible to neighbourhoods' contextual factors: refugees and non-EU immigrants. Results from this chapter show that living in a neighbourhood that has a very high level of deprivation increases the risk of mortality. Yet, this relation disappears after controlling for immigrants' household income and citizenship status. This result remains consistent across sub-groups and across different operationalisations of deprivation. This finding is in contradiction with previous studies that have observed a negative effect of neighbourhoods' deprivation on immigrants' mortality, even after controlling for immigrants socio-economic status (Denney et al., 2018; Hajat et al., 2010). This discrepancy may be caused by using register data serving measuring immigrants' income more accurately than previous studies that have used self-reported measures of income. It may also be explained by the nature of the Dutch welfare state that provides a better health security to immigrants than in the US. In addition, I find that having a higher income is strongly associated with mortality. Similarly, I observe that becoming a Dutch citizen is negatively related with mortality, a finding that corroborates those of previous studies (Minsart et al., 2013; Riosmena et al. , 2015). This puts emphasis on the detrimental health effect of legal status insecurity and shows, yet again, the potential benefits of citizenship acquisition for immigrants' post-settlement trajectory.

Answering the research question

How do these findings relate to the research question: *How do the residential environment and immigrant naturalisation interrelate in immigrants' post-settlement process in the Netherlands?* The first three empirical chapters of this dissertation show that citizenship acquisition and immigrants' residential context are strongly interrelated. First, neighbourhoods' characteristics are significantly associated with immigrants' propensity to naturalise. This suggests that immigrants who engage in the naturalisation procedure are not isolated actors and emphasizes the need to move beyond individual-level factors to better understand the

determinants of citizenship acquisition. Second, becoming a Dutch citizen may facilitate immigrants' residential mobility and, by doing so, affect the nature of the neighbourhood in which immigrants reside. This has implications for immigrants' settlement process as neighbourhoods' characteristics may affect their integration and well-being. Analysis from the final empirical chapter points to the limited relevance of neighbourhoods' characteristics on immigrants' well-being. These findings, that contrast with previous research based in different national contexts (Denney et al., 2018; Hajat et al., 2010), are likely explained by the structure of the Dutch welfare state that allows access to health care to all residents and facilitates territorial cohesion. In such a context, citizenship acquisition may not be needed for immigrants to overcome possible health challenges associated with living in a deprived neighbourhood. Nevertheless, evidence from this chapter emphasises the relevance of individual-level economic resources for long-term health outcomes, especially income but also, although to a lesser extent, citizenship status.

The empirical chapters of this dissertation suggest that naturalisation and immigrants' residential environment are two closely related concepts. Findings from chapter 2 show that neighbourhood-level characteristics matter for citizenship acquisition. More specifically, the availability of migrant-networks seems to be an important predictor of immigrants' decision to become a citizen. Yet, this relation is not straightforward. While having regular contacts with other immigrants is negatively associated with citizenship acquisition, as one would assume from an assimilation perspective, living among naturalised immigrants may on the other hand stimulate the naturalisation process. Chapter 3 and 4 demonstrate that becoming a Dutch citizen may facilitate immigrants' residential mobility by reducing the risk of nationality-based discrimination on the part of housing market actors. From this perspective, citizenship status may condition the type of neighbourhood in which immigrants reside and, by doing so, may strongly affect immigrants' post-settlement process. Finally, findings from chapter 5 do not demonstrate the endogenous role of naturalisation in the relation between neighbourhood's deprivation and mortality. However, this does not necessarily imply that future studies investigating neighbourhood effects should not adjust for citizenship status. The lack of relevance of citizenship status may stem from the fact that the Netherlands has a relatively supportive welfare state that grants health care access to all its residents and prevents high rates of neighbourhood segregation. Therefore, I invite future studies taking place in different national

contexts to take into account immigrants' citizenship status in order to adjust for potential confounding effect derived from spatial assimilation.

6.2. Academic contribution

Theoretical contribution

This dissertation investigates the interplay between naturalisation and immigrants' residential context. It does so within the framework of spatial assimilation theory, a theory that has been mostly used in the literature to explain immigrants' residential mobility. Using this theoretical perspective, this dissertation brings together several fields of literature. First, it engages with the literature focusing on the determinants of citizenship acquisition and highlights the key role played by residential characteristics and social networks' availability in influencing immigrants' decision to naturalise. This theoretical framework contrasts with the often decontextualised individual-level cost-benefit theories applied in much of the literature (Yang, 1994). Second, this dissertation contributes to the literature on immigrants' residential mobility by showing how becoming a Dutch citizen may reduce place stratification and facilitate immigrants' mobility outside of certain types of neighbourhoods. While this strand of literature has often emphasised the role played by socio-demographic and socio-economic characteristics, limited attention had been paid in the past to citizenship status (Bolt & van Kempen, 2010; Vaalavuo et al., 2019; Zorlu & Mulder, 2008). Moreover, this brings new evidence of the relevance of citizenship acquisition for immigrants' integration process and therefore relates to previous research that have highlighted the key role played by naturalisation for immigrants' integration in the job market (Peters et al., 2018, 2020), a phenomenon labelled as the citizenship premium. Finally, the fifth chapter of this dissertation contributes to a better understanding of the relation between neighbourhood's factors and immigrants' health by offering a framework that accounts for the potential confounding role of immigrants' financial resources and citizenship status. Although findings from this chapter do not validate the assumption that citizenship acquisition acts as a confounding factor of the relation between neighbourhood and health, they show the relevance of citizenship acquisition for immigrants' health which speaks to a broader debate about the detrimental effect of legal status

precariousness on immigrants' health outcomes (Aranda et al., 2014; Bernhard et al., 2007; Robertson & Runganaikaloo, 2014).

Methodological contribution

This dissertation also offers several methodological innovations. Using register data, I can measure neighbourhoods' characteristics with objective indicators based on the whole registered Dutch population. By measuring these characteristics at the neighbourhood level, I am moreover able to zoom into immigrants' immediate social and economic environment. This contrasts with previous research that has often used large scale measurements of neighbourhoods covering very large numbers of individuals (Abascal, 2017; Logan et al., 2012; Mossaad et al., 2018). The use of register data also allows me to accurately determine immigrants socio-economic characteristics and to overcome several issues inherent with survey design such as non-response and social desirability biases, two types of bias that have been found to be particularly prevalent among immigrant and low income populations (Deding et al., 2008; Figari et al., 2012; Kappelhof, 2014). Finally, I am able to benefit from the longitudinal structure of these register data and can follow immigrants for significant periods of time. This enables me not only to observe patterns of variation over time, but also to build empirical strategies that account, at least to a considerable degree, for immigrants' self-selection into naturalisation and into neighbourhoods. Although these strategies do not allow for strong statements about causal mechanisms, this approach goes considerably beyond that of previous studies relying predominantly on cross-sectional designs (Abascal, 2017; Bolt & van Kempen, 2003; Denney et al., 2018; Hajat et al., 2010; Logan et al., 2012; Vogiazides, 2018; Yang, 1994).

6.3. Limitations

The use of register data also comes with a number of challenges. By their nature, register data only include information about individuals who are lawfully registered in the Netherlands. This implies that undocumented immigrants cannot not be observed in my analyses. Although this could raise legitimate question as regards the representativity of my study population, it is important to note that legal residence is an important requirement to become a Dutch citizen. Consequently, undocumented immigrants, who are

not eligible for naturalisation, are not part of this thesis' target population. Register data moreover only cover objective information provided by the Dutch authorities. While this implies that I can measure socio-demographic and socio-economic characteristics with a considerable degree of accuracy, at both the individual and the neighbourhood level, this also means that I have no subjective information about immigrants' cultural integration and social networks. I compensate for this lack of information using various proxies of cultural integration including partnership with a Dutch national, number of children within the household and length of stay in the Netherlands. I also approximate immigrants' social network by measuring the characteristics of all individuals living in the same neighbourhood at a particular time. Due to data restrictions, I am also not able to directly measure housing market discrimination. To overcome this limitation, I use corollaries of housing market discrimination such as immigrants' country of origin or immigrants' financial resources. In essence, this empirical strategy is very different from that of previous studies that have aimed at directly measuring housing market discrimination with experimental designs (Ahmed & Hammarstedt, 2008; Heylen & van den Broek, 2016). Finally, important variables at the individual and neighbourhood level are missing for the study period. I am, for instance, not able to distinguish between immigrants renting a dwelling in the private sector or in social housing and I am also not able to include accurate measures of neighbourhoods' quality of life. Further research will be needed to investigate the potential relevance of these factors. Another limitation lies in the fact that this thesis exclusively uses quantitative methods. This approach allows me to use large-N data bases and to systematically test various mechanisms and hypotheses related to citizenship acquisition and residential context. In that sense, it is well suited to address the research question of this thesis. Yet, analyses of a more qualitative nature could bring a different understanding of how these mechanisms operate. Questions related to how exactly neighbourhoods' factors affect immigrants' desire to naturalise and immigrants' quality of life may necessitate a strategy that delves into immigrants' feelings and perceptions of their environment and would therefore require a more qualitative approach.

6.4. Avenues for future research

This thesis represents a first attempt to develop a framework linking immigrants' naturalisation and residential context. By doing so, it brings together different strands of literature that have often been studied

separately and fills an important academic gap. Yet, the limited scope of this research as well as the data limitations entail that more research needs to be done to fully understand the complexity of the citizenship-neighbourhood nexus.

As a start, it is important to mention that several mechanisms developed in this thesis cannot be tested directly. This is the case of housing market discrimination but also of various processes related to social networks. To circumvent this issue, I examine different variables that, I argue, strongly correlate with the mechanisms at play in my empirical chapters. While this strategy allows me to draw a comprehensive picture of how citizenship acquisition and neighbourhoods' characteristics correlate, and is therefore appropriate to address the research question, more research will be needed to directly test these mechanisms using different empirical strategies and data. Future studies could for instance test the positive signalling potential of citizenship acquisition with experimental designs, such as field experiments, conducted among landlords, real estate agents, and mortgage lenders. Although this type of empirical strategy is common practice to identify tasted-based discrimination (Ahmed & Hammarstedt, 2008; Bengtsson et al., 2012; Carlsson & Eriksson, 2015), I argue that such studies should pay more attention to discrimination based on legal status. Future studies could also shed light on immigrants' social networks using survey data to add valuable and specific information about the extent to which neighbourhoods' characteristics affect the nature and frequency of contacts immigrants have with their neighbours, but also about the type of resources immigrants are able to collect through their ethnic networks.

Although in the empirical work reported in this dissertation I could draw on a large amount of detailed information about neighbourhoods, I focused on neighbourhoods' socio-economic characteristics. The scope of this research could therefore be extended with the inclusion of more information about neighbourhoods' quality of life. This could include objective indicators of criminality, air pollution or provision of public services but could also involve survey measures of social cohesion and well-being aggregated at the neighbourhood level. Adding such data would not only allow researchers to extend the scope of this research but would also constitute a good strategy to investigate some of the causal pathways laid out in this thesis. In the same vein, more attention should be paid to immigrants' type of housing. As I expect the dynamics of housing market discrimination to be very different across housing sectors, it is essential to identify in future research whether immigrants rent a dwelling in the private sector or in social

housing. Similarly, more information on housing quality and satisfaction will be needed to better predict immigrants' residential mobility.

I argue in this thesis that immigrants draw important resources from their place of residency. Yet, neighbourhoods do not constitute the only relevant unit of measurement to determine social networks and life opportunities. Immigrants may also be influenced in various way by the people they meet at their workplace or by the types of activities they frequently engage in. These social structures may occur beyond immigrants' residential context. Therefore, it would be interesting to apply to different contexts some of the mechanisms outlined in this thesis by looking for instance at the types of contacts immigrants have within their workplace and beyond their neighbourhood.

Even though this thesis has touched upon the issue of immigrants' health, it does not cover the question of immigrants' utilisation of health services and, more specifically, does not investigate the extent to which immigrants' access and usage of health services are shaped by citizenship status and neighbourhoods' characteristics. Yet, previous studies have suggested that immigrants with an unsecure status are often reluctant to get in contact with health institutions from fear that this could lead to a risk of deportation (Aung et al., 2010; Ortega et al., 2007; Winters et al., 2018). Moreover, community resources may condition the extent to which immigrants make use of health services. Immigrants living in neighbourhoods with a low provision of health services may find it more difficult to have access to health care. Moreover, immigrants living in immigrant concentrated neighbourhoods may be more likely to receive relevant information about the health care system and may feel supported and encouraged to receive care in case of bad medical condition. Understanding how these concepts relate to one another could help developing a better understanding of immigrants' usage of health services and would also represent a great contribution to the literature on citizenship and neighbourhood effects.

This thesis furthermore exclusively focuses on 1st generation immigrants who were older than eighteen years old upon arrival, yet the mechanisms outlined may also apply to immigrants' who arrived at very young age – often referred as the 1.5 generation – and to the native-born descendants of immigrants – often referred as the 2nd generation. In theory, these later generations could also suffer from nationality-based discrimination and therefore benefit from citizenship acquisition to improve their residential mobility. Moreover, although they may not have the same needs as first-generation immigrants, the so-called 1.5 and

2nd generation may be able to capitalise on the resources present in their close environment to improve the quality of their life in the Netherlands (Labussière et al., 2021). The question to what extent these mechanisms apply to these two particular groups remains, however, unanswered at the moment.

Finally, the nature of the relation between citizenship acquisition and neighbourhood's context may be dependent on institutional conditions at the national level, thus making comparison with other countries very difficult. First, citizenship acquisition may matter to different extents as a function of citizenship regimes. One could argue, for instance, that immigrants living in countries with very restrictive naturalisation rules, including longer residency requirements, must rely more heavily on their ethnic networks to improve their socio-economic position. This could disincentivise immigrants to become Dutch citizens but could also result in a lack of desire to leave migrant concentrated areas. In the same vein, integration policies at the national and local level may matter to a considerable degree. More inclusive integration policies can encourage immigrants to become members of the national community, which could generate a greater desire to naturalise and a greater willingness to move to predominantly native neighbourhoods. Second, the mechanisms driving the relation between citizenship acquisition and neighbourhoods may operate differently depending on the structure of the housing market. Here, the Netherlands appears to stand apart from its European neighbours. In 2012, the country had the highest share of social housing in Europe (32%). As I expect citizenship to matter most particularly for private landlords, real estate agencies and mortgage lenders, one could expect the relevance of citizenship acquisition to be stronger in countries that have a lower share of social housing. Moreover, the Netherlands has a long history of social mixing which may have limited the geographic concentration of immigrant and low income in groups. Yet, different situations may apply elsewhere, and it would therefore be interesting to see whether these findings hold in a different context with higher rates of economic and migrant concentration.

Overall, I invite future studies to build upon the work that I have set out in this thesis using different empirical strategies and data that would allow to test with a greater degree of accuracy the mechanisms driving the relation between naturalisation and immigrants' residential context. Moreover, the scope of this this thesis could be expanded by paying greater attention to the question of immigrants' usage of health services, and by adding a focus on the situation of the so-called 1.5 and 2nd generations. More cross-national

research will be needed to better understand whether and how these findings, observed in the Dutch context, could be generalised to other immigrant receiving countries.

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Appendix A

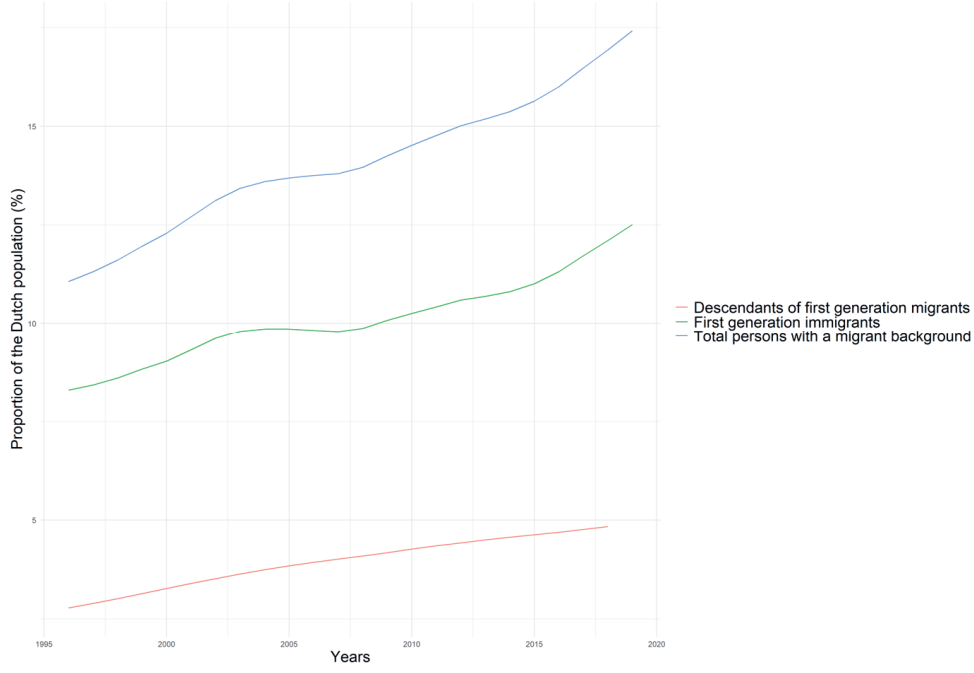
Supplementary materials Chapter 2

I. Descriptive statistics

A. Immigrant population and rates of neighbourhood concentration in the Netherlands

Figure A.1 displays the proportion of foreign-born residents and their descendants living in the Netherlands from 1996 to 2019. As shown in table A.1, only a small minority of neighbourhoods have, on average, a migrant concentration above 20% during the period 1996-2016. Moreover, concentrated neighbourhoods tend to be located in highly populated and urban areas (Table A.2 and A.3). However, a majority of immigrants from our four cohorts are located in neighbourhoods that have a proportion of persons with a migrant background higher than 20%.

Figure A. 1 Proportion of first-generation immigrants and their descendants (with two foreign-born parents) in the Netherlands over time



Source: Statistics Netherlands.

Table A. 1 Average migrant concentration between 1996 and 2016 in Dutch neighbourhoods

	Number of neighbourhoods	%
< 10%	8,034	68.7
10 - 19%	1,923	16.4
20 - 29 %	819	7.1
30 - 49%	635	5.4
50% or higher	286	2.4
	11,697	100

Source: Statistics Netherlands.

Table A. 2 Average migrant concentration by neighbourhood population

	< 10%	10 - 19%	20-29%	30 - 49%	> 50%
< 500 inhabitants	39.8%	13.0%	11.9%	12.5%	14.7%
500 – 1,000 inh.	19.8%	15.4%	11.6%	14.1%	11.7%
1,001 – 2,000 inh.	21.3%	28.2%	30.1%	25.1%	18.2%
2,001 – 5,000 inh.	16.4%	34.8%	34.0%	38.7%	35.1%
> 5,000 inhabitants	3.1%	8.7%	12.4%	9.6%	20.3%
Total	100%	100%	100%	100%	100%

Source: Statistics Netherlands.

Table A. 3 Average migrant concentration in Amsterdam, Rotterdam and the Hague

	Amsterdam		Rotterdam		The Hague	
	Number of neighbourhoods	%	Number of neighbourhoods	%	Number of neighbourhoods	%
< 10%	26	5.7	9	10.6	3	2.7
10 - 19%	52	11.5	17	20	23	20.9
20 - 29 %	119	26.3	12	14.1	31	28.2
30 - 49%	145	32.0	25	29.4	30	27.3
> 50%	111	24.5	22	25.9	23	20.9
	453	100	85	100	110	100

Source: Statistics Netherlands.

Table A. 4 Number of immigrants living in concentrated neighbourhoods (cohorts 96-97/2001-2002)

	N	%
< 10%	135,046	15.1
10 - 19%	183,870	20.6
20 - 29 %	173,641	19.5
30 - 49%	210,857	23.7
> 50%	187,867	21.1
Observations = 891,281		

Source: Statistics Netherlands.

B. Variable description

Table A.5 Variable description

Name	Nature	Within variation (std. dev.)
Naturalisation	Time variant	0.28
Neighbourhood's migrant concentration	Time variant	0.45
Proportion of co-nationals	Time variant	0.38
Proportion of persons with a migrant background within the same age category	Time variant	0.50
Proportion of naturalised migrants	Time variant	0.56
Gender	Time invariant	0
Migrant cohort	Time invariant	0
Age at migration	Time invariant	0
Employment status	Time variant	0.30
Partner status	Time variant	0.39
Migration motive	Time invariant	0
Urbanisation rate	Time variant	0.28
Neighbourhoods' employment rate	Time variant	0.56
Kauffman index	Time invariant	0
Human development index	Time invariant	0
Dual citizenship	Time variant	0.18
EU citizenship	Time invariant	0

Source: Statistics Netherlands.

Table A. 6 Descriptive statistics (naturalised/not naturalised) – individual characteristics

		All immigrants		Naturalised	
		N	%	N	%
Migrant cohort	Cohort - 1996	26,360	22.23	13,852	52.81
	Cohort - 1997	27,025	22.79	12,999	48.23
	Cohort - 2001	33,345	28.12	11,007	33.03
	Cohort - 2002	31,861	26.87	10,235	32.14
Gender	Female	57,629	48.59	21,930	38.16
	Male	60,962	51.41	26,163	42.97
Age at migration	Age at arrival (18 – 24)	30,467	25.69	13,029	42.84
	Age at arrival (25 – 39)	29,664	25.01	12,363	41.77
	Age at arrival (30 – 36)	30,309	25.56	13,080	43.25
	Age at arrival (37 – 96)	28,151	23.74	9,620	34.24
Migration motive	Family migrants	54,122	45.64	24,896	46.06
	Asylum	23,692	19.98	14,458	61.31
	Labour migration	22,330	18.83	3,201	14.36
	Study	11,800	9.95	3,349	28.41
	Other type	6,647	5.60	2,189	32.98
Employment	Employed	56,483	47.63	16,331	28.99
	Not Employed	62,108	52.37	31,762	51.22
EU	EU	94,678	79.84	2,098	8.80
	Non-EU	23,913	20.16	45,995	48.67
Kauffman index	First quartile (-2.68; -1.26)	31,737	26.76	19,423	61.41
	Second quartile (> -1.26; -0.21)	23,955	20.20	10,151	42.43
	Third quartile (> -0.21; 0.98)	26,661	22.48	13,832	51.94
	Fourth quartile (> 0.98; 1.72)	36,238	30.56	4,687	12.96
Human development index	First quartile (0.25 – 0.58)	33,709	28.42	18,958	56.35
	Second quartile (> 0.58 – 0.66)	28,973	24.42	15,386	53.24
	Third quartile (> 0.66 – 0.79)	19,370	16.33	8,089	41.80
	Fourth quartile (> 0.79 – 0.92)	36,539	30.81	5,660	15.53
Dual nationality	No automatic loss	29,199	24.61	32,790	36.78
	Automatic loss	89,392	75.39	15,273	52.37
Citizenship status of the partner	No partner	64,187	54.14	23,290	36.41
	Foreign partner	27,078	22.83	9,900	36.62
	Dutch partner	27,326	23.03	14,855	54.45
		Individuals = 118,591			

Source: Statistics Netherlands.

Table A. 7 Descriptive statistics (naturalised/not naturalised) – neighbourhood characteristics (at arrival)

		All immigrants		Naturalised		Level of measurement
		N	%	N	%	
Proportion of persons with a migrant background	First quartile (0 – 12.6%)	30,219	25.48	12,566	41.63	Buurt
	Second quartile (> 12.6 – 24.4%)	31,338	26.43	11,450	36.66	
	Third quartile (> 24.4 – 41.4%)	29,294	24.70	12,027	41.13	
	Fourth quartile (> 41.4 – 100%)	27,740	23.39	12,050	43.52	
Proportion of co-nationals	First quartile (0 – 0.19%)	32,939	27.78	14,356	43.67	Buurt
	Second quartile (> 0.19 – 0.56%)	29,685	25.03	12,120	40.96	
	Third quartile (> 0.56 – 2.62%)	28,735	24.23	11,101	38.73	
	Fourth quartile (> 2.62 – 50.7%)	27,232	22.96	10,516	38.64	
Proportion of persons with a migrant background within the same age category	First quartile (0 – 6.19%)	26,879	22.72	11,774	43.85	Buurt
	Second quartile (> 6.19 – 10.44%)	27,953	23.63	10,758	38.53	
	Third quartile (> 10.44 – 16.58%)	28,212	23.85	10,599	37.63	
	Fourth quartile (> 16.58 – 72.92%)	35,260	29.80	14,877	42.26	
Proportion of naturalised migrants	First quartile (0 – 51.7%)	39,794	33.59	10,754	27.07	Buurt
	Second quartile > 51.7 – 62.0%)	31,429	26.53	14,069	44.84	
	Third quartile (> 62.0 – 68.7%)	26,182	22.09	12,227	46.81	
	Fourth quartile (> 68.7% - 100%)	21,086	17.79	11,031	52.44	
Urbanisation rate	< than 500 inhabitants per sq km	2,220	1.92	740	34.94	Municipality
	Between 500 and 1000	7,937	6.65	3,321	42.47	
	Between 1000 and 1500	10,691	8.98	4,673	44.44	
	Between 1500 and 2500	37,441	31.59	16,254	43.57	
	> than 2500 inhabitants per sq km	60,302	50.96	22,951	38.14	
Rate of Employment	First quartile (0 – 0.35)	33,271	28.06	14,287	43.01	Municipality
	Second quartile (> 0.35 – 0.41)	28,567	24.09	12,527	43.99	
	Third quartile (> 0.41 – 0.46)	28,001	23.61	11,600	41.52	
	Fourth quartile (> 0.46 – 0.82)	28,752	24.24	9,679	33.71	
		Individuals = 118,591				

Source: Statistics Netherlands.

Table A. 8 Length of stay of naturalised and non-naturalised migrants

	Naturalised		Not Naturalised	
	N	%	N	%
5 years or less	678	1.41	18,439	26.23
Between 5 and 8 years	3,336	6.93	12,433	17.68
Between 8 and 11 years	3,719	7.71	6,293	8.94
11 years and more	40,473	83.95	33,220	47.13
Individuals = 118,591				

Source: Statistics Netherlands.

Table A. 9 Residential mobility in the observation period by migration motive

	Stayed in the same neighbourhood for the whole observation period	Resided in two different neighbourhoods	Resided in three different neighbourhoods	Resided in three different neighbourhoods or more
Family migrants	44%	35%	13%	8%
Refugees	34%	37%	19%	10%
Labour migrants	54%	31%	10%	5%
Others	44%	30%	14%	12%

Source: Statistics Netherlands.

Table A. 10 Frequency of contacts with individuals of Turkish origin as a function of neighbourhood characteristics

		Few contacts (Never-less often)	Moderate contacts (several times a year – a few times a month)	Regular contacts (several times a week – everyday)	Total
Proportion of co-nationals	First quartile	20.6 %	23.4 %	56 %	100%
	Second quartile	16.5 %	20.9 %	62.6 %	100%
	Third quartile	5.7%	30.5 %	63.8 %	100%
	Fourth quartile	0.7 %	29.6 %	69.7 %	100%
Spearman correlation coefficient: 0.14**					
Proportion of persons with a migrant background within the same age category	First quartile	19.7%	36.9%	43.4%	100%
	Second quartile	14.1%	29.6%	56.3%	100%
	Third quartile	5.7%	28.7%	65.6%	100%
	Fourth quartile	7.9%	23.7%	68.4%	100%
Spearman correlation coefficient: 0.21***					
N = 446					

Source: Statistics Netherlands and "New immigrant survey – The Netherlands" (Lubbers et al. 2018), first wave, question PPCO_NIS2NL. . *p < .05; **p < .01; ***p<0.001.

II. Cox proportional hazard models:

The following section includes all the models that are used in the analysis of the paper. All models are stratified by year of settlement.

Table A. 11 Stratified Cox proportional hazards model with shared frailty and IPTW on the risk of naturalisation

		Model 0: Frailty		Model 1 Frailty and IPTW (1)		Model 2: Frailty and IPTW (2)	
		Exp (Coeff)	Std Err	Exp(Coeff)	Std. Err.	Exp(Coeff)	Std. Err.
Gender	Female	Ref	Ref	Ref	Ref	Ref	Ref
	Male	1.17***	0.01	1.17***	0.01	1.15***	0.01
Age at arrival	Age at arrival (18 – 24)	Ref	Ref	Ref	Ref	Ref	Ref
	Age at arrival (25 – 29)	1.14***	0.01	1.15***	0.01	1.13***	0.01
	Age at arrival (30 – 36)	1.24***	0.02	1.25***	0.01	1.22***	0.01
	Age at arrival (37 – 96)	1.05***	0.01	1.07***	0.01	1.06***	0.01
Migration motive	Family migrants	Ref	Ref	Ref	Ref	Ref	Ref
	Asylum	1.68***	0.02	1.68***	0.02	1.57***	0.02
	Labour migration	0.85***	0.02	0.84***	0.02	0.81***	0.02
	Study migration	1.21***	0.02	1.20***	0.02	1.16***	0.02
	Other type	1.13***	0.03	1.14***	0.03	1.13***	0.02
Employed	Not employed	Ref	Ref	Ref	Ref	Ref	Ref
	Employed	1.55***	0.02	1.55***	0.02	1.55***	0.01
EU citizen	No	Ref	Ref	Ref	Ref	Ref	Ref
	Yes	0.32***	0.01	0.30***	0.01	0.29***	0.01
Kauffman Index	First quartile (-2.68 ; -1.26)	Ref	Ref	Ref	Ref	Ref	Ref
	Second quartile (> -1.26 ; -0.21)	0.80***	0.02	0.79***	0.02	0.76***	0.01
	Third quartile (> -0.21; 0.98)	0.87***	0.01	0.86***	0.01	0.90***	0.01
	Fourth quartile (> 0.98, 1.72)	0.36***	0.01	0.37***	0.01	0.38***	0.01
Human Development Index	First quartile (0.25 – 0.58)	Ref	Ref	Ref	Ref	Ref	Ref
	Second quartile (> 0.58 – 0.66)	1.08***	0.01	1.07***	0.01	1.05***	0.01
	Third quartile (> 0.66 – 0.79)	0.69***	0.01	0.70***	0.02	0.81***	0.01
	Fourth quartile (> 0.79 – 0.92)	1.21***	0.03	1.24***	0.03	1.19***	0.02
Dual citizenship acceptance	Not allowed	Ref	Ref	Ref	Ref	Ref	Ref
	Allowed	1.03	0.02	1.02	0.02	1.07**	0.01

Citizenship status of the partner	No partner	Ref	Ref	Ref	Ref	Ref	Ref
	Foreign-born partner	0.47***	0.01	0.45***	0.01	0.48***	0.01
	Dutch partner	1.56***	0.02	1.57***	0.02	1.62***	0.02
Urbanisation rate	< than 500 inhabitants per sq km	Ref	Ref	Ref	Ref	Ref	Ref
	Between 500 and 1000	1.05***	0.02	1.05***	0.01	1.07***	0.01
	Between 1000 and 1500	1.00	0.02	0.98	0.02	1.02	0.01
	Between 1500 and 2500	1.00	0.02	0.99	0.02	1.03	0.02
	> than 2500 inhabitants per sq km	0.87***	0.02	0.84***	0.03	0.90***	0.03
Rate of Employment (neighbourhood)	First quartile (0 – 0.35)	Ref	Ref	Ref	Ref	Ref	Ref
	Second quartile (> 0.35 – 0.41)	1.02	0.01	1.02	0.02	1.00	0.01
	Third quartile (> 0.41 – 0.46)	1.02	0.01	1.00	0.02	0.97	0.01
	Fourth quartile (> 0.46 – 0.82)	0.99	0.02	0.99	0.02	0.95*	0.01
Proportion of persons with a migrant background	First quartile (0 – 12.6%)	Ref	Ref	Ref	Ref	Ref	Ref
	Second quartile (> 12.6 – 24.4%)	0.90***	0.02	0.90***	0.02	0.97***	0.01
	Third quartile (> 24.4 – 41.4%)	0.89***	0.01	0.90***	0.02	1.03***	0.01
	Fourth quartile (> 41.4 – 100%)	0.84***	0.02	0.87***	0.02	1.04***	0.01
Proportion of co-nationals	First quartile (0 – 0.19%)	Ref	Ref	Ref	Ref	Ref	Ref
	Second quartile (> 0.19 – 0.56%)	-	-	-	-	0.94***	0.01
	Third quartile (> 0.56 – 2.62%)	-	-	-	-	0.78***	0.01
	Fourth quartile (> 2.62 – 50.7%)	-	-	-	-	0.60***	0.01
Proportion of persons with a migrant background within the same age category	First quartile (0 – 6.19%)	Ref	Ref	Ref	Ref	Ref	Ref
	Second quartile (> 6.19 – 10.44%)	-	-	-	-	0.90***	0.01
	Third quartile (> 10.44 – 16.58%)	-	-	-	-	0.85***	0.01
	Fourth quartile (> 16.58 – 72.92%)	-	-	-	-	0.84***	0.02
Observations=891,281; Individuals= 118,591; Events = 48,090							
				Standard deviation of the random effect = 0.27; Variance of the random effect = 0.07		Standard deviation of the random effect = 0.27; Variance of the random effect = 0.07	

Source: Statistics Netherlands. *p < .05; **p < .01; ***p<0.001. The model is stratified by cohorts

Table A. 12 Stratified Cox proportional hazards regression with shared frailty and IPTW on the risk of naturalisation – sub-groups (1)

		Model 3: Turkish and Moroccan immigrants excluded		Model 4: Belgian and German immigrants excluded	
		Exp(Coeff)	Std. Err.	Exp(Coeff)	Std. Err.
Gender	Female	Ref	Ref	Ref	Ref
	Male	1.23***	0.01	1.15***	0.01
Age at arrival	Age at arrival (18 – 24)	Ref	Ref	Ref	Ref
	Age at arrival (25 – 29)	1.06***	0.01	1.13***	0.01
	Age at arrival (30 – 36)	1.08***	0.01	1.22***	0.01
	Age at arrival (37 – 96)	1.00	0.01	1.06***	0.01
Migration type	Family migrants	Ref	Ref	Ref	Ref
	Asylum	1.42***	0.01	1.57***	0.02
	Labour migration	0.68***	0.01	0.81***	0.02
	Study migration	1.02	0.01	1.16***	0.02
	Other type	1.02	0.05	1.16***	0.02
Employed	Not employed	Ref	Ref	Ref	Ref
	Employed	1.55***	0.01	1.55***	0.01
EU citizen	No	Ref	Ref	Ref	Ref
	Yes	0.33***	0.01	0.32***	0.01
Kauffman Index	First quartile (-2.68 ; -1.26)	Ref	Ref	Ref	Ref
	Second quartile (> -1.26 ; -0.21)	0.87***	0.01	0.76***	0.01
	Third quartile (> -0.21; 0.98)	0.87***	0.01	0.90***	0.01
	Fourth quartile (> 0.98, 1.72)	0.38***	0.01	0.39***	0.01
Human Development Index	First quartile (0.25 – 0.58)	Ref	Ref	Ref	Ref
	Second quartile (> 0.58 – 0.66)	1.03**	0.01	1.05***	0.01
	Third quartile (> 0.66 – 0.79)	1.30***	0.02	0.81***	0.02
	Fourth quartile (> 0.79 – 0.92)	1.11***	0.02	1.18***	0.03
Dual citizenship acceptance	Not allowed	Ref	Ref	Ref	Ref
	Allowed	1.20***	0.01	1.07***	0.01

Citizenship status of the partner	No partner	Ref	Ref	Ref	Ref
	Foreign-born partner	0.53***	0.01	0.47***	0.01
	Dutch partner	1.82***	0.03	1.62***	0.02
Urbanisation rate	< than 500 inhabitants per sq km	Ref	Ref	Ref	Ref
	Between 500 and 1000	1.05***	0.01	1.08***	0.01
	Between 1000 and 1500	1.02	0.01	1.02*	0.02
	Between 1500 and 2500	1.00	0.02	1.04*	0.02
	> than 2500 inhabitants per sq km	0.84***	0.03	0.93*	0.04
Rate of Employment (buurt level)	First quartile (0 – 0.35)	Ref.	Ref	Ref.	Ref
	Second quartile (> 0.35 – 0.41)	1.03**	0.01	1.00	0.01
	Third quartile (> 0.41 – 0.46)	1.00	0.01	0.98*	0.01
	Fourth quartile (> 0.46 – 0.82)	0.94***	0.01	0.95***	0.01
Proportion of persons with a migrant background	First quartile (0 – 12.6%)	Ref	Ref	Ref	Ref
	Second quartile (> 12.6 – 24.4%)	0.92***	0.01	0.97***	0.01
	Third quartile (> 24.4 – 41.4%)	0.97**	0.01	1.04***	0.01
	Fourth quartile (> 41.4 – 100%)	0.97**	0.01	1.05***	0.01
Proportion of co-nationals	First quartile (0 – 0.19%)	Ref	Ref	Ref	Ref
	Second quartile (> 0.19 – 0.56%)	0.96***	0.01	0.95***	0.01
	Third quartile (> 0.56 – 2.62%)	0.87***	0.01	0.78***	0.01
	Fourth quartile (> 2.62 – 50.7%)	0.96*	0.02	0.61***	0.01
Proportion of persons with a migrant background within the same age category	First quartile (0 – 6.19%)	Ref	Ref	Ref	Ref
	Second quartile (> 6.19 – 10.44%)	0.88***	0.01	0.90***	0.01
	Third quartile (> 10.44 – 16.58%)	0.83***	0.01	0.85***	0.01
	Fourth quartile (> 16.58 – 72.92%)	0.82***	0.02	0.87***	0.01
		Observations= 650,734; Individuals= 92,089; Events = 36,760		Observations= 866,946; Individuals= 115,114; Events = 47,924	
		Standard deviation of the random effect = 0.31; Variance of the random effect = 0.10		Standard deviation of the random effect = 0.29; Variance of the random effect = 0.08	

Source: Statistics Netherlands. *p < .05; **p < .01; ***p<0.001. The model is stratified by cohorts.

Table A. 13 Stratified Cox proportional hazards regression with shared frailty and IPTW on the risk of naturalisation -sub-groups (2)

		Model 5: Family migrants		Model 6: Refugees		Model 7: Labour migrants		Model 8: Others		Model 9: Refugees (stayed in the same neighbourhood)	
		Exp(Coeff)	Std. Err.	Exp(Coeff)	Std. Err.	Exp(Coeff)	Std. Err.	Exp(Coeff)	Std. Err.	Exp (Coeff)	Std. Err.
Gender	Female	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	Male	1.04***	0.01	1.18***	0.01	1.12***	0.03	1.32***	0.03	1.20***	0.02
Age at arrival	Age at arrival (18 – 24)	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	Age at arrival (25 – 29)	1.07***	0.01	1.12***	0.02	1.02	0.05	1.13***	0.03	1.16***	0.03
	Age at arrival (30 – 36)	1.06***	0.01	1.19***	0.02	0.99	0.05	1.29***	0.04	1.25***	0.03
	Age at arrival (37 – 96)	0.82***	0.02	1.18***	0.02	0.76***	0.04	1.06	0.04	1.26***	0.03
Employed	Not employed	Ref	Ref	Ref	Ref	Ref	Ref	ref	Ref	Ref	Ref
	Employed	1.40***	0.01	1.51***	0.02	1.09***	0.03	2.37***	0.05	1.54***	0.02
EU citizen	No	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	Yes	0.37***	0.01	-	-	0.29***	0.01	0.34***	0.01	-	-
Kauffman Index	First quartile (-2.68 ; -1.26)	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	Second quartile (> -1.26 ; -0.21)	0.74***	0.02	0.79***	0.03	0.93***	0.05	0.78***	0.03	0.76***	0.03
	Third quartile (> -0.21; 0.98)	0.85***	0.01	0.92***	0.02	1.08***	0.04	0.90***	0.03	0.89**	0.03
	Fourth quartile (> 0.98, 1.72)	0.41***	0.01	0.57***	0.03	0.28***	0.02	0.41***	0.01	0.64***	0.05
Human Development Index	First quartile (0.25 – 0.58)	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	Second quartile (> 0.58 – 0.66)	1.05***	0.01	0.96***	0.01	1.14***	0.05	0.90***	0.03	0.99	0.02
	Third quartile (> 0.66 – 0.79)	0.66***	0.01	1.35***	0.05	0.94*	0.04	1.03	0.04	1.51***	0.07
	Fourth quartile (> 0.79 – 0.92)	1.21***	0.02	0.86***	0.05	0.96*	0.05	1.02	0.04	0.95	0.07
Dual citizenship acceptance	Not allowed	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	Allowed	1.00	0.01	1.24***	0.03	1.33***	0.05	1.08***	0.03	1.21***	0.03

Citizenship status of the partner	No partner	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	Foreign-born partner	0.39***	0.01	0.64***	0.01	0.30***	0.01	0.47***	0.02	0.62***	0.01
	Dutch partner	1.22***	0.02	2.03***	0.04	1.76***	0.07	1.91***	0.05	2.14***	0.06
Urbanisation rate	< than 500 inhabitants per sq km	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	Between 500 and 1000	1.09***	0.01	0.95**	0.01	1.16***	0.04	1.12***	0.03	0.94***	0.02
	Between 1000 and 1500	1.04*	0.02	0.87***	0.02	1.17***	0.06	1.31***	0.05	0.86***	0.02
	Between 1500 and 2500	1.10***	0.02	0.80***	0.02	1.39***	0.09	1.35***	0.06	0.79***	0.02
	> than 2500 inhabitants per sq km	0.98	0.04	0.65***	0.07	1.22	0.15	1.06	0.09	0.62***	0.03
Rate of Employment (buurt level)	First quartile (0 – 0.35)	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	Second quartile (> 0.35 – 0.41)	0.97*	0.01	1.02	0.02	0.99	0.04	1.04	0.03	1.03	0.03
	Third quartile (> 0.41 – 0.46)	0.92***	0.01	1.05**	0.02	0.91***	0.04	1.08***	0.03	1.07**	0.03
	Fourth quartile (> 0.46 – 0.82)	0.92***	0.01	1.03	0.02	0.90***	0.04	1.06**	0.03	1.02	0.03
Proportion of persons with a migrant background	First quartile (0 – 12.6%)	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	Second quartile (> 12.6 – 24.4%)	1.03*	0.01	0.94***	0.02	0.84***	0.03	0.92*	0.03	0.91***	0.03
	Third quartile (> 24.4 – 41.4%)	1.09***	0.02	1.00	0.02	0.93*	0.04	0.94**	0.03	0.99	0.03
	Fourth quartile (> 41.4 – 100%)	1.11***	0.02	0.93***	0.02	1.03	0.05	1.06	0.04	0.93*	0.04
Proportion of co-nationals	First quartile (0 – 0.19%)	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	Second quartile (> 0.19 – 0.56%)	0.97*	0.01	0.99	0.01	0.87***	0.03	0.87***	0.02	0.97*	0.02
	Third quartile (> 0.56 – 2.62%)	0.76***	0.02	1.00	0.02	0.70***	0.03	0.62***	0.02	0.95**	0.03
	Fourth quartile (> 2.62 – 50.7%)	0.63***	0.02	0.72***	0.02	0.67***	0.03	0.71***	0.02	0.67***	0.04

Proportion of persons with a migrant background within the same age category	First quartile (0 – 6.19%)	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	Second quartile (> 6.19 – 10.44%)	0.95***	0.02	0.93***	0.01	0.83***	0.04	0.89***	0.03	0.94***	0.02
	Third quartile (> 10.44 – 16.58%)	0.90***	0.02	0.94*	0.02	0.78***	0.04	0.77***	0.03	0.94***	0.03
	Fourth quartile (> 16.58 – 72.92%)	0.93***	0.02	0.91***	0.02	0.74***	0.05	0.80***	0.04	0.88***	0.04
		Observations = 455,820; Individuals= 54,147; Events = 24,899		Observations = 179,015; Individuals = 23,663; Events = 14,424		Observations = 137,302; Individuals = 22,421; Events = 3,197		Observations = 119,144; Individuals = 18,360 Events = 5,570		Observations = 62,532 Individuals = 10,692 Events = 5,119	

Source: Statistics Netherlands. *p < .05; **p < .01; ***p<0.001. The model is stratified by cohorts.

Table A.14. Stratified Cox proportional hazards regression with shared frailty and IPTW with interaction.

		Model 10		Model 11		Model 12		Model 13	
		Exp(Coeff)	Std. Err.	Exp(Coeff)	Std. Err.	Exp(Coeff)	Std. Err.	Exp(Coeff)	Std. Err.
Proportion of naturalised migrants	First quartile (0 – 52%)	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	Second quartile (> 52 - 62%)	1.42***	0.02	1.34***	0.02	1.38***	0.01	1.33***	0.01
	Third quartile (> 62 – 69%)	1.49***	0.02	1.47***	0.02	1.45***	0.02	1.34***	0.02
	Fourth quartile (> 69 – 100%)	1.74***	0.02	1.69***	0.02	1.70***	0.02	1.55***	0.02
Proportion of persons with a migrant background	Low proportion (below median)	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	High proportion (below median)	0.95***	0.01	0.90***	0.01	-	-	-	-
Proportion of co-nationals	Low proportion (below the median value)	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	High proportion (below the median value)	-	-	-	-	0.75***	0.01	0.66**	0.01
Proportion of naturalised migrants*Proportion of persons with a migrant background	First quartile*High proportion	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	Second quartile*High proportion	-	-	1.05**	0.02	-	-	-	
	Third quartile*High proportion	-	-	1.07***	0.02	-	-	-	-
	Fourth quartile*High proportion	-	-	1.13***	0.03	-	-	-	
Rate of naturalised migrants* Proportion of persons with a migrant background	First quartile*High proportion	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	Second quartile*High proportion	-	-	-	-	-	-	1.10***	0.02
	Third quartile*High proportion	-	-	-	-	-	-	1.19***	0.02
	Fourth quartile*High proportion	-	-	-	-	-	-	1.24***	0.03
Gender	Female	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	Male	1.15***	0.01	1.14***	0.01	1.14***	0.01	1.12***	0.01
Age at arrival	Age at arrival (18 – 24)	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	Age at arrival (25 – 29)	1.15***	0.01	1.14***	0.01	1.16***	0.01	1.14***	0.01
	Age at arrival (30 – 36)	1.25***	0.01	1.23***	0.01	1.23***	0.01	1.20***	0.01
	Age at arrival (37 – 96)	1.06***	0.01	1.06***	0.01	1.06***	0.01	1.08***	0.01
Migration type	Family migrants	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	Asylum	1.67***	0.02	1.61***	0.02	1.57***	0.02	1.59***	0.02

	Labour migration	0.88***	0.01	0.85***	0.01	0.84***	0.01	0.86***	0.01
	Study migration	1.24***	0.02	1.25***	0.02	1.19***	0.02	1.26***	0.02
	Other type	1.17***	0.01	1.15***	0.01	1.13***	0.01	1.15***	0.01
Employed	Not employed	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	Employed	1.52***	0.01	1.52***	0.01	1.56***	0.01	1.53***	0.01
EU citizen	No	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	Yes	0.31***	0.01	0.30***	0.01	0.32***	0.01	0.31***	0.01
Kauffman Index	First quartile (-2.68 ; -1.26)	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	Second quartile (> -1.26 ; -0.21)	0.75***	0.01	0.76***	0.01	0.72***	0.01	0.76***	0.01
	Third quartile (> -0.21; 0.98)	0.88***	0.01	0.88***	0.01	0.88***	0.01	0.88***	0.01
	Fourth quartile (> 0.98, 1.72)	0.39***	0.01	0.38***	0.01	0.37***	0.01	0.38***	0.01
Human Development Index	First quartile (0.25 – 0.58)	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	Second quartile (> 0.58 – 0.66)	1.08***	0.01	1.06***	0.01	1.07***	0.01	1.07***	0.01
	Third quartile (> 0.66 – 0.79)	0.78***	0.01	0.77***	0.01	0.79***	0.01	0.76***	0.01
	Fourth quartile (> 0.79 – 0.92)	1.21***	0.03	1.20***	0.03	1.29***	0.03	1.21***	0.03
Dual citizenship acceptance	Not allowed	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	Allowed	1.06*	0.02	1.06*	0.02	1.05*	0.02	1.06*	0.02
Citizenship status of the partner	No partner	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	Foreign-born partner	0.45***	0.01	0.47***	0.01	0.47***	0.01	0.47***	0.01
	Dutch partner	1.50***	0.01	1.54***	0.01	1.63***	0.01	1.56***	0.02
Urbanisation rate	< than 500 inhabitants per sq km	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	Between 500 and 1000	1.08***	0.01	1.09***	0.01	1.07***	0.01	1.08***	0.01
	Between 1000 and 1500	1.03*	0.02	1.03*	0.02	1.02	0.02	1.03	0.02
	Between 1500 and 2500	1.11***	0.02	1.09***	0.02	1.06***	0.02	1.09***	0.02
	> than 2500 inhabitants per sq km	1.06***	0.03	1.04***	0.03	0.94***	0.03	1.04	0.03
Rate of Employment (neighbourhood)	First quartile (0 – 0.35)	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	Second quartile (> 0.35 – 0.41)	1.05	0.02	1.01	0.02	1.01	0.01	1.02*	0.01
	Third quartile (> 0.41 – 0.46)	1.05	0.02	1.01	0.02	0.98	0.01	1.02	0.01
	Fourth quartile (> 0.46 – 0.82)	1.06	0.02	1.00	0.02	0.96	0.01	1.01	0.01
Observations= 891 281; Individuals= 118 591; Events = 48 090									
Standard deviation of the random effect = 0.23; Variance of the random effect = 0.05									

Source: Statistics Netherlands. *p < .05; **p < .01; ***p<0.001. The model is stratified by cohorts.

III. Robustness checks

We perform robustness checks to test the validity of the results of our main analyses. Table A.15 includes two regression models using an alternative measure of persons of migrant background and co-nationals. In contrast with our main models, we coded this time immigrants' descendants born with a Dutch parent according to the country code of their foreign parent. Using these alternative measurements did not substantially change the value of our estimates. The outcome of the regression can be found in the supplementary materials. Table A.16 and Table A.17 include several regression models that use a different measure of IPTW that is based on neighbourhoods' proportion of co-nationals. The outcomes of these models are largely similar to the ones obtained with our initial measure of IPTW. The models stratified by country of origin are included in tables A.18 and A.19.

Table A. 14 Stratified Cox proportional hazards regression with shared frailty and IPTW on the risk of naturalisation - Alternative measure of neighbourhood concentrations

			Model A.1
		Exp(Coeff)	Std. Err.
Proportion of persons with a migrant background	First quartile (0 – 19.2%)	Ref	Ref
	Second quartile (> 19.2 – 31.5%)	0.96***	0.01
	Third quartile (> 31.5 – 47.8%)	1.02	0.01
	Fourth quartile (> 47.8 – 100%)	1.04*	0.01
Proportion of co-nationals	First quartile (0 - 0.24%)	Ref	Ref
	Second quartile (> 0.24 – 0.74%)	0.94***	0.01
	Third quartile (> 0.74 – 3.16%)	0.77***	0.01
	Fourth quartile (> 3.16 – 55.5%)	0.60***	0.01
Proportion of persons with a migrant background within the same age category	First quartile (0 – 6.19%)	Ref	Ref
	Second quartile (> 6.19 – 10.44%)	0.88***	0.01
	Third quartile (> 10.44 – 16.58%)	0.82***	0.01
	Fourth quartile (> 16.58 – 72.92%)	0.82***	0.01
		Standard deviation of the random effect = 0.29; Variance of the random effect = 0.08	

Source: Statistics Netherlands. *p < .05; **p < .01; ***p<0.001.
This model additionally controls for gender, age at arrival, migration motive, employment status, citizenship status of the partner, level of stability of the origin country, level of development of the origin country, EU citizenship, dual citizenship law of both the origin country and the Netherlands, the degree of urbanisation of the neighbourhood and the level of employment of the neighbourhood. The models are stratified by cohorts.

Table A. 15 Stratified Cox proportional hazards regression with shared frailty and alternative IPTW

		Model A.2	
		Exp(Coeff)	Std. Err.
Proportion of persons with a migrant background	First quartile (0 – 12.6%)	Ref	Ref
	Second quartile (> 12.6 – 24.4%)	0.97**	0.01
	Third quartile (> 24.4 – 41.4%)	1.03*	0.01
	Fourth quartile (> 41.4 – 100%)	1.03*	0.01
Proportion of co-nationals	First quartile (0 – 0.19%)	Ref	Ref
	Second quartile (> 0.19 – 0.56%)	0.95***	0.01
	Third quartile (> 0.56 – 2.62%)	0.77***	0.01
	Fourth quartile (> 2.62 – 50.7%)	0.61***	0.01
Proportion of persons with a migrant background within the same age category	First quartile (0 – 6.19%)	Ref	Ref
	Second quartile (> 6.19 – 10.44%)	0.89***	0.01
	Third quartile (> 10.44 – 16.58%)	0.85***	0.01
	Fourth quartile (> 16.58 – 72.92%)	0.83***	0.01
		Standard deviation of the random effect = 0.29; Variance of the random effect = 0.08	

Source: Statistics Netherlands. *p < .05; **p < .01; ***p<0.001.
This model additionally controls for gender, age at arrival, migration motive, employment status, citizenship status of the partner, level of stability of the origin country, level of development of the origin country, EU citizenship, dual citizenship law of both the origin country and the Netherlands, the degree of urbanisation of the neighbourhood and the level of employment of the neighbourhood. The models are stratified by cohorts.

Table A. 17 Stratified Cox proportional hazards regression with shared frailty and alternative IPTW with interactions

		Model A.3		Model A.4		Model A.5		Model A.6	
		Exp(Coeff)	Std. Err.	Exp(Coeff)	Std. Err.	Exp(Coeff)	Std. Err.	Exp(Coeff)	Std. Err.
Proportion of naturalised migrants	First quartile (0 – 52%)	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	Second quartile (> 52 - 62%)	1.42***	0.02	1.33***	0.03	1.36***	0.01	1.30***	0.01
	Third quartile (> 62 – 69%)	1.48***	0.02	1.47***	0.03	1.41***	0.02	1.38***	0.02
	Fourth quartile (> 69 – 100%)	1.73***	0.02	1.70***	0.03	1.58***	0.02	1.52***	0.02
Proportion of persons with a migrant background	Low proportion (below the median value)	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	High proportion (below the median value)	0.95***	0.01	0.91***	0.02	-	-	-	-
Proportion of co-nationals	Low proportion (below the median value)	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	High proportion (below the median value)	-	-	-	-	0.74***	0.01	0.65**	0.01
Rate of naturalised migrants *Proportion of persons with a migrant background	First quartile*High proportion	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	Second quartile*High proportion	-	-	1.04**	0.03	-	-	-	-
	Third quartile*High proportion	-	-	1.06***	0.03	-	-	-	-
	Fourth quartile*High proportion	-	-	1.13***	0.03	-	-	-	-
Rate of naturalised migrants* Proportion of co-nationals	First quartile*High proportion	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	Second quartile*High proportion	-	-	-	-	-	-	1.05**	0.02
	Third quartile*High proportion	-	-	-	-	-	-	1.13***	0.02
	Fourth quartile*High proportion	-	-	-	-	-	-	1.18***	0.03
Observations= 891 281; Individuals= 118 591; Events = 48 090 Standard deviation of the random effect = 0.23; Variance of the random effect = 0.05									

Source: Statistics Netherlands. *p < .05; **p < .01; ***p<0.001. This model additionally controls for gender, age at arrival, migration type, employment status, citizenship status of the partner, level of stability of the origin country, level of development of the origin country, EU citizenship, dual citizenship law of both the origin country and the Netherlands, the degree of urbanisation of the neighbourhood and the level of employment of the neighbourhood. The models are stratified by cohorts..

Table A. 16 Stratified Cox proportional hazards regression with shared frailty and IPTW (stratified by country of origin)

			Model A.5
		Exp(Coeff)	Std. Err.
Proportion of persons with a migrant background	First quartile (0 – 12.6%)	Ref	Ref
	Second quartile (> 12.6 – 24.4%)	0.94***	0.01
	Third quartile (> 24.4 – 41.4%)	0.96**	0.02
	Fourth quartile (> 41.4 – 100%)	0.96*	0.02
Proportion of co-nationals	First quartile (0 – 0.19%)	Ref	Ref
	Second quartile (> 0.19 – 0.56%)	0.95***	0.01
	Third quartile (> 0.56 – 2.62%)	0.89***	0.89
	Fourth quartile (> 2.62 – 50.7%)	0.72***	0.72
Proportion of persons with a migrant background within the same age category	First quartile (0 – 6.19%)	Ref	Ref
	Second quartile (> 6.19 – 10.44%)	0.93***	0.01
	Third quartile (> 10.44 – 16.58%)	0.89***	0.01
	Fourth quartile (> 16.58 – 72.92%)	0.88***	0.01
		Standard deviation of the random effect = 0.29; Variance of the random effect = 0.08	

Source: Statistics Netherlands. *p < .05; **p < .01; ***p<0.001. This model additionally controls for gender, age at arrival, migration motive, employment status, citizenship status of the partner, dual citizenship law of both the origin country and the Netherlands, the degree of urbanisation of the neighbourhood and the level of employment of the neighbourhood. The models are stratified by cohorts and country of origin.

Table A. 17 Stratified Cox proportional hazards regression with shared frailty and IPTW with interactions (stratified by country of origin)

		Model A.8		Model A.9		Model A.10		Model A.11	
		Exp(Coeff)	Std. Err.	Exp(Coeff)	Std. Err.	Exp(Coeff)	Std. Err.	Exp(Coeff)	Std. Err.
Proportion of naturalised migrants	First quartile (0 – 52%)	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	Second quartile (> 52 - 62%)	1.26***	0.02	1.26***	0.02	1.38***	0.01	1.30***	0.01
	Third quartile (> 62 – 69%)	1.35***	0.03	1.37***	0.03	1.44***	0.02	1.31***	0.02
	Fourth quartile (> 69 – 100%)	1.51***	0.03	1.53***	0.03	1.60***	0.02	1.52***	0.02
Proportion of persons with a migrant background	Low proportion (below the median value)	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	High proportion (below the median value)	0.95***	0.02	0.90***	0.01	-	-	-	-
Proportion of co-nationals	Low proportion (below the median value)	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	High proportion (below the median value)	-	-	-	-	0.74***	0.01	0.65**	0.01
Rate of naturalised migrants *Proportion of persons with a migrant background	First quartile*High proportion	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	Second quartile*High proportion	-	-	1.02	0.03	-	-	-	-
	Third quartile*High proportion	-	-	1.04*	0.03	-	-	-	-
	Fourth quartile *High proportion	-	-	1.13***	0.03	-	-	-	-
Rate of naturalised migrants*Proportion of co-nationals	First quartile*High proportion	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	Second quartile*High proportion	-	-	-	-	-	-	1.07**	0.02
	Third quartile*High proportion	-	-	-	-	-	-	1.16***	0.02
	Fourth quartile*High proportion	-	-	-	-	-	-	1.20***	0.03
Standard deviation of the random effect = 0.23; Variance of the random effect = 0.05									

Source: Statistics Netherlands. *p < .05; **p < .01; ***p<0.001. This model additionally controls for gender, age at arrival, migration type, employment status, citizenship status of the partner, level of stability of the origin country, level of development of the origin country, EU citizenship, dual citizenship law of both the origin country and the Netherlands, the degree of urbanisation of the neighbourhood and the level of employment of the neighbourhood. The models are stratified by cohorts and country of origin.

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IV. IPTW analysis:

We estimate the propensity scores using a multinomial logistic regression in which the exposure to different degrees of the treatment variable is regressed on a range of observed covariates. In this paper, we follow the suggestion of Caliendo and Kopeinig (2008, 6) and only include in our propensity score model the variables that influence simultaneously the treatment variable (different degrees of migrant concentration of the neighbourhood upon arrival) and the outcome variable (naturalisation).

The propensity score regression therefore controls for gender, age at arrival, migration motive, employment status, EU citizenship, citizenship status of the partner and level of development of the origin country, household income level, homeowner and number of minor children living within the household. Moreover, the treatment variable is measured with a factor variable that expresses the different degrees of proportion of individuals with a migrant background. This variable is cut across quartiles and has four categories. Once we have derived the propensity scores, we then calculate the IPTW with the following formula (Guo and Fraser 2015):

For the first category of migrant concentration:

$$\text{Inverse propensity score weights} = \left(\frac{1}{\text{Propensity Score of the first quartile}}\right)$$

For the second category of migrant concentration:

$$\text{Inverse propensity score weights} = \left(\frac{1}{\text{Propensity Score of the second quartile}}\right)$$

For the third category of migrant concentration:

$$\text{Inverse propensity score weights} = \left(\frac{1}{\text{Propensity Score of the third quartile}}\right)$$

For the fourth category of migrant concentration:

$$\text{Inverse propensity score weights} = \left(\frac{1}{\text{Propensity Score of the fourth quartile}}\right)$$

The outcome of the propensity score regression is displayed in table A.20. As shown in table A.21, the value of the IPTW range from 1.85 to 16.63, with a median value of 3.75. Table A.22 displays the data balance before and after the ITWP adjustment. Individuals who initially moved into neighbourhoods with different levels of migrant concentration differed significantly in terms of gender, age at arrival, migration motive, employment, EU citizenship, level of development of the origin

country, partner's status, household income level, homeownership and number of children within the household (first column). These differences however vanish after we include the IPTW (second column).

We execute the same procedure when calculating the propensity scores of the concentration of co-nationals (Table A.16 and A.17).

Table A. 20 Logistic regression used to crease propensity scores

		Base outcome = Rate of persons with a migrant background – first quartile					
		Second quartile		Third quartile		Fourth quartile	
		Coeff.	Std Err.	Coeff.	Std Err.	Coeff.	Std Err.
Gender	Female	Ref	Ref	Ref	Ref	Ref	Ref
	Male	-0.19***	0.02	-0.28		-0.32***	0.02
Age at arrival	Age at arrival (18 – 24)	Ref	Ref	Ref	Ref	Ref	Ref
	Age at arrival (25 – 29)	-0.01	0.02	-0.11***	0.02	-0.27***	0.02
	Age at arrival (30 – 36)	-0.01	0.02	-0.18***	0.02	-0.34***	0.02
	Age at arrival (37 – 96)	-0.13***	0.02	-0.31***	0.03	-0.40***	0.03
Migration motive	Family motive	Ref	Ref	Ref	Ref	Ref	Ref
	Asylum	-0.12***	0.03	-0.10***	0.03	-0.08	0.03
	Labour migration	0.28***	0.03	0.22***	0.03	-0.03	0.03
	Study migration	0.36***	0.03	0.50***	0.03	0.16***	0.03
	Other motive	-0.01	0.04	-0.10**	0.04	-0.09*	0.04
Employed	Not employed	Ref	Ref	Ref	Ref	Ref0	Ref
	Employed	-0.18***	0.02	0.26***	0.02	-0.32***	0.20
EU citizen	No	Ref	Ref	Ref	Ref	Ref	Ref
	Yes	-0.53***	0.03	-0.43***	0.02	-0.43***	0.02
Kauffman Index	First quartile (-2.68 ; -1.26)	Ref	Ref	Ref	Ref	Ref	Ref
	Second quartile (> -1.26 ; -0.21)	0.18***	0.04	0.22***	0.04	0.52***	
	Third quartile (> -0.21; 0.98)	0.04	0.03	0.10***	0.03	0.50***	
	Fourth quartile (> 0.98, 1.72)	0.20***	0.03	0.11***	0.03	0.20***	
Human Development Index	First quartile (0.25 – 0.58)	Ref	Ref	Ref	Ref	Ref	Ref
	Second quartile (> 0.58 – 0.66)	-0.28***	0.03	-0.38***	0.03	-0.69***	0.03
	Third quartile (> 0.66 – 0.79)	-0.04	0.04	-0.11***	0.04	-0.24***	0.04
	Fourth quartile (> 0.79 – 0.92)	0.03	0.04	-0.26***	0.04	-0.83***	0.04
Citizenship status of the partner	No partner	Ref	Ref	Ref	Ref	Ref	Ref
	Foreign-born partner	0.22***	0.02	0.34***	0.02	0.11***	0.02
	Dutch partner	0.24***	0.03	0.49***	0.03	0.63***	0.03
Homeowner	No	Ref	Ref	Ref	Ref	Ref	Ref
	Yes	0.14***	0.02	-0.31***	0.02	-0.43***	
Standardized household income	First quartile	Ref	Ref	Ref	Ref	Ref	Ref
	Second quartile	-0.06*	0.02	-0.04	0.02	-0.05*	0.02
	Third quartile	-0.05*	0.02	-0.12***	0.02	-0.17***	0.03
	Fourth quartile	0.05***	0.02	-0.18***	0.02	-0.45***	0.03
Number of children	0	Ref	Ref	Ref	Ref	Ref	Ref
	1	-0.06***	0.02	-0.11***	0.02	-0.05*	0.02
	2	-0.09***	0.02	-0.18***	0.02	-0.06***	0.02
	More than 2	-0.05***	0.02	-0.13***	0.02	-0.11***	0.02
Minor children in household	No	Ref	Ref	Ref	Ref	Ref	Ref
	Yes	-0.09	0.03	-0.38***	0.03	-0.83***	0.04
Individuals = 118,591							

Source: Statistics Netherlands. *p < .05; **p < .01; ***p<0.001.

Table A. 21 Distribution of the IPTW

	Minimum	First quartile	Median	Third quartile	Maximum
IPTW value	1.07	1.51	1.81	2.26	4.34

Source: Statistics Netherlands.

Table A. 18 Data balance before and after propensity score weight adjustment (univariate regressions)

		Base outcome = Rate of persons with a migrant background – first quartile											
		Second quartile				Third quartile				Fourth quartile			
		Proportion of persons with a migrant background		Proportion of persons with a migrant background – IPTW included		Proportion of persons with a migrant background		Proportion of persons with a migrant background – IPTW included		Proportion of persons with a migrant background		Proportion of persons with a migrant background – IPTW included	
		Coefficients	Std. Err.	Coefficients	Std. Err.	Coefficients	Std. Err.	Coefficients	Std. Err.	Coefficients	Std. Err.	Coefficients	Std. Err.
Gender	Female	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	Male	-0.18***	0.01	0.02	0.01	-0.21***	0.01	0.01	0.01	-0.18***	0.01	0.03	0.01
Age at arrival	Age at arrival (18 – 24)	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	Age at arrival (25 – 29)	-0.00	0.02	-0.01	0.02	-0.16***	0.02	0.00	0.02	-0.41***	0.02	-0.00	0.02
	Age at arrival (30 – 36)	-0.01	0.02	-0.01	0.02	-0.25***	0.02	0.01	0.02	-0.53***	0.02	-0.04	0.02
	Age at arrival (37 – 96)	-0.14***	0.03	-0.01	0.03	-0.44***	0.03	0.01	0.03	-0.73**	0.03	-0.08**	0.03
Migration motive	Family motive	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	Asylum	-0.16***	0.02	-0.06**	0.02	-0.13***	0.02	-0.06**	0.02	-0.29***	0.02	0.00	0.02
	Labour migration	0.06**	0.02	-0.05	0.02	-0.35***	0.02	-0.03	0.02	-1.09***	0.02	-0.01	0.02
	Study migration	0.26***	0.02	-0.05	0.02	0.25***	0.02	0.05	0.02	-0.34***	0.02	0.03	0.02
	Other motive	-0.18***	0.03	-0.00	0.03	-0.48***	0.03	-0.01	0.03	-0.72***	0.03	-0.01	0.03
Employed	Not employed	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	Employed	-0.10***	0.01	0.01	0.01	-0.25***	0.01	0.02	0.01	-0.34***	0.02	0.01	0.02

EU citizen	No	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	Yes	-0.24***	0.01	0.00	0.01	-0.78***	0.02	0.00	0.02	-1.62***	0.03	0.01	0.03
Kauffman Index	First quartile (-2.68 ; -1.26)	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	Second quartile (> -1.26 ; -0.21)	0.42***	0.02	0.02	0.02	0.51***	0.02	0.02	0.02	0.88***	0.02	-0.00	0.02
	Third quartile (> -0.21; 0.98)	0.20***	0.02	0.05	0.02	0.25***	0.02	0.05	0.02	0.65***	0.02	0.01	0.02
	Fourth quartile (> 0.98, 1.72)	0.15***	0.02	0.02	0.02	-0.28***	0.02	0.02	0.02	-0.78***	0.02	-0.00	0.02
Human Development Index	First quartile (0.25 – 0.58)	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	Second quartile (> 0.58 – 0.66)	-0.30***	0.02	-0.01	0.02	-0.50***	0.02	-0.02	0.02	-1.02***	0.02	-0.02	0.02
	Third quartile (> 0.66 – 0.79)	0.11***	0.02	-0.01	0.02	0.07**	0.02	-0.01	0.02	0.03	0.02	-0.00	0.02
	Fourth quartile (> 0.79 – 0.92)	-0.16***	0.02	-0.01	0.02	-0.75***	0.02	-0.00	0.02	-1.68***	0.02	-0.02	0.02
Citizenship status of the partner	No partner	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	Foreign-born partner	0.17***	0.02	-0.00	0.02	0.23***	0.02	0.00	0.02	0.01	0.02	-0.01	0.02
	Dutch partner	0.35***	0.02	0.02	0.02	0.73***	0.02	0.01	0.02	1.14***	0.02	0.04	0.02
Homeownership	No	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	Yes	0.18***	0.02	0.03	0.02	-0.34***	0.02	0.02	0.02	-0.49***	0.02	-0.06**	0.02
Income	First quartile	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	Second quartile	-0.19***	0.02	-0.00	0.02	-0.06***	0.02	0.00	0.02	0.17***	0.02	0.02	0.02
	Third quartile	-0.14***	0.02	0.01	0.02	-0.16***	0.02	-0.01	0.02	0.04	0.02	0.02	0.02
	Fourth quartile	0.16***	0.02	0.03	0.02	-0.29***	0.02	0.01	0.02	-0.64***	0.03	-0.05*	0.03
Minor children living in the household	No	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	Yes	-0.05	0.03	-0.04	0.03	-0.43***	0.03	-0.03	0.04	-0.90***	0.04	-0.01	0.04
Individuals = 118,591													

Source: Statistics Netherlands. *p < .05; **p < .01; ***p<0.001.

V. Test of multicollinearity

Table A. 19 Test of proportionality assumption

		VIF value
Gender	Female	Ref.
	Male	1.19
Age at arrival	Age at arrival (18 – 24)	Ref.
	Age at arrival (25 – 29)	1.54
	Age at arrival (30 – 36)	1.57
	Age at arrival (37 – 96)	1.59
Migration motive	Family motive	Ref.
	Asylum	1.75
	Labour migration	1.68
	Study migration	1.21
	Other motive	1.12
Employed	Not employed	Ref.
	Employed	1.13
EU citizen	No	Ref.
	Yes	2.81
Kauffman Index	First quartile (-2.68 ; -1.26)	Ref.
	Second quartile (> -1.26 ; -0.21)	4.38
	Third quartile (> -0.21; 0.98)	2.33
	Fourth quartile (> 0.98, 1.72)	3.48
Settlement year	1996	Ref.
	1997	1.54
	2001	1.63
	2002	1.55
Human Development Index	First quartile (0.25 – 0.58)	Ref.
	Second quartile (> 0.58 – 0.66)	1.88
	Third quartile (> 0.66 – 0.79)	3.56
	Fourth quartile (> 0.79 – 0.92)	4.23
Dual citizenship acceptance	Not allowed	Ref.
	Allowed	3.00
Citizenship status of the partner	No partner	Ref.
	Foreign-born partner	1.17
	Dutch partner	2.58
Urbanisation rate	< than 500 inhabitants per sq km	Ref.
	Between 500 and 1000	1.52
	Between 1000 and 1500	1.40
	Between 1500 and 2500	1.50
	> than 2500 inhabitants per sq km	1.15
Rate of Employment (buurt level)	First quartile (0 – 0.35)	Ref.
	Second quartile (> 0.35 – 0.41)	1.69
	Third quartile (> 0.41 – 0.46)	2.00
	Fourth quartile (> 0.46 – 0.82)	2.38
Proportion of persons with a migrant background	First quartile (0 – 12.6%)	Ref.
	Second quartile (> 12.6 – 24.4%)	2.03
	Third quartile (> 24.4 – 41.4%)	2.83
	Fourth quartile (> 41.4 – 100%)	4.72

Proportion of co-nationals	First quartile (0 – 0.19%)	Ref.
	Second quartile (> 0.19 – 0.56%)	1.53
	Third quartile (> 0.56 – 2.62%)	1.64
	Fourth quartile (> 2.62 – 50.7%)	2.37
Proportion of persons with a migrant background within the same age category	First quartile (0 – 6.19%)	Ref.
	Second quartile (> 6.19 – 10.44%)	3.19
	Third quartile (> 10.44 – 16.58%)	2.32
	Fourth quartile (> 16.58 – 72.92%)	1.78

Source: Statistics Netherlands.

VI. Proportionality assumption

We control for any violation of the proportionality assumption using the *estat* command in stata. The outcome of this test is portrayed in table A.24.

Table A. 20 Test of proportionality assumption

		P-value
Gender	Female	Ref.
	Male	0.92
Age at arrival	Age at arrival (18 – 24)	Ref.
	Age at arrival (25 – 29)	0.05
	Age at arrival (30 – 36)	0.07
	Age at arrival (37 – 96)	0.07
Migration motive	Family motive	Ref.
	Asylum	0.11
	Labour migration	0.08
	Study migration	0.05
	Other motive	0.22
Employed	Not employed	Ref.
	Employed	0.11
EU citizen	No	Ref.
	Yes	0.09
Kauffman Index	First quartile (-2.68 ; -1.26)	Ref.
	Second quartile (> -1.26 ; -0.21)	0.03
	Third quartile (> -0.21; 0.98)	0.05
	Fourth quartile (> 0.98, 1.72)	0.05
Settlement year	1996	Ref.
	1997	0.00
	2001	0.00
	2002	0.00
Human Development Index	First quartile (0.25 – 0.58)	Ref.
	Second quartile (> 0.58 – 0.66)	0.11
	Third quartile (> 0.66 – 0.79)	0.10
	Fourth quartile (> 0.79 – 0.92)	0.09
Dual citizenship acceptance	Not allowed	Ref.
	Allowed	0.06
Citizenship status of the partner	No partner	Ref.
	Foreign-born partner	0.07
	Dutch partner	0.07
Urbanisation rate	< than 500 inhabitants per sq km	Ref.
	Between 500 and 1000	0.59
	Between 1000 and 1500	0.14
	Between 1500 and 2500	0.28
	> than 2500 inhabitants per sq km	0.56
Rate of Employment (buurt level)	First quartile (0 – 0.35)	Ref.
	Second quartile (> 0.35 – 0.41)	0.08
	Third quartile (> 0.41 – 0.46)	0.09
	Fourth quartile (> 0.46 – 0.82)	0.08

Proportion of persons with a migrant background	First quartile (0 – 12.6%)	Ref.
	Second quartile (> 12.6 – 24.4%)	0.27
	Third quartile (> 24.4 – 41.4%)	0.56
	Fourth quartile (> 41.4 – 100%)	0.38
Proportion of persons with a migrant background within the same age category	First quartile (0 – 6.19%)	Ref.
	Second quartile (> 6.19 – 10.44%)	0.87
	Third quartile (> 10.44 – 16.58%)	0.55
	Fourth quartile (> 16.58 – 72.92%)	0.66
Proportion of co-nationals	First quartile (0 – 0.19%)	Ref.
	Second quartile (> 0.19 – 0.56%)	0.06
	Third quartile (> 0.56 – 2.62%)	0.12
	Fourth quartile (> 2.62 – 50.7%)	0.08

Source: Statistics Netherlands.

Appendix B

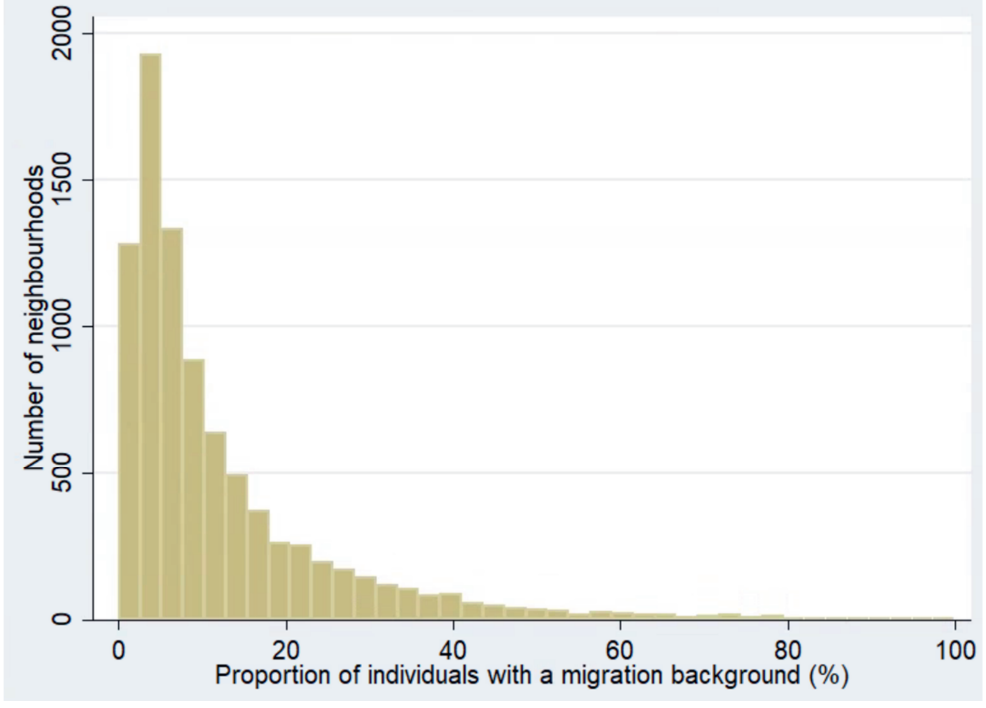
Supplementary materials Chapter 3

I. Descriptive statistics:

A. Immigrant concentration in the Netherlands:

Our dependent variable is based on the proportion of individuals with a migration background living in a certain neighbourhood. The number of neighbourhoods included in our initial data base was 8,771[34]. Looking at the distribution of immigrant concentration across neighbourhoods (figure B.1, table B.1), we can see that the majority of the neighbourhoods had a low level of immigrant concentration. As shown in table B.2, a majority of immigrants was however located in a concentrated neighbourhood upon arrival. These concentrated neighbourhoods are mainly located in urbanised areas (table B.4 and table B.5).

Figure B. 1 Proportion of individuals with an migration background across neighbourhoods



Source: Statistics Netherlands.

[34] Our data base initially included immigrants who arrived in the Netherlands in 2003, 2004 and 2005 and lived in a neighbourhood that has a population of 100 residents or more. The number of 8,771 neighbourhoods corresponds to the number of neighbourhoods covered in our data base before we further specified our population and excluded immigrants who were younger than 25 years old upon arrival, EU immigrants, immigrants who left the country before the event was achieved and immigrants who initially moved to a non-concentrated neighbourhoods. This number was reduced to 4 ,733 neighbourhoods in the final data base.

Table B. 1 Proportion of individuals with a migration background across neighbourhoods

	Minimum	First quartile	Median	Third quartile	Maximum	Number of neighbourhoods
Proportion of individuals with a migration background	0.01	3.8	7.40	15.64	100	8,771

Source: Statistics Netherlands.

Table B. 2 Number of individuals living in concentrated neighbourhoods[35]

	Number of individuals	%
Moved to a concentrated neighbourhood upon arrival (higher than 20%)	72,678	61.1
Moved to a non-concentrated neighbourhood upon arrival (lower than 20%)	46,280	38.9

Source: Statistics Netherlands.

Table B. 3 Average immigrant concentration between 1996 and 2016 in Dutch neighbourhoods

	Number of neighbourhoods	%
Lower than 10%	8,034	68.7
Between 10 and 19%	1,923	16.4
Between 20 and 29 %	819	7.1
Between 30 and 49%	635	5.4
50% or higher	286	2.4
	11,697	100

Source: Statistics Netherlands.

[35] The data base initially included 118,958 individuals. Due to the design of our study, we only took into account immigrants who initially moved to a concentrated neighbourhood (72,678 individuals). This number was reduced to 29,400 after we excluded EU migrants, immigrants who moved out of the Netherlands before the event occurs, and immigrants who were younger than 25 years old upon arrival.

Table B. 4 Average immigrant concentration in Amsterdam, Rotterdam and the Hague

	Amsterdam		Rotterdam		The Hague	
	Number of neighbourhoods	%	Number of neighbourhoods	%	Number of neighbourhoods	%
Lower than 10%	26	5.7	9	10.6	3	2.7
Between 10 and 19%	52	11.5	17	20.0	23	20.9
Between 20 and 29 %	119	26.3	12	14.1	31	28.2
Between 30 and 49%	145	32.0	25	29.4	30	27.3
50% or higher	111	24.5	22	25.9	23	20.9
	453	100	85	100	110	100

Source: Statistics Netherlands.

Table B. 5 Average immigrant concentration by neighbourhood population

	Less than 500 inh.	Between 500 and 1,000 inh.	Between 1,001 and 2,000 inh.	Between 2,001 and 5,000 inh.	More than 5,000 inh.	Total
Lower than 10%	39.8%	19.8%	21.3%	16.4%	3.1%	100%
Between 10 and 19%	13.0%	15.4%	28.2%	34.8%	8.7%	100%
Between 20 and 29 %	11.9%	11.6%	30.1%	34.0%	12.4%	100%
Between 30 and 49%	12.5%	14.1%	25.1%	38.7%	9.6%	100%
50% or higher	14.7%	11.7%	18.2%	35.1%	20.3%	100%

Source: Statistics Netherlands.

B. Individual and neighbourhood level variables:

Table B. 6 Rates of mobility across various predictors (only time invariant characteristics included)

		Total		Mobility		Mobility via homeownership		Mobility via the renting market	
		N	%	N	%	N	%	N	%
Citizenship	Naturalised during the examination period	7,095	24.13	4,660	65.68	1,184	16.68	3,476	49.00
	Did not naturalised during the examination period	22,305	75.87	6,872	30.80	1,149	5.14	5,723	25.66
Age at arrival	25 – 35 years old	19,359	65.85	8,071	41.69	1,894	9.78	6,177	31.91
	35 – 45 years old	7,093	24.13	2,471	34.84	338	4.77	2,135	30.07
	45 – 60 years old	2,460	8.37	788	32.03	87	3.50	698	28.53
	Older than 60 years old	488	1.65	202	41.39	14	2.87	189	38.52
Migrant cohort	Cohort – 2003	11,162	37.97	4,691	42.03	914	8.19	3,777	33.84
	Cohort – 2004	9,072	30.86	3,496	38.54	712	7.85	2,784	30.69
	Cohort – 2005	9,166	31.17	3,345	36.49	707	7.71	2,638	28.78
Gender	Male	16,338	55.57	6,159	37.70	873	5.36	5,286	32.34
	Female	13,062	44.43	5,373	41.13	1,460	11.18	3,913	29.95
Migration motive	Family migration	11,580	39.39	4,577	39.52	1,223	10.58	3,352	28.94
	Asylum	2,511	8.54	1,674	66.67	86	3.42	1,588	63.25
	Labour migration	5,216	17.74	2,117	40.59	422	8.09	1,695	32.50
	Study	3,968	13.50	1,451	36.57	321	8.09	1,130	28.48
	Other motive	6,125	20.83	1,713	27.96	281	4.59	1,434	23.37
Human development index	First quartile	9,571	32.55	3,278	34.25	358	3.74	2,920	30.51
	Second quartile	12,573	42.77	5,062	40.26	1,172	9.32	3,890	30.94
	Third quartile	3,840	13.06	1,790	46.61	500	13.02	1,290	33.59
	Fourth quartile	3,416	11.62	1,402	41.04	303	8.90	1,099	32.14
Individuals = 29,400; Events = 11,532									

Source: Statistics Netherlands.

Table B. 7 Descriptive statistics – time variant individual level variables

		N	%
Income	First quartile	54,512	23.21
	Second quartile	54,689	23.28
	Third quartile	54,680	23.24
	Fourth quartile	54,761	23.32
	Unknown	16,270	6.94
Job contract	Unemployed	150,302	63.98
	Fixed term contract	37,097	15.79
	Permanent contract	47,513	20.23
Partner status	No partner	116,644	49.65
	Dutch partner	50,471	21.49
	Foreign partner	67,797	28.86
Number of children	No children	106,011	45.14
	One child	49,051	20.88
	Two children	45,831	19.51
	More than two children	34,019	14.49
Type of housing	Home owner	55,924	23.81
	Renting with housing benefits	67,865	28.89
	Renting with housing benefits	94,994	40.44
	Unknown	16,129	6.87
Mobility	One neighbourhood	109,794	46.74
	Two neighbourhoods	76,252	32.46
	Three neighbourhoods	32,220	13.72
	More than three neighbourhoods	16,646	2.15
	Observations = 234,912		

Source: Statistics Netherlands.

Table B. 8 Descriptive statistics – Neighbourhood level variables

		N	%
Urbanisation	< than 500 inh. per sq. m.	1,969	0.84
	Between 500 and 1000	9,774	4.16
	Between 1000 and 1500	12,105	5.15
	Between 1500 and 2500	61,183	26.05
	> than 2500	137,918	58.72
	Unknown	11,936	5.08
Homogeneity of the immigrants community	First quartile	59,158	25.18
	Second quartile	50,204	21.37
	Third quartile	51,065	21.74
	Fourth quartile	74,485	31.71
Concentration of persons with an immigrant background (municipal level	First quartile	73,269	31.19
	Second quartile	57,318	24.40
	Third quartile	55,815	23.76
	Fourth quartile	48,510	20.76
Enployment rate (buurt level)	First quartile	59,858	25.48
	Second quartile	58,118	24.74
	Third quartile	56,898	24.22
	Fourth quartile	60,038	25.56
Average income (buurt level)	First quartile	58,728	25.00
	Second quartile	58,728	25.00
	Third quartile	58,728	25.00
	Fourth quartile	58,728	25.00
Observations = 234,912			

Source: Statistics Netherlands.

Table B. 9 Income brackets across quartiles per year (quartiles are based on the immigrant population)

	First Quartile	Second quartile	Third quartile	Fourth quartile
2003	0 – 9,900	9,900 – 13,400	13,400 – 18,000	18,000 and higher
2004	0 – 9,978	9,978 – 13,409	13,409 – 18,289	18,289 and higher
2005	0 – 9,799	9,799 – 13,460	13,460 – 18,753	18,753 and higher
2006	0 – 10,672	10,762 – 14,730	14,730 – 20,180	20,180 and higher
2007	0 – 11,316	11,316 – 15,413	15,413 – 21,580	21,580 and higher
2008	0 – 11,773	11,773 – 15,845	15,845 – 22,170	22,170 and higher
2009	0 – 11,887	11,887 – 15,701	15,701 – 22,051	22,051 and higher
2010	0 – 11,979	11,979 – 15,455	15,455 – 21,528	21,528 and higher
2011	0 – 12,546	12,456 – 16,324	16,324 – 23,088	23,088 and higher
2012	0 – 12,451	12,451 – 16,091	16,091 – 22,828	22,828 and higher
2013	0 – 12,465	12,465 – 15,991	15,991 – 23,058	23,058 and higher
2014	0 – 12,923	12,923 – 16,349	16,349 – 23,648	23,468 and higher
2015	0 – 13,186	13,186 – 16,551	16,551 – 24,450	24,450 and higher
2016	0 – 13,610	13,610 – 17,674	17,674 – 25,830	25,830 and higher

Source: Statistics Netherlands.

II. **Main analysis**

The following section includes models 1 to 8 as well as the robustness checks (model A.1 to 1.4). Model 1, 4, 5 and 6 control for gender, age at arrival, settlement year, mobility, number of children, migration motive, type of housing, legal status of the partner, type of job contract, income, level of development of the origin country, homogeneity of the immigrant community in the neighbourhood, neighbourhood's employment rate , urbanisation rate, size of the immigrant community in the municipality and average income at the neighbourhood level. As model 2 and 3 only focus on immigrants coming from one single country, we do not include in these models any characteristics of the country of origin due to multicollinearity issue. The variable Human Development Index is therefore excluded from these two models. Since eligibility for housing benefits is dependent on one's income level, we do not control for income in models 7 and 8. Self-selection into naturalisation is controlled for in all models with a time invariant measure of whether an individual has naturalised during the examination period.

Table B. 10 Cox proportional hazard model – Mobility outside of concentrated neighbourhoods (both types of mobility together)

		Model 1	
		Exp(Coeff)	Std. Err.
Naturalisation	Not naturalised	Ref.	Ref.
	Naturalised	1.50***	0.10
Gender	Male	Ref.	Ref.
	Female	0.90***	0.02
Income	Low income (first quartile)	Ref.	Ref.
	Medium-low income (second quartile)	0.63***	0.02
	Medium-high income (third quartile)	0.69***	0.03
	High income (fourth quartile)	0.82***	0.03
Type of job contract	Unemployed	Ref.	Ref.
	Temporary contract	0.91*	0.03
	Permanent contract	0.92*	0.03
Mobility		1.00	0.02
Number of children	No children	Ref.	Ref.
	One child	0.90***	0.02
	Two children	0.84***	0.02
	More than two children	0.95	0.03
Homogeneity of the immigrants community	First quartile	Ref.	Ref.
	Second quartile	0.95	0.04
	Third quartile	1.01	0.04
	Fourth quartile	0.80**	0.03
Rate of first generation migrants and their descendants (municipality)	First quartile	Ref.	Ref.
	Second quartile	0.65***	0.03
	Third quartile	0.26***	0.04
	Fourth quartile	0.24***	0.04
Average income (buurt level)	First quartile	Ref.	Ref.
	Second quartile	0.92*	0.03
	Third quartile	1.02	0.04
	Fourth quartile	1.01	0.06

Urbanisation	< than 500 inh. per sq. m.	Ref.	Ref.
	Between 500 and 1000	1.01	0.12
	Between 1000 and 1500	0.71***	0.09
	Between 1500 and 2500	0.57***	0.05
	> than 2500	0.59***	0.06
Employment rate	First quartile	Ref.	Ref.
	Second quartile	0.93	0.03
	Third quartile	0.93	0.03
	Fourth quartile	1.13**	0.05
Migration motive	Family migrants	Ref.	Ref.
	Asylum	1.82***	0.07
	Economic migrants	1.35***	0.05
	Student migrants	1.26***	0.05
	Other motive	0.82***	0.03
HDI index	First quartile	Ref.	Ref.
	Second quartile	1.12***	0.03
	Third quartile	1.26***	0.05
	Fourth quartile	1.70***	0.09
Naturalised during the observation period *Time		1.09***	0.01

Source: Statistics Netherlands. *p < .05; **p < .01; ***p<0.001. Model 1 is stratified by housing type, partner status, settlement year, and age at arrival. The variable "Naturalised during the observation period" is moreover interacted with time.

Table B. 11 Cox proportional hazard model – Mobility outside of concentrated neighbourhoods for sub-groups

		Model 2: Turkish immigrants		Model 3: Moroccan immigrants		Model 4: Turkish and Moroccan immigrants excluded	
		Exp(Coeff)	Std. Err.	Exp(Coeff)	Std. Err.	Exp(Coeff)	Std. Err.
Naturalisation	Not naturalised	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
	Naturalised	2.51***	0.36	2.80***	0.37	1.29***	0.08
Gender	Male	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
	Female	-	-	0.72***	0.06	-	-
Age at arrival	25 – 35 years old	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
	35 – 45 years old	1.00	0.07	0.95	0.09	0.92***	0.02
	45 – 60 years old	0.88	0.10	0.93	0.09	0.78***	0.03
	More than 60 years old	0.67***	0.17	0.59***	0.7	0.69***	0.07
Income	Low income (first quartile)	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
	Medium-low income (second quartile)	0.67***	0.07	0.56***	0.06	0.68***	0.03
	Medium-high income (third quartile)	0.71***	0.07	0.59***	0.06	0.73***	0.03
	High income (fourth quartile)	0.69***	0.07	0.55***	0.07	0.92*	0.04
Type of job contract	Unemployed	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
	Temporary contract	1.08	0.10	1.07	0.11	0.93*	0.03
	Permanent contract	0.91	0.09	1.13	0.11	0.93*	0.04
Settlement year	2003	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
	2004	1.04	0.08	0.96	0.08	0.94	0.03

	2005	1.00	0.08	1.04	0.10	0.96	0.03
Mobility		0.97	0.05	0.97	0.06	0.99	0.02
Number of children	No children	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
	One child	0.65***	0.05	0.57***	0.06	-	-
	Two children	0.63***	0.06	0.47***	0.06	-	-
	More than two children	0.52***	0.07	0.42***	0.06	-	-
Homogeneity of the immigrants community	First quartile	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
	Second quartile	1.82	0.70	0.23*	0.14	0.91*	0.03
	Third quartile	0.72	0.38	0.31*	0.15	0.94	0.03
	Fourth quartile	0.84	0.28	0.21*	0.10	1.01	0.05
Rate of first generation migrants and their descendants (municipality)	First quartile	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
	Second quartile	0.62***	0.05	0.66***	0.07	0.66***	0.02
	Third quartile	0.20***	0.02	0.24***	0.04	0.30***	0.01
	Fourth quartile	0.21***	0.03	0.25***	0.04	0.25***	0.01
Urbanisation	< than 500 inh. per sq. m.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
	Between 500 and 1000	0.85	0.16	0.17*	0.15	0.99	0.12
	Between 1000 and 1500	0.75	0.15	0.14*	0.11	0.74**	0.09
	Between 1500 and 2500	0.61	0.12	0.12**	0.10	0.63***	0.06
	> than 2500	0.54	0.11	0.11**	0.09	0.71***	0.07
Employment rate	First quartile	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
	Second quartile	1.12	0.09	0.91	0.09	0.93	0.03
	Third quartile	1.08	0.10	0.96	0.10	0.92*	0.03
	Fourth quartile	1.42**	0.16	0.93	0.13	1.09	0.04

Average income (buurt level)	First quartile	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
	Second quartile	0.90	0.08	1.05	0.11	0.90**	0.04
	Third quartile	0.95	0.11	1.14	0.15	0.95	0.05
	Fourth quartile	0.64**	0.13	1.19	0.24	0.89	0.05
Migration motive	Family migrants	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
	Asylum	1.44	0.37	-	-	1.58***	0.07
	Economic migrants	1.15	0.13	-	-	1.26***	0.05
	Student	0.95	0.21	-	-	1.15**	0.05
	Other motive	0.82	0.08	-	-	0.74***	0.03
HDI index	First quartile	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
	Second quartile	-	-	-	-	1.26***	0.04
	Third quartile	-	-	-	-	1.36***	0.05
	Fourth quartile	-	-	-	-	1.59***	0.07
Naturalised during the observation period	Did not naturalise	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
	Naturalised	1.79***	0.14	2.61***	0.21	-	-
Naturalised during the observation period*Time		-	-	-	-	1.06***	0.01
		Observations = 29,247, Individuals = 3,512, Events = 982		Observations = 23,242, Individuals = 2,899, Events = 801		Observations= 87,924, Individuals = 14,209, Events = 6,785	

Source: Statistics Netherlands. *p < .05; **p < .01; ***p<0.001. Model 2 is stratified by housing type, partner status, gender and HDI index. Model 3 is stratified by housing type, partner status, migration motive and HDI index. Model 4 is stratified by housing type, partner status, gender, number of children. The variable "Naturalised during the observation period" is interacted with time in this model.

Table B. 12 Cox proportional hazard model – Mobility outside of concentrated neighbourhoods

		Model 5: Mobility through homeownership		Model 6: Mobility through renting	
		Exp(Coeff)	Std. Err.	Exp(Coeff)	Std. Err.
Naturalisation	Not naturalised	Ref.	Ref.	Ref.	Ref.
	Naturalised	1.44***	0.13	1.51***	0.09
Gender	Male	Ref.	Ref.	Ref.	Ref.
	Female	1.00	0.05	0.87***	0.03
Income	First quartile	Ref.	Ref.	Ref.	Ref.
	Second quartile	1.10***	0.11	0.62***	0.02
	Third quartile	1.24***	0.11	0.64**	0.03
	Fourth quartile	1.56***	0.14	0.70***	0.03
Type of job contract	Unemployed	Ref.	Ref.	Ref.	Ref.
	Temporary contract	1.04	0.07	0.93	0.04
	Permanent contract	1.21*	0.07	0.87**	0.04
Native Dutch Partner	No	Ref.	Ref.	Ref.	Ref.
	Yes	1.13**	0.06	-	-
Settlement year	2003	Ref.	Ref.	Ref.	Ref.
	2004	0.99	0.06	0.95	0.03
	2005	1.00	0.06	0.99	0.03
Mobility		0.63***	0.03	0.97	0.02
Number of children	No children	Ref.	Ref.	Ref.	Ref.
	One child	1.21**	0.07	0.74***	0.03
	Two children	0.99	0.07	0.70***	0.03
	More than two children	0.77**	0.10	0.76***	0.04
Homogeneity of the immigrants community	First quartile	Ref.	Ref.	Ref.	Ref.
	Second quartile	0.83**	0.06	1.08	0.03
	Third quartile	0.79***	0.06	1.18***	0.02
	Fourth quartile	0.62***	0.05	0.98	0.02
Rate of first generation migrants and their descendants (municipality)	First quartile	Ref.	Ref.	Ref.	Ref.
	Second quartile	-	-	0.72***	0.03
	Third quartile	-	-	0.30***	0.02
	Fourth quartile	-	-	0.26***	0.02

Urbanisation	< than 500 inh. per sq. m.	Ref.	Ref.	Ref.	Ref.
	Between 500 and 1000	0.92	0.43	1.05	0.13
	Between 1000 and 1500	1.66	0.66	0.75*	0.09
	Between 1500 and 2500	1.33	0.79	0.59***	0.07
	> than 2500	1.75	0.40	0.53***	0.07
Employment rate	First quartile	Ref.	Ref.	Ref.	Ref.
	Second quartile	0.95	0.07	0.97	0.13
	Third quartile	0.82**	0.06	0.71**	0.09
	Fourth quartile	0.97	0.06	0.57***	0.07
Average income (buurt level)	First quartile	Ref.	Ref.	Ref.	Ref.
	Second quartile	1.10	0.08	0.92*	0.04
	Third quartile	1.11	0.10	1.00	0.05
	Fourth quartile	0.84	0.09	0.86	006
Migration motive	Family migrants	Ref.	Ref.	Ref.	Ref.
	Asylum	1.57***	0.24	-	-
	Economic migrants	1.32***	0.10	-	-
	Student migrants	1.25***	0.10	-	-
	Other motive	1.04	0.08	-	-
HDI index	First quartile	Ref.	Ref.	Ref.	Ref.
	Second quartile	1.42***	0.11	1.05	0.04
	Third quartile	1.60***	0.13	1.20***	0.06
	Fourth quartile	1.87***	0.17	1.43***	0.10
Naturalised during the observation period	Did not naturalise	Ref.	Ref.	Ref.	Ref.
	Naturalised	1.58***	0.09	-	-
Naturalised during the observation period*Time		-	-	1.08***	0.01
		Observations = 189,736, Individuals = 20,620, Events = 2,034		Observations = 156,333, Individuals = 20,620, Events = 6,534	

Source: Statistics Netherlands. *p < .05; **p < .01; ***p<0.001. Model 5 is stratified by type of housing, age at arrival and rate first generation migrants and their descendants in the municipality. Model 6 is stratified by partner status, age at arrival, migration motive, and type of housing. The variable "Naturalised during the observation period" is interacted with time in this model.

Table B. 13 Cox proportional hazard model – Mobility outside of concentrated neighbourhoods

		Model 7: Mobility through renting with housing benefits		Model 8: Mobility through renting without renting benefits	
		Exp(Coeff)	Std. Err.	Exp(Coeff)	Std. Err.
Naturalisation	Not naturalised	Ref.	Ref.	Ref.	Ref.
	Naturalised	1.05	0.06	1.39***	0.07
Gender	Male	Ref.	Ref.	Ref.	Ref.
	Female	0.87***	0.03	0.88***	0.03
Age at arrival	25 – 35 years old	Ref.	Ref.	Ref.	Ref.
	35 – 45 years old	0.92*	0.03	0.91***	0.03
	45 – 60 years old	0.92	0.05	0.82**	0.04
	More than 60 years old	1.00	0.10	0.99	0.10
Type of job	Unemployed	Ref.	Ref.	Ref.	Ref.
contract	Temporary contract	0.83***	0.04	0.92*	0.04
	Permanent contract	0.80***	0.04	0.76***	0.03
Settlement year	2003	Ref.	Ref.	Ref.	Ref.
	2004	1.01	0.04	1.06	0.04
	2005	1.11***	0.04	1.13***	0.04
Mobility		1.25***	0.02	1.24***	0.02
Homogeneity of	First quartile	Ref.	Ref.	Ref.	Ref.
the immigrants	Second quartile	1.04	0.05	0.99	0.04
community	Third quartile	1.03	0.04	0.88***	0.03
	Fourth quartile	0.88**	0.04	0.61***	0.03
Rate of first	First quartile	Ref.	Ref.	Ref.	Ref.
generation	Second quartile	0.61***	0.03	0.57***	0.02
migrants and their	Third quartile	0.22***	0.02	0.22***	0.01
descendants	Fourth quartile	0.16***	0.01	0.18***	0.01
Urbanisation	< than 500 inh. per sq. m.	Ref.	Ref.	Ref.	Ref.
	Between 500 and 1000	0.84	0.08	0.89	0.09
	Between 1000 and 1500	0.66***	0.04	0.75***	0.07
	Between 1500 and 2500	0.46***	0.04	0.59***	0.06
	> than 2500	0.40***	0.04	0.58***	0.06
Employment rate	First quartile	Ref.	Ref.	Ref.	Ref.
	Second quartile	0.85***	0.04	1.16***	0.05
	Third quartile	1.02	0.04	1.34***	0.05

	Fourth quartile	1.40***	0.07	1.63***	0.07
Average income (buurt level)	First quartile	Ref.	Ref.	Ref.	Ref.
	Second quartile	0.82***	0.05	0.89*	0.05
	Third quartile	1.15*	0.07	1.26***	0.07
	Fourth quartile	1.44***	0.10	1.49***	0.09
Migration motive	Family migrants	Ref.	Ref.	Ref.	Ref.
	Asylum	1.52***	0.07	1.30***	0.06
	Economic migrants	1.03	0.05	1.28***	0.06
	Student migrants	1.04	0.06	1.26***	0.06
	Other motive	0.83***	0.04	0.86***	0.04
HDI index	First quartile	Ref.	Ref.	Ref.	Ref.
	Second quartile	1.16***	0.04	1.15***	0.04
	Third quartile	1.27***	0.06	1.12**	0.05
	Fourth quartile	0.99	0.09	1.34***	0.08
Naturalised during the observation period	Did not naturalise	Ref.	Ref.	Ref.	Ref.
	Naturalised	1.84***	0.06	1.24***	0.04
		Observations = 175,102		Observations = 167,827	
		Individuals = 20,620		Individuals = 20,620	
		Events = 2,979		Events = 3,555	

Source: Statistics Netherlands. *p < .05; **p < .01; ***p<0.001. Models 7 and 8 are stratified by type of housing, number of children in the household and partner status.

III. Robustness checks

In this section, we present the results of two complementary analyses that aim to assess the robustness of our findings.

We categorize a neighbourhood as 'concentrated' if the proportion of inhabitants with a migration background exceeds a threshold of 20%. In order to make sure that this is a robust choice, we run the same analyses using two alternative threshold levels of 25% and 30% (Table B.14). The effect of naturalisation remains positive and significant. Yet, it must be noted that the value of the hazard ratio diminishes as we increase the threshold of concentration. This does not come as a surprise, however, as we would expect prices to be a little cheaper in neighbourhoods that have a migrant-concentration level situated between 20% and 30% in comparison to neighbourhoods that have a concentration level below 20%. Moreover, landlords and real estate agents who manage dwellings in these areas may be more lenient towards migrants as they represent a higher share of the population.

Furthermore, the time invariant measure of naturalisation that we use to control for self-selection into naturalisation does not take into account how long after arrival in the Netherlands immigrants decide to apply for Dutch citizenship. Yet, there are reasons to believe that self-selection into different timings of naturalisation also matters. Immigrants who naturalise more rapidly after arriving in the Netherlands may possess certain cognitive, cultural or material characteristics that could positively influence their residential mobility. In order to make sure that this form of self-selection does not bias our estimates, we run two additional models focusing on naturalised immigrants only (Table B.15). The first model does not include any measure of when people become Dutch citizens, while the second model includes a measure of the number of years after arriving in the Netherlands until naturalisation. If the timing of naturalisation plays a role, we would expect the hazard ratio of naturalisation to substantially decrease after controlling for years until naturalisation. This turns out not to be the case.

Table B. 14 Cox proportional hazard model – Mobility outside of concentrated neighbourhoods

		Model A.1: Concentration > 25%		Model A.2: Concentration > 30%	
		Exp(Coeff)	Std. Err.	Exp(Coeff)	Std. Err.
Naturalisation	Not naturalised	Ref.	Ref.	Ref.	Ref.
	Naturalised	1.31***	0.09	1.25***	0.08
		Observations = 120,037 Individuals = 17,866 Events = 8,083		Observations = 96,502 Individuals = 14,840 Events = 7,156	

Source: Statistics Netherlands. *p < .05; **p < .01; ***p<0.001. Models 18 and 19 are stratified by partner status, type of housing, age at arrival, level of human development. The variable "Naturalised during the examination period" is interacted with time.

Table B. 15 Cox proportional hazard model – Mobility outside of concentrated neighbourhoods of naturalised migrants (both types of mobility together)

		Model A.3: Years until naturalisation excluded		Model A.4: Years until naturalisation included	
		Exp(Coeff)	Std. Err.	Exp(Coeff)	Std. Err.
Naturalisation	Not naturalised	Ref.	Ref.	Ref.	Ref.
	Naturalised	1.44***	0.09	1.40***	0.11
Years until citizenship*Time	0 to 5 years	-	-	Ref.	Ref.
	5 to 8 years	-	-	1.00	0.01
	8 to 10 years	-	-	1.02	0.01
	More than 10 years	-	-	0.98	0.02
		Observations: 37,159; Individuals: 5,950 Events : 3,598			

Source: Statistics Netherlands. *p < .05; **p < .01; ***p<0.001. Model 2 is stratified by housing type and partner status. The variable years until naturalisation is interacted with time.

IV. **Tests of the proportionality assumption:**

We test the proportionality assumption using the phtest command in STATA in combination with a visual examination of the probability of survival over time. Table B.16 shows the outcome of the test for our first full model (model 4). As shown in table B.16 several variables seem to violate the proportionality assumption in this model (p-value < 0.5). Yet, because the large number of observations included in the analysis may lead to more conservative p-values we additionally take a look at the visual representation of the probability of survival over time. When doing so, we can see that the probabilities of survival over time are clearly different for the different categories of the variables partner status, type of housing, age at arrival, year of settlements and naturalisation during the observation period. This is an indication that these variables violate the assumption of proportionality (figure 2, 3, 4, 5, and 6). This is however not the case for the variables human development index and migration motive for which the lines remain parallel. We therefore decide to control for these violations by stratifying by partner status, type of housing, age at arrival and year of settlement in our analysis. We chose not to stratify by the variable naturalised during the examination period as, by definition, the first stratum of this variable does not include any individual experiencing naturalisation. Instead, we interact this variable with time (using the tvc procedure in stata) which is another common way to control for any violation of the proportionality assumption (Borucka 2014).

We apply a similar procedure to all the other models included in this paper.

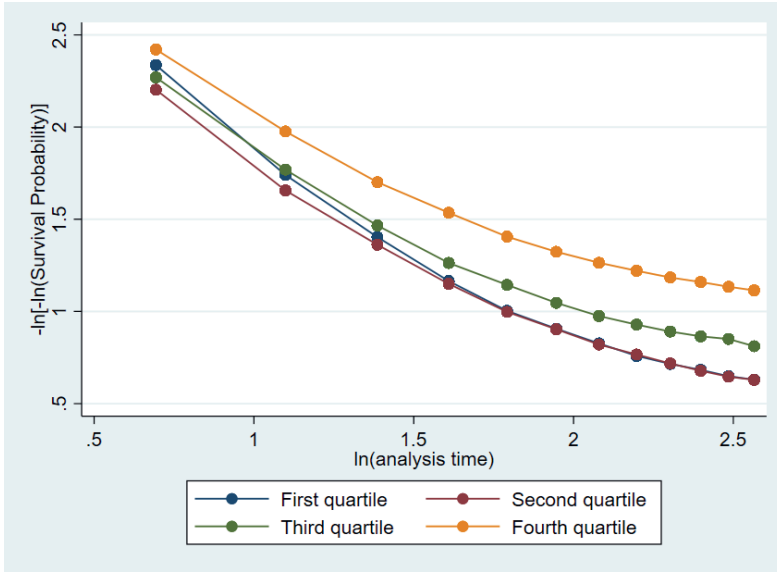
Table B. 16 Output of the phtest (proportionality assumption)

		p-value
Naturalisation	Not naturalised	Ref.
	Naturalised	0.10
Gender	Male	Ref.
	Female	0.06
Age at arrival	25 – 35 years old	Ref.
	35 – 45 years old	0.00
	45 – 60 years old	0.00
	More than 60 years old	0.01
Income	First quartile	Ref.
	Second quartile	0.58
	Third quartile	0.06
	Fourth quartile	0.32
Type of job contract	Unemployed	Ref.
	Temporary contract	0.10
	Permanent contract	0.58
Settlement year	2003	Ref.
	2004	0.05
	2005	0.00
Mobility		0.64
Number of children	No children	Ref.
	One child	0.73
	Two children	0.05
	More than two children	0.06
Homogeneity of the immigrants community	First quartile	Ref.
	Second quartile	0.82
	Third quartile	0.16
	Fourth quartile	0.94
Rate of first generation migrants and their descendants	First quartile	Ref.
(municipality)	Second quartile	0.22
	Third quartile	0.37
	Fourth quartile	0.06
Urbanisation	< than 500 inh. per sq. m.	Ref.
	Between 500 and 1000	0.80
	Between 1000 and 1500	0.65

	Between 1500 and 2500	0.20
	> than 2500	0.20
Employment rate	First quartile	Ref.
	Second quartile	0.06
	Third quartile	0.61
	Fourth quartile	0.21
Migration motive	Family migrants	Ref.
	Asylum	0.81
	Economic migrants	0.01
	Student migrants	0.01
	Other motive	0.06
Housing type	Home owner	Ref.
	Rent with housing benefits	0.47
	Rent without housing benefits	0.00
Partner status	No Partner	Ref.
	Native Dutch Partner	0.00
Level of human development	First quartile	Ref.
	Second quartile	0.02
	Third quartile	0.01
	Fourth quartile	0.41
Average income (buurt level)	First quartile	Ref.
	Second quartile	0.12
	Third quartile	0.22
	Fourth quartile	0.18
Naturalised during the examination period	Did not naturalise	Ref.
	Naturalised	0.00

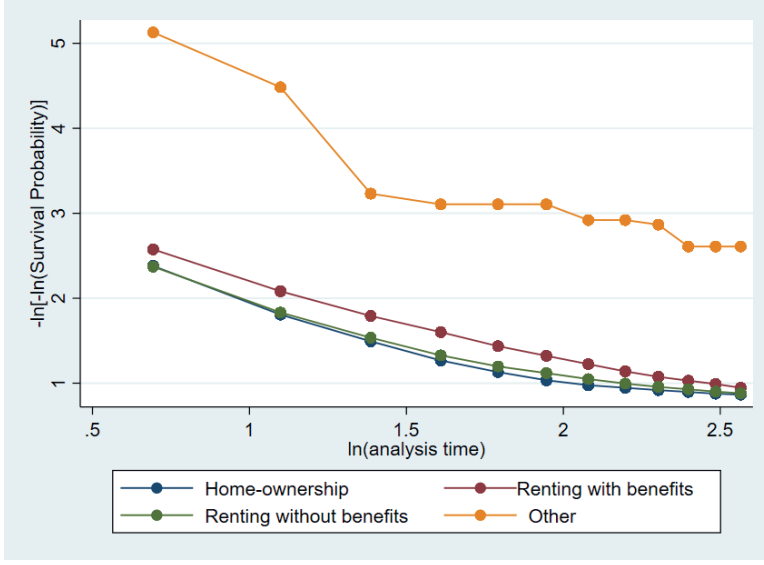
Source: Statistics Netherlands.

Figure B. 2 Probability of survival over time – age at arrival



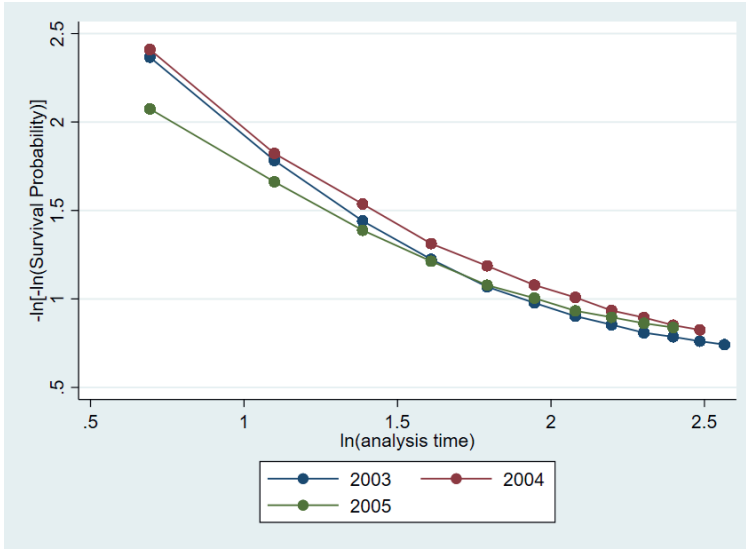
Source: Statistics Netherlands.

Figure B. 3 Probability of survival over time – type of housing



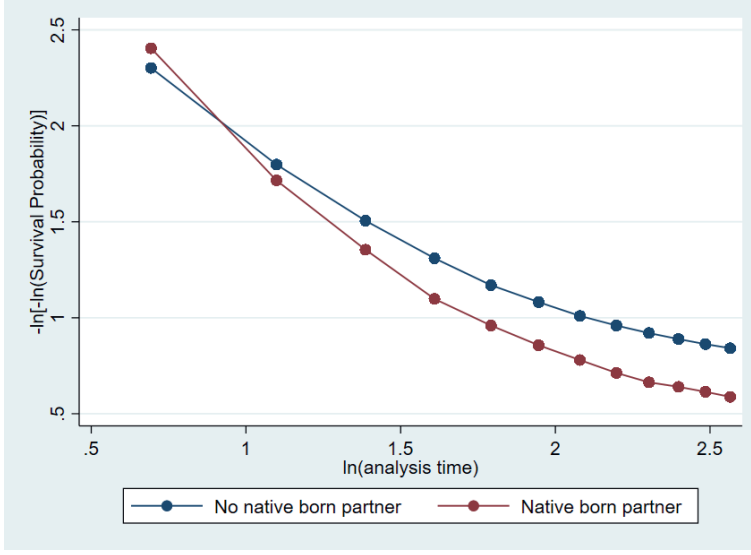
Source: Statistics Netherlands.

Figure B. 4 Probability of survival over time – settlement year



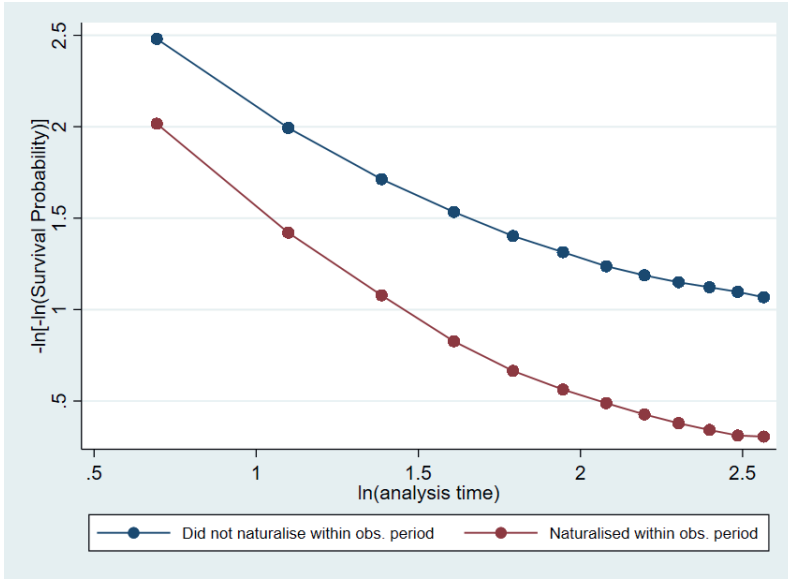
Source: Statistics Netherlands.

Figure B. 5 Probability of survival over time – partner status



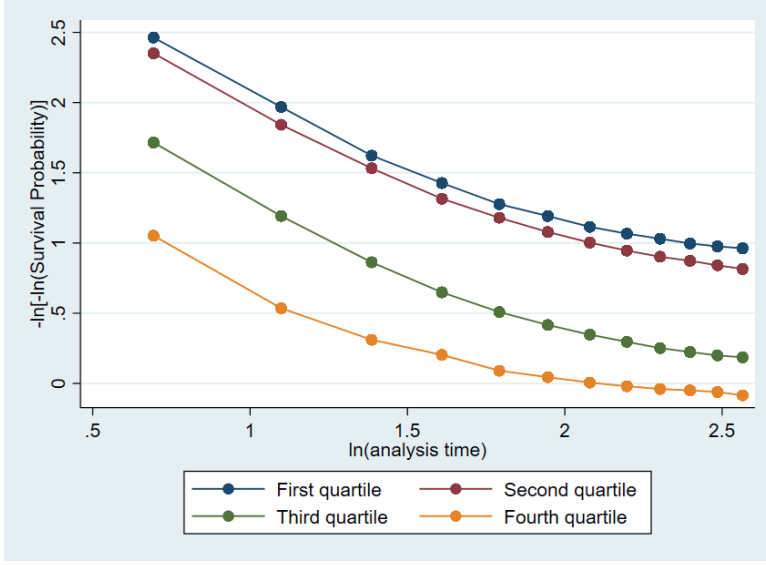
Source: Statistics Netherlands.

Figure B. 6 Probability of survival over time – naturalised within the observation period



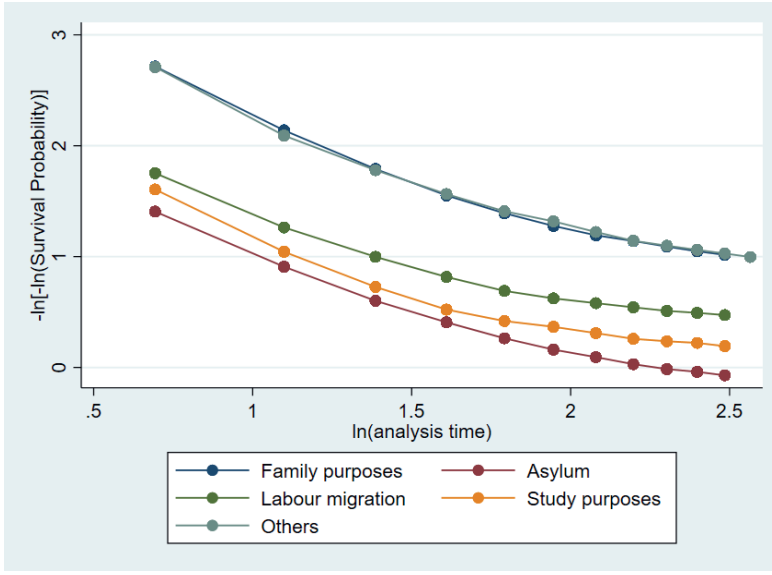
Source: Statistics Netherlands.

Figure B. 7 Probability of survival over time – human development index



Source: Statistics Netherlands.

Figure B. 8 Probability of survival over time – migration motive



Source: Statistics Netherlands.

Appendix C

Supplementary materials Chapter 4

I. Descriptive statistics

Table C. 1 Population composition (individual characteristics)

		N	%
Gender	Male	12,981	42.66
	Female	17,446	57.34
Age at arrival	First quartile (25 -28 yo)	11,001	36.16
	Second quartile (28-31 yo)	8,232	27.05
	Third quartile (31-37 yo)	6,458	21.22
	Fourth quartile (> 37 yo)	4,736	15.57
Migration motive	Family migrants	18,479	60.73
	Asylum	2,301	7.56
	Labour migrants	9,647	31.71
Settlement Year	2003	16,467	54.12
	2004	13,960	45.88
Average income	First quartile (< 11573 euros)	8,328	27.37
	Second quartile (11573 – 15829 euros)	7,578	24.91
	Third quartile (15829 – 22695 euros)	7,998	26.29
	Fourth quartile (> 22695)	6,523	21.44
Naturalised during the examination period	No	18,621	61.20
	Yes	11,806	38.80
Length of stay	7 to 9 years	2,320	7.63
	9 to 11 years	1,818	5.97
	More than 11 years	26,289	86.40
Biggest country groups	Morocco	3,264	10.73
	Turkey	3,358	11.04
	Former USSR	1,860	6.11
	China	719	2.36
	Iraq	816	2.68
Became a homeowner during the observation period	No	15,488	50.90
	Yes	14,939	49.10
	Number of individuals = 30,427		

Source: Statistics Netherlands.

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Table C. 2 Population composition (neighborhood characteristics)

	Minimum	First quartile	Median	Third quartile	Maximum
Rate of neighborhood wealth	0	39.15	53.13	66.25	100
Rate of co-nationals (%)	0	0.02	1.02	2.01	53.74
Rate of persons with an immigrant background (%)	0	19.73	32.73	49.36	100

Source: Statistics Netherlands.

Table C. 3 Median crime rate category of neighbourhood wealth

	Median value of crime against goods per 100 inhabitants
Proportion of neighbourhood residents within the top 6 deciles (first decile) – 0 – 42%	36
Proportion of neighbourhood residents within the top 6 deciles (second decile) – 42 – 53%	28
Proportion of neighbourhood residents within the top 6 deciles (third decile) – 53% - 60%	21
Proportion of neighbourhood residents within the top 6 deciles (fourth decile) – 60% - 65%	18
Proportion of neighbourhood residents within the top 6 deciles (fifth decile) – 65 – 69%	17
Proportion of neighbourhood residents within the top 6 deciles (sixth decile) – 69 – 73%	17
Proportion of neighbourhood residents within the top 6 deciles (seventh decile) – 73 - 76	16
Proportion of neighbourhood residents within the top 6 deciles (eighth decile) – 76 – 79%	17
Proportion of neighbourhood residents within the top 6 deciles (ninth decile) – 79 – 84%	19
Proportion of neighbourhood residents within the top 6 deciles (tenth decile) – 84 – 99%	19

Source: Statistics Netherlands

II. Inferential statistics

Table C. 4 Linear individual fixed effects regression (Whole population)

		Model 0.1: Whole population (1)		Model 0.2: Whole population (2)	
		Coefficients	Std. Err.	Coefficients	Std. Err.
Income (deciles)		0.19***	0.01	0.20***	0.02
Naturalisation	Did not naturalise	Ref.	Ref.	Ref.	Ref.
	Naturalised	-0.46***	0.09	-0.53***	0.10
Employment	Employed	Ref.	Ref.	Ref.	Ref.
	Not employed	-	-	0.19***	0.07
Partner status	Non-Dutch partner	Ref.	Ref.	Ref.	Ref.
	Dutch partner	-	-	0.59***	0.17
Length of stay		-	-	-0.01***	0.01
Number of children (household)		-	-	0.36***	0.05
Rate of co-nationals	First quartile	Ref.	Ref.	Ref.	Ref.
	Second quartile	-	-	-	-
	Third quartile	-	-	-	-
	Fourth quartile	-	-	-	-

Rate of persons with an immigrant background	First quartile	Ref.	Ref.	Ref.	Ref.
	Second quartile	-8.40***	0.20	-	-
	Third quartile	-15.68***	0.24	-	-
	Fourth quartile	-28.08***	0.28	-	-
Observations = 215,027					
Individuals = 30,442					

Source: Statistics Netherlands. *p < .05; **p < .01; ***p<0.001.

Table C. 5 Linear individual fixed effects regression (Whole population)

		Model 1: Whole population (3)		Model 2: Whole population (4)	
		Coefficients	Std. Err.	Coefficients	Std. Err.
Income (deciles)		0.15***	0.01	0.11***	0.01
Naturalisation	Did not naturalise	Ref.	Ref.	Ref.	Ref.
	Naturalised	-0.31**	0.08	-1.51***	0.12
Income (deciles)*Naturalisation		-	-	0.22***	0.02
Employment	Employed	Ref.	Ref.	Ref.	Ref.
	Not employed	0.19***	0.06	0.18***	0.06
Partner status	Non-Dutch partner	Ref.	Ref.	Ref.	Ref.
	Dutch partner	0.59***	0.13	0.60***	0.13
Length of stay		0.10***	0.01	0.10***	0.01
Number of children (household)		0.25***	0.04	0.26***	0.04
Rate of co-nationals	First quartile	Ref.	Ref.	Ref.	Ref.
	Second quartile	-0.83***	0.13	-0.82***	0.13
	Third quartile	-2.51***	0.19	-2.52***	0.19
	Fourth quartile	-5.47***	0.28	-5.50***	0.28

Rate of persons with an immigrant background	First quartile	Ref.	Ref.	Ref.	Ref.
	Second quartile	-8.40***	0.20	-8.39***	0.20
	Third quartile	-15.68***	0.24	-15.67***	0.24
	Fourth quartile	-28.08***	0.28	-28.07***	0.28
Observations = 215,027					
Individuals = 30,442					

Source: Statistics Netherlands. *p < .05; **p < .01; ***p<0.001.

Table C. 6 Linear individual fixed effects regression with quadratic term (Whole population)

		Model 3: Whole population	
		Coefficients	Std. Err.
Income (deciles)		0.02	0.04
Income*Income		0.01**	0.00
Naturalisation	Did not naturalise	Ref.	Ref.
	Naturalised	0.01	0.19
Income (deciles)*Naturalisation		-0.48**	0.08
Income*Income*Naturalisation		0.06***	0.01
Employment	Employed	Ref.	Ref.
	Not employed	0.19***	0.05
Partner status	Non-Dutch partner	Ref.	Ref.
	Dutch partner	0.59***	0.11
Length of stay		0.09***	0.01
Number of children (household)		0.24***	0.04
Rate of co-nationals	First quartile	Ref.	Ref.
	Second quartile	-0.84***	0.14
	Third quartile	-2.53***	0.19
	Fourth quartile	-5.51***	0.29

Rate of persons with an immigrant background	First quartile	Ref.	Ref.
	Second quartile	-8.39***	0.20
	Third quartile	-15.66***	0.24
	Fourth quartile	-28.07***	0.28
	Observations = 215,027		
	Individuals = 30,442		

Source: Statistics Netherlands. *p < .05; **p < .01; ***p<0.001.

Table C. 7 Linear individual fixed effects regression (Became a homeowner/Never became a homeowner)

		Model 4: Became a homeowner (1)		Model 5: Became a homeowner(2)		Model 6: Never became a homeowner (1)		Model 7: Never became a homeowner (2)	
		Coefficients	Std. Err.	Coefficients	Std. Err.	Coefficients	Std. Err.	Coefficients	Std. Err.
Income (deciles)		0.13***	0.02	0.08****	0.02	0.12****	0.02	0.12***	0.02
Naturalisation	Did not naturalise	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
	Naturalised	-0.03	0.12	-1.64***	0.28	-0.29**	0.09	-0.23	-0.15
Income (deciles)*Naturalisation		-	-	0.24***	0.04	-	-	-0.01	0.03
Employment	Employed	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
	Not employed	0.26***	0.08	0.25***	0.08	0.14***	0.07	0.14***	0.07
Partner status	Non-Dutch partner	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
	Dutch partner	0.81***	0.24	0.77***	0.24	0.49**	0.14	0.49**	0.14
Length of stay		0.25***	0.01	0.25***	0.01	-0.08*	0.01	-0.08*	0.01
Number of children (household)		0.52***	0.06	0.52***	0.07	-0.04	0.05	-0.04	0.05
Rate of co-nationals	First quartile	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
	Second quartile	-0.39***	0.19	-0.39***	0.19	-1.47***	0.20	-1.47***	0.20
	Third quartile	-1.54***	0.28	-1.59***	0.34	-3.80***	0.29	-3.80***	0.29
	Fourth quartile	-3.30***	0.44	-3.29***	0.42	-7.70***	0.40	-7.70***	0.39

Rate of persons with an immigrant background	First quartile	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
	Second quartile	-8.24***	0.28	-8.24***	0.28	-8.51***	0.29	-8.51***	0.29
	Third quartile	-15.74***	0.34	-15.72***	0.34	-15.54***	0.34	-15.54***	0.34
	Fourth quartile	-28.15***	0.42	-28.13***	0.42	-27.89***	0.39	-27.89***	0.39
		Observations = 106,899; Individuals = 14,950				Observations = 108,128; Individuals = 15,492			

Source: Statistics Netherlands. *p < .05; **p < .01; ***p<0.001.

Table C. 8 Linear individual fixed effects regression with quadratic term (Became a homeowner/Never became a homeowner)

		Model 8: Became a homeowner		Model 9: Never became a homeowner	
		Coefficients	Std. Err.	Coefficients	Std. Err.
Income		-0.15*	0.06	0.38***	0.08
Income*Income		0.02***	0.00	-0.03**	0.01
Naturalisation	Did not naturalise	Ref.	Ref.	Ref.	Ref.
	Naturalised	-0.24	0.44	0.58*	0.29
Income*Naturalisation		-0.34*	0.14	-0.43**	0.13
Income*Income*Naturalisation		0.05***	0.01	0.04***	0.01
Employment	Employed	Ref.	Ref.	Ref.	Ref.
	Not employed	0.24***	0.08	0.15	0.07
Partner status	Non-Dutch partner	Ref.	Ref.	Ref.	Ref.
	Dutch partner	0.74***	0.24	0.49**	0.15
Length of stay		0.24***	0.01	-0.08***	0.01
Number of children (household)		0.55***	0.07	-0.04	0.05
Rate of co-nationals	First quartile	Ref.	Ref.	Ref.	Ref.
	Second quartile	-0.40***	0.19	-1.46***	0.20
	Third quartile	-1.55***	0.28	-3.77***	0.29
	Fourth quartile	-3.30***	0.44	-7.65***	0.40

Rate of persons with an immigrant background	First quartile	Ref.	Ref.	Ref.	Ref.
	Second quartile	-8.23***	0.28	-8.51***	0.29
	Third quartile	-15.71***	0.34	-15.54***	0.34
	Fourth quartile	-28.12***	0.42	-27.88***	0.39
		Observations = 106,899; Individuals = 14,950		Observations = 108,128; Individuals = 15,492	

Source: Statistics Netherlands. *p < .05; **p < .01; ***p<0.001.

Table C. 9 Linear individual fixed effects regression (EU migrants/Non-EU migrants)

		Model 10: EU migrants		Model 11: Non-EU migrants	
		Coefficients	Std. Err.	Coefficients	Std. Err.
Income (deciles)		0.06**	0.02	0.11***	0.02
Naturalisation	Did not naturalise	Ref.	Ref.	Ref.	Ref.
	Naturalised	-0.80	0.76	-1.22***	0.15
Income (deciles)*Naturalisation		0.12	0.10	0.22***	0.02
Employment	Employed	Ref.	Ref.	Ref.	Ref.
	Not employed	0.10	0.12	0.22***	0.02
Partner status	Non-Dutch partner	Ref.	Ref.	Ref.	Ref.
	Dutch partner	0.23	0.45	0.60***	0.13
Length of stay		0.25***	0.02	0.02	0.01
Number of children (household)		0.70***	0.11	0.17***	0.05
Rate of co-nationals	First quartile	Ref.	Ref.	Ref.	Ref.
	Second quartile	-0.50*	0.22	-0.90***	0.17
	Third quartile	-0.91***	0.32	-3.27***	0.25
	Fourth quartile	-1.60***	0.49	-6.92***	0.36

Rate of persons with an immigrant background	First quartile	Ref.	Ref.	Ref.	Ref.
	Second quartile	-8.49***	0.38	-8.23***	0.25
	Third quartile	-15.63***	0.49	-15.48***	0.30
	Fourth quartile	-27.84***	0.63	-27.66***	0.33
		Observations = 50,323		Observations = 164,704	
		Individuals = 7,356		Individuals = 23,086	

Source: Statistics Netherlands. *p < .05; **p < .01; ***p<0.001.

Table C. 10 Linear individual fixed effects regression with quadratic term (EU migrants/Non-EU migrants)

		Model 12: EU migrants		Model 13: Non-EU migrants	
		Coefficients	Std. Err.	Coefficients	Std. Err.
Income (deciles)		-0.21*	0.08	0.16*	0.07
Income*Income		0.02**	0.01	-0.00	0.01
Naturalisation	Did not naturalise	Ref.	Ref.	Ref.	Ref.
	Naturalised	1.90	1.44	0.49*	0.25
Income (deciles)*Naturalisation		-0.98*	0.47	-0.57***	0.10
Income*Income*Naturalisation		0.09*	0.04	0.07***	0.01
Employment	Employed	Ref.	Ref.	Ref.	Ref.
	Not employed	0.09	0.04	0.21***	0.06
Partner status	Non-Dutch partner	Ref.	Ref.	Ref.	Ref.
	Dutch partner	0.18	0.45	0.58***	0.13
Length of stay		0.23***	0.02	0.01	0.01
Number of children (household)		0.71***	0.11	0.17***	0.05
Rate of co-nationals	First quartile	Ref.	Ref.	Ref.	Ref.
	Second quartile	-0.50***	0.22	-0.89***	0.17
	Third quartile	-0.91***	0.32	-3.26***	0.25
	Fourth quartile	-1.59***	0.49	-6.91***	0.36

Rate of persons with an immigrant background	First quartile	Ref.	Ref.	Ref.	Ref.
	Second quartile	-8.49***	0.38	-8.22***	0.25
	Third quartile	-15.62***	0.49	-15.48***	0.30
	Fourth quartile	-27.82***	0.62	-27.76***	0.34
		Observations = 50,323		Observations = 164,704	
		Individuals = 7,356		Individuals = 23,086	

Source: Statistics Netherlands. *p < .05; **p < .01; ***p<0.001.

Table C. 11 Linear individual fixed effects regression (EU 15 + EFTA/EU post 2004/Turks and Moroccans/Non-EU migrants (Turks and Moroccans excl.)

		Model 14: EU 15+ EFTA		Model 15: EU post 2004		Model 16: Tks & Mor.		Model 17: Non-EU migr. (Tk & Mor. Excl.)	
		Coefficients	Std. Err.	Coefficients	Std. Err.	Coefficients	Std. Err.	Coefficients	Std. Err.
Income		0.06*	0.03	0.05	0.04	0.05	0.03	0.12***	0.02
Naturalisation	Did not naturalise	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
	Naturalised	-1.13	2.62	-0.67	0.83	-0.96***	0.27	-1.42***	0.18
Income*Naturalisation		0.12	0.32	0.19	0.11	0.23***	0.05	0.20***	0.03
Employment	Employed	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
	Not employed	0.12	0.16	0.13	0.17	0.17	0.10	0.16*	0.08
Partner status	Non-Dutch partner	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
	Dutch partner	0.35	0.64	0.00	0.68	-0.03	0.21	0.79***	0.14
Length of stay		0.25***	0.02	0.26***	0.03	-0.21***	0.02	0.13***	0.01
Number of children (household)		0.64***	0.13	0.87***	0.20	0.21**	0.06	0.27***	0.06

Rate of co-nationals	First quartile	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
	Second quartile	0.01	0.30	-1.06***	0.33	-2.61***	0.71	-0.82***	0.18
	Third quartile	0.25	0.43	-2.10***	0.47	-6.08***	0.81	-3.05***	0.27
	Fourth quartile	0.84	0.81	-3.50***	0.63	-12.06***	0.85	-4.70***	0.46
Rate of persons with an immigrant background	First quartile	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
	Second quartile	-8.69***	0.52	-8.32***	0.56	-7.32***	0.47	-8.24***	0.29
	Third quartile	-14.74***	0.65	-17.22***	0.74	-13.70***	0.53	-15.69***	0.35
	Fourth quartile	-26.41***	0.82	-29.26***	0.95	-24.40***	0.60	-28.80***	0.40
		Observations = 29,805		Observations = 20,518		Observations = 48,332		Observations = 116,372	
		Individuals = 4,429		Individuals = 2,927		Individuals = 6,623		Individuals = 16,463	

Source: Statistics Netherlands. *p < .05; **p < .01; ***p<0.001.

Table C. 12 Linear individual fixed effects regression with quadratic term (EU 15 + EFTA/EU post 2004/Turks and Moroccans/Non-EU migrants (Turks and Moroccans excl.))

		Model 18: EU 15 + EFTA		Model 19: EU post 2004		Model 20: Tks and Mor.		Model 21: Non-EU migr. (Tk and Mor. Excl.)	
		Coefficients	Std. Err.	Coefficients	Std. Err.	Coefficients	Std. Err.	Coefficients	Std. Err.
Income (deciles)		-0.15	0.10	-0.32*	0.14	-0.12	0.09	0.32***	0.08
Income*Income		0.02*	0.01	0.03**	0.01	0.02	0.01	-0.02*	0.01
Naturalisation	Did not naturalise	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
	Naturalised	-3.55	3.69	2.29	1.60	-0.36	0.47	0.59*	0.29
Income (deciles)*Naturalisation		1.17	1.12	-1.08*	0.53	-0.04	0.19	-0.74***	0.12
Income*Income*Naturalisation		-0.08	0.09	0.10*	0.04	-0.02	0.02	0.09***	0.01
Employment	Employed	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
	Not employed	0.11	0.16	0.11	0.17	0.18	0.10	0.16*	0.08
Partner status	Non-Dutch partner	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
	Dutch partner	0.34	0.64	-0.07	0.67	-0.05	0.21	0.78***	0.17

Length of stay		0.25***	0.02	0.24***	0.03	-0.21***	0.02	0.13***	0.02
Number of children (household)		0.65***	0.13	0.88***	0.20	0.21***	0.06	0.26***	0.06
Rate of co-nationals	First quartile	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
	Second quartile	0.01	0.30	-1.08***	0.33	-2.60***	0.71	-0.82***	0.18
	Third quartile	0.25	0.43	-2.11***	0.47	-6.06***	0.81	-3.04***	0.27
	Fourth quartile	0.84	0.81	-3.51***	0.63	-12.04***	0.85	-4.64***	0.46
Rate of persons with an immigrant background	First quartile	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
	Second quartile	-8.68***	0.52	-8.31***	0.56	-7.33***	0.47	-8.23***	0.29
	Third quartile	-14.74***	0.65	-17.21***	0.73	-13.70***	0.53	-15.69***	0.35
	Fourth quartile	-26.40***	0.82	-29.20***	0.94	-24.41***	0.60	-28.78***	0.40
		Observations = 29,805; Individuals = 4,429		Observations = 20,518; Individuals = 2,927		Observations = 48,332; Individuals = 6,623		Observations = 116,372; Individuals = 16,463	

Source: Statistics Netherlands. *p < .05; **p < .01; ***p<0.001.

III. Multi-collinearity checks

Table C. 13 VIF values

Variables	VIF
Income deciles	1.33
Naturalisation	1.25
Length of stay	1.18
Number of children	1.03
Partner status	1.13
Employment status	1.13
Co-nationals – second quartile	1.58
Co-nationals – third quartile	1.65
Co-nationals – fourth quartile	2.03
Rate of persons with an immigrant background – second quartile	1.58
Rate of persons with an immigrant background – third quartile	1.66
Rate of persons with an immigrant background – fourth quartile	1.95
Total	1.46

Source: Statistics Netherlands.

Appendix D

Supplementary materials Chapter 5

I. Descriptive statistics

Table D. 1 Variables description

Name	Description	Categories	Nature	Level of measurement
Neighbourhood deprivation (1)	Rate of individuals with unemployment benefits living in the neighbourhood (%)	1 = First quartile (< 1.09%) 2 = Second quartile (1.09 – 1.51%) 3 = Third quartile (1.51 – 1.99%) 4 = Fourth quartile (> 1.99%)	Time variant	Neighbourhood
Neighbourhood deprivation (2)	Rate of individuals with paid employment living in the neighbourhood (inversed scale from high % of employment to low % of employment)	1 = First quartile (< 0.54.24%) 2 = Second quartile (54.24 – 59.57%) 3 = Third quartile (59.57- 65.07%) 4 = Fourth quartile (65.07 – 100%)	Time variant	Neighbourhood
Neighbourhood deprivation (3)	Rate of individuals in the four lowest deciles of Dutch income)	1 = First quartile (< 36.19%) 2 = Second quartile (36.19– 49.89%) 3 = Third quartile (49.89 – 62.44%) 4 = Fourth quartile (62.44 – 100%)	Time variant	Neighbourhood
Mortality	Indicator of whether someone has passed away	0 = No 1 = Yes	Time variant	Individual
Standardized household income	Mean standardized household income over the whole observation period	1 = First quartile (< 13,595 eur) 2 = Second quartile (13,595 – 17,574 eur) 3 = Third quartile (17,574 – 23,056 eur) 4 = Fourth quartile (> 23,056 eur)	Time constant	Household
Citizenship status	Indicator of whether someone has acquired Dutch citizenship within the first 10 years of residency	0 = No 1 = Yes	Time constant	Individual
Age at migration	Age at the moment of migration to the Netherlands	1 = First quartile (18 – 29 yo) 2 = Second quartile (29-35 yo) 3 = Third quartile (35 – 41 yo) 4 = Fourth quartile (> 41 yo)	Time constant	Individual

Gender	Gender	1 = Male 2 = Female	Time constant	Individual
Partner status	Indicator of whether someone is in partnership with a Dutch citizen	0 = No 1 = Yes	Time variant	Household
Year of settlement	Year of arrival in the Netherlands	1 to 10 = 1985 to 1995	Time invariant	Individual
Housing type	Type of housing on a particular year	1= Homeowner 2=Rent without housing benefits 3= Rent with housing benefits 4 = No information	Time variant	Household
Rate of co-nationals	Rate of co-nationals living in the neighbourhood	1 = First quartile (< 0.2%) 2 = Second quartile (0.2 – 1%) 3 = Third quartile (1 – 4.6%) 4 = Fourth quartile (> 4.6 %)	Time variant	Neighbourhood
Urbanisation rate	Number of inhabitants per squared km	< than 500 inh/km2 Between 500 and 1000 Btw 1000 and 1500 Btw 1500 and 2500 > 2500 inh/km2	Time variant	Municipality

Source: Statistics Netherlands.

Table D. 2 Descriptive statistics (1)

		N	%
Passed away within the examination period	No	224,484	96.54
	Yes	8,038	3.46
Neighbourhood deprivation (% with unemployment benefits)	First quartile	58,130	25.00
	Second quartile	58,219	25.03
	Third quartile	58,080	24.98
	Fourth quartile	58,093	24.99
Neighbourhood deprivation (% of employed individuals)	First quartile	65,986	28.99
	Second quartile	58,006	25.49
	Third quartile	53,749	23.62
	Fourth quartile	49,845	21.90
Neighbourhood deprivation (% of individuals in the four lowest deciles of Dutch income)	First quartile	50,574	22.22
	Second quartile	61,553	27.05
	Third quartile	61,047	26.82
	Fourth quartile	54,412	23.91
Gender	Male	107,340	46.16
	Female	125,182	53.84
Settlement year	1985	15,334	6.59
	1986	16,584	7.13
	1987	17,767	7.64
	1988	19,535	8.40
	1989	20,500	8.82
	1990	23,667	10.18
	1991	24,063	10.35
	1992	24,733	10.64
	1993	26,220	11.28
	1994	21,721	9.34
	1995	22,398	9.63
Standardized household income	First quartile	58,674	25.34
	Second quartile	57,486	24.83
	Third quartile	57,529	24.84
	Fourth quartile	57,875	24.99
Age at arrival	First quartile	57,828	24.87
	Second quartile	60,890	26.19
	Third quartile	55,545	23.89
	Fourth quartile	58,259	25.06
Naturalised within 10 years	No	80,735	34.72
	Yes	151,787	65.28
EU citizenship upon arrival	No	198,945	85.56
	Yes	33,477	14.44
Refugees	No	143,548	61.74
	Yes	88,974	38.26
Country of origin	Iraq	4,380	1.88
	Indonesia	4,698	2.02
	Belgium	4,810	2.09

	China	4,973	2.13
	Poland	5,058	2.18
	Iran	7,622	3.28
	Yugoslavia	18,110	7.79
	Morocco	41,913	18.03
	Turkey	46,741	20.10
	Other countries	94,217	40.52
		Individuals = 232,522	

Source: Statistics Netherlands.

Table D. 3 Descriptive statistics (2)

		Passed away within observation period
		%
Neighbourhood deprivation (% with unemployment benefits)	First quartile	3.21
	Second quartile	3.24
	Third quartile	3.42
	Fourth quartile	3.97
Neighbourhood deprivation (% of employed individuals)	First quartile	3.14
	Second quartile	3.47
	Third quartile	3.11
	Fourth quartile	2.88
Neighbourhood deprivation (% of individuals in the four lowest deciles of Dutch income)	First quartile	3.15
	Second quartile	3.34
	Third quartile	3.05
	Fourth quartile	3.26
Gender	Male	4.33
	Female	2.71
Settlement year	1985	5.92
	1986	5.70
	1987	4.97
	1988	4.20
	1989	3.87
	1990	3.05
	1991	2.98
	1992	2.62
	1993	2.52
	1994	2.35
	1995	1.92
Naturalised within 10 years	No	4.37
	Yes	2.97
EU countries (before 2004)	No	2.96
	Yes	6.40
Refugees	No	3.92
	Yes	2.70
Country of origin	Iraq	2.03
	Indonesia	3.70
	Belgium	6.30
	China	2.19
	Poland	3.46
	Iran	2.56
	Yugoslavia	3.24
	Morocco	2.22
	Turkey	2.35
	Other countries	2.61
Age at arrival	First quartile	1.01
	Second quartile	1.62
	Third quartile	2.99
	Fourth quartile	8.25

Standardized household income	First quartile	7.14
	Second quartile	2.22
	Third quartile	1.59
	Fourth quartile	1.21

Source: Statistics Netherlands.

II. Main models

Table D. 4 Cox Proportional Hazard models

		Model 1		Model 2 - income included		Model 3 - citizenship included		Model 4 - income and citizenship included		Model 5- all controls included	
		HR	Std. Err	HR	Std. Err.	HR	Std. Err	HR	Std. Err.	HR	Std. Err.
Neighbourhood deprivation (% with unemployment benefits)	First quartile	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	Second quartile	0.99	0.03	0.98	0.04	0.99	0.03	0.99	0.04	0.95	0.04
	Third quartile	1.02	0.04	1.00	0.04	1.03	0.03	1.01	0.04	0.98	0.04
	Fourth quartile	1.11***	0.04	1.03	0.04	1.13***	0.04	1.05	0.04	0.92	0.04
Standardized household income	First quartile	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	Second quartile	-	-	0.31***	0.01	-	-	0.31***	0.01	0.33***	0.02
	Third quartile	-	-	0.22***	0.01	-	-	0.22***	0.01	0.20***	0.01
	Fourth quartile	-	-	0.16***	0.01	-	-	0.16***	0.01	0.10***	0.01
Naturalised within 10 years	No	Ref	Ref	Ref	Ref	Ref	Ref	Ref.	Ref.	Ref	Ref
	Yes	-	-	-	-	0.77***	0.02	0.79***	0.02	0.84***	0.03
Gender	No	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref.	Ref.
	Yes	-	-	-	-	-	-	-	-	0.70***	0.02
Rate of co-nationals	First quartile	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref.	Ref.
	Second quartile	-	-	-	-	-	-	-	-	0.91***	0.04
	Third quartile	-	-	-	-	-	-	-	-	0.88***	0.04
	Fourth quartile	-	-	-	-	-	-	-	-	0.84***	0.05

Age at arrival	First quartile	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref.	Ref.
	Second quartile	-	-	-	-	-	-	-	-	1.72***	0.10
	Third quartile	-	-	-	-	-	-	-	-	2.64***	0.17
	Fourth quartile	-	-	-	-	-	-	-	-	5.65***	0.40
Dutch partner	No	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref.	Ref.
	Yes	-	-	-	-	-	-	-	-	0.89***	0.02
Rate of urbanisation	< than 500 inh/km2	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref.	Ref.
	Between 500 and 1000	-	-	-	-	-	-	-	-	1.04	0.04
	Btw 1000 and 1500	-	-		-	-	-		-	1.04	0.05
	Btw 1500 and 2500	-	-		-	-	-		-	1.06	0.06
	>2500	-	-		-	-	-		-	0.97	0.11
Housing type	Homeowner	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	Rent w/o housing benefits	-	-	-	-	-	-	-	-	1.11	0.34
	Rent w/ housing benefits	-	-	-	-	-	-	-	-	1.99*	0.59
	No information	-	-	-	-	-	-	-	-	11.1***	29.3
		Var of the random effect = 0.06		Var of the random effect = 0.09		Var of the random effect = 0.06		Var of the random effect = 0.09		Var of the random effect = 0.10	
Observations = 3,357,713; Individuals = 227,720; Events = 6,797											

Source: Statistics Netherlands. Model 4 stratified by year of arrival and country of origin. *p < .05; **p < .01; ***p<0.001.

Table D. 5 Cox Proportional Hazard models (whole population)

		Model 6 – Deprivation = % of employed individuals (univariate)		Model 7 - Deprivation = % of employed individuals (full controls)		Model 8 – Deprivation = % of individuals in the four lowest deciles of Dutch income (univariate)		Model 9 – Deprivation = % of individuals in the four lowest deciles of Dutch income (full controls)	
		HR	Std. Err.	HR	Std Err	HR	Std. Err.	HR	Std. Err.
Neighbourhood deprivation (alternative operationalizations)	Low depriv.	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	Med-low depriv.	1.16***	0.04	1.07	0.04	1.15***	0.04	0.99	0.04
	Med-high depriv.	1.15***	0.04	1.03	0.04	1.13***	0.04	0.99	0.04
	High depriv.	1.12***	0.04	1.00	0.04	1.11***	0.04	0.94	0.04
Standardized household income	First quartile	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	Second quartile	-	-	0.36***	0.01	-	-	0.36***	0.01
	Third quartile	-	-	0.23***	0.01	-	-	0.23***	0.01
	Fourth quartile	-	-	0.11***	0.00	-	-	0.11***	0.00
Naturalised within 10 years	No	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	Yes	-	-	0.86***	0.03	-	-	0.86***	0.03
Gender	No	Ref	Ref	Ref	Ref	Ref.	Ref.	Ref.	Ref.
	Yes	-	-	0.65***	0.02	-	-	0.70***	0.02
Rate of co-nationals	First quartile	Ref	Ref	Ref	Ref	Ref.	Ref.	Ref.	Ref.
	Second quartile	-	-	0.91*	0.04	-	-	0.91*	0.04
	Third quartile	-	-	0.88*	0.04	-	-	0.89*	0.04

	Fourth quartile	-	-	0.84***	0.05	-	-	0.86*	0.06
Age at arrival	First quartile	Ref	Ref	Ref	Ref	Ref.	Ref.	Ref.	Ref.
	Second quartile	-	-	1.72***	0.10	-	-	1.72***	0.10
	Third quartile	-	-	2.64***	0.17	-	-	2.64***	0.17
	Fourth quartile	-	-	5.40***	0.40	-	-	5.40***	0.40
Dutch partner	No	Ref	Ref	Ref	Ref	Ref.	Ref.	Ref.	Ref.
	Yes	-	-	0.89***	0.02	-	-	0.88***	0.02
Rate of urbanisation	< than 500 inh/km2	Ref	Ref	Ref	Ref	Ref.	Ref.	Ref.	Ref.
	Between 500 and 1000	-	-	1.03	0.03	-	-	1.03	0.03
	Btw 1000 and 1500	-	-	1.03	0.05	-	-	1.03	0.05
	Btw 1500 and 2500	-	-	1.06	0.06	-	-	1.05	0.06
	>2500	-	-	0.96	0.11	-	-	0.95	0.11
Housing type	Homeowner	Ref	Ref	Ref	Ref	Ref.	Ref.	Ref.	Ref.
	Rent w/o housing benefits	-	-	1.11	0.34	-	-	1.11	0.34
	Rent w/ housing benefits	-	-	1.99*	0.59	-	-	1.99*	0.59
	No information	-	-	11.1***	29.3	-	-	11.1***	29.3
		Variance of the random effect = 0.06		Variance of the random effect = 0.10		Variance of the random effect = 0.06		Variance of the random effect = 0.10	
				Observations = 3,357,713; Individuals = 227,720; Events = 6,797					

Source: Statistics Netherlands. Models stratified by year of arrival and country of origin. *p < .05; **p < .01; ***p<0.001.

Table D. 6 Cox Proportional Hazard models (Non EU/EU and Other/Refugee)

		Model 10 – Non-EU		Model 11 – EU		Model 12 – Other		Model 13 – Refugee	
		HR	Std. Err	HR	Std. Err.	HR	Std. Err.	HR	Std Err.
Neighbourhood deprivation (% with unemployment benefits)	First quartile	Ref	Ref	Ref.	Ref.	Ref	Ref	Ref.	Ref.
	Second quartile	0.97	0.05	0.95	0.08	0.92	0.05	1.08	0.07
	Third quartile	1.01	0.05	0.96	0.08	0.95	0.05	1.06	0.07
	Fourth quartile	0.96	0.05	0.92	0.08	0.90	0.05	1.09	0.07
Naturalised within 10 years	No	Ref	Ref	Ref.	Ref.	Ref	Ref	Ref.	Ref.
	Yes	0.81***	0.03	1.05	0.06	0.88***	0.03	0.80***	0.04
Standardized household income	First quartile	Ref	Ref	Ref.	Ref.	Ref	Ref	Ref	Ref
	Second quartile	0.32***	0.01	0.34***	0.02	0.31***	0.01	0.31***	0.02
	Third quartile	0.21***	0.01	0.21***	0.01	0.20***	0.01	0.19***	0.01
	Fourth quartile	0.11***	0.01	0.10***	0.01	0.10***	0.01	0.10***	0.01
Gender	Male	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
	Female	0.71***	0.02	0.66***	0.03	0.61***	0.02	0.65***	0.02
Rate of co-nationals	First quartile	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	Second quartile	0.93	0.04	0.89	0.07	0.88	0.04	0.93	0.06
	Third quartile	0.93	0.05	0.79	0.07	0.85*	0.05	0.91	0.07

	Fourth quartile	0.87	0.06	0.86	0.13	0.88	0.06	0.75*	0.07
Age at arrival	First quartile	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
	Second quartile	1.76***	0.11	1.67***	0.31	1.75***	0.13	1.65***	0.17
	Third quartile	2.58***	0.18	3.16***	0.59	2.62***	0.21	2.65***	0.29
	Fourth quartile	5.22***	0.42	6.48***	1.33	5.43***	0.48	5.28***	0.72
Dutch partner	No	Ref	Ref	Ref.	Ref.	Ref	Ref	Ref	Ref
	Yes	0.88**	0.03	0.86	0.09	0.83***	0.03	0.98	0.04
Rate of urbanisation	< than 500 inh. Per. Sq. m.	Ref	Ref	Ref.	Ref.	Ref	Ref	Ref	Ref
	Between 500 and 1000	1.01	0.04	1.19*	0.07	1.07*	0.04	0.98	0.05
	Btw 1000 and 1500	1.03	0.06	1.05	0.10	1.08*	0.07	0.95	0.08
	Btw 1500 and 2500	1.13	0.08	0.98	0.10	1.06	0.07	1.04	0.10
	>2500	1.15	0.18	0.86	0.15	0.91*	0.13	1.08	0.23
Housing type	Homeowner	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	Rent w/o housing benefits	1.42	0.53	1.46	0.51	0.85	0.30	2.86	2.23
	Rent w/ housing benefits	2.48*	0.91	1.32	0.87	1.61	0.53	4.53*	3.49
	No information	14.4***	34.01	6.45***	26.9	7.78***	22.01	34.58***	25.01
		Variance of the random effect = 0.09		Variance of the random effect = 0.10		Variance of the random effect = 0.08		Variance of the random effect = 0.10	
		Obs. = 2,862 639; Individuals = 195,764; Events = 5,147		Obs. = 495,112; Individuals = 31,966; Events = 1,651		Obs. = 2,151,435; Individuals = 139,235; Events = 4,581		Obs. = 1,206,316; Individuals = 88,415; Events = 2,217	

Source: Statistics Netherlands. Models stratified by year of arrival and country of origin. *p < .05; **p < .01; ***p<0.001.

III. Robustness checks

Table D. 7 Group composition – Information on education/No information on education

		Individuals for whom information for education is not available	Individuals for whom information for education is available
Mortality	Did not pass away within the obs period	96.26	98.26
	Passed away within the obs period	3.74	1.74
Age at arrival	First quartile	22.91	36.71
	Second quartile	26.54	24.03
	Third quartile	24.45	20.48
	Fourth quartile	26.09	18.79
Naturalised within 10 years	No	36.54	23.69
	Yes	63.56	76.31
Gender	Male	45.82	48.27
	Female	54.18	51.73
Settlement year	1985	7.68	0
	1986	8.31	0
	1987	7.89	6.14
	1988	8.68	6.69
	1989	9.10	7.12
	1990	10.47	8.43
	1991	10.59	8.88
	1992	10.70	10.25
	1993	11.11	12.29
	1994	8.94	11.79
	1995	6.43	28.42
EU citizens	No	85.42	86.41
	Yes	14.58	13.59
Refugees	No	63.54	50.79
	Yes	36.46	49.21
Standardized household income	First quartile	26.61	17.69
	Second quartile	25.71	19.52
	Third quartile	24.73	25.53
	Fourth quartile	22.96	37.27

Source: Statistics Netherlands.

Table D. 8 Cox Proportional Hazard models – sample based on individuals for whom information on education is available

		Model A.3 = Education not included		Model A.4 = Education included	
		HR	Std. Err	HR	Std. Err.
Neighbourhood deprivation (% with unemployment benefits)	First quartile	Ref	Ref	Ref	Ref
	Second quartile	0.92	0.12	0.92	0.12
	Third quartile	0.91	0.14	0.91	0.14
	Fourth quartile	0.90	0.12	0.90	0.12
Standardized household income overtime	First quartile	Ref	Ref	Ref	Ref
	Second quartile	0.34***	0.04	0.34***	0.04
	Third quartile	0.20***	0.03	0.20***	0.03
	Fourth quartile	0.08***	0.01	0.08***	0.01
Naturalised within 10 years	No	Ref	Ref	Ref	Ref
	Yes	0.88	0.09	0.87	0.09
Gender	No	Ref	Ref	Ref	Ref
	Yes	0.66***	0.06	0.65***	0.06
Rate of co-nationals	First quartile	Ref	Ref	Ref	Ref
	Second quartile	0.95	0.12	0.95	0.12
	Third quartile	0.93	0.14	0.93	0.14
	Fourth quartile	0.84	0.19	0.84	0.18
Age at arrival	First quartile	Ref	Ref	Ref	Ref
	Second quartile	1.11	0.21	1.11	0.21
	Third quartile	1.68***	0.32	1.68***	0.33
	Fourth quartile	4.79***	0.79	4.79***	0.82
Dutch partner	No	Ref	Ref	Ref	Ref
	Yes	0.88	0.09	0.88	0.09
Rate of urbanisation	< than 500 inh. Per. Sq. m.	Ref	Ref	Ref	Ref
	Between 500 and 1000	1.04	0.11	1.03	0.11
	Btw 1000 and 1500	0.96	0.17	0.95	0.16
	Btw 1500 and 2500	0.93	0.19	0.92	0.19
	>2500	0.96	0.32	0.94	0.31

Housing type	Homeowner	Ref	Ref	Ref	Ref
	Rent w/o housing benefits	1.23	1.23	1.23	1.23
	Rent w/ housing benefits	2.76	1.34	2.76	1.34
	No information	21.03***	23.45	21.03***	23.45
Education	Low education	Ref	Ref	Ref	Ref
	Middle education	-	-	0.96	0.10
	High education	-	-	0.81	0.11
			Variance of the random effect = 0.10		
			Obs: 430,679		
			Ind: 32,862; Events: 573		

Source: Statistics Netherlands. Models stratified by year of arrival and country of origin. *p < .05; **p < .01; ***p<0.001.

Impact Paragraph

The main objective of this thesis is to investigate the interplay between immigrants' citizenship acquisition and immigrants' residential context in the Netherlands. With that aim, I develop an empirical strategy, using register data from Statistics Netherlands, that allows me to measure how citizenship and residential context relate to one another and also to investigate the mechanisms driving this relationship. I find that these two concepts are intrinsically connected. In Chapter 2, I observe that social network availability at the neighbourhood level is positively associated with immigrants' decision to naturalise. Thus, immigrants living in a neighbourhood with a dense migrant network are less likely to become Dutch citizens, a relation that may be driven by fewer inter-group contacts. Conversely, I find that having regular contacts with immigrants who have completed the naturalisation procedure may facilitate access to valuable information about the naturalisation process and may be viewed as a signal of an inclusive society which, altogether, can positively affect immigrants' likelihood to naturalise. Taking a different perspective, I conclude in Chapters 3 and 4 that becoming a Dutch citizen facilitates immigrants' mobility to predominantly native and higher-income neighbourhoods. This suggests that naturalisation acts as a positive signal for various housing market actors, thereby reducing the risk of nationality-based discrimination in the renting and homeownership market. In Chapter 5, I examine whether naturalisation can be considered a confounding factor of the relation between neighbourhood's deprivation and immigrants' health. Findings from this chapter show that, although naturalisation does not act as a confounding factor, it is associated with a lower risk of mortality. This demonstrates the relevance of citizenship status as an important predictor of health, which is a crucial aspect of personal well-being.

Immigrants' naturalisation has mostly been studied through the lens of individual-level factors. As a consequence, little is known about the interplay between naturalisation and the residential context in which immigrants live. This thesis aims at bridging this gap by studying how neighbourhood's context may condition immigrants' decision to become citizens but also how naturalisation may shape the residential context in which immigrants live. First, Chapter 2

contributes to the literature on the determinants of citizenship acquisition by showing that the decision to naturalise is not a phenomenon that is solely determined by individual-level predictors. Rather, immigrants who aspire to become citizens are influenced by their residential environment and the individuals they regularly engage with. Second, results from Chapters 3 and 4 provide evidence of nationality-based discrimination in the Dutch housing market and highlight the relevance of citizenship acquisition for immigrants' residential mobility, a factor that has often been neglected in the literature. Moreover, these findings are in line with those of previous studies that have observed the signalling potential of citizenship acquisition in the labour market and among mortgage lenders. Finally, Chapter 5 engages with the literature on neighbourhoods' factors and health. It also relates to previous studies that have demonstrated the detrimental health effects of legal precariousness.

Findings from this research have important societal relevance. First, they emphasise the importance of neighbourhoods' characteristics for immigrants' integration. At a time when the Netherlands actively engages in urban social mixing policies, often based on the assumption that living in a neighbourhood with a high concentration of immigrants will impede immigrants' integration trajectory, these findings offer a more nuanced perspective which is of great interest to policymakers. Second, these findings show that citizenship acquisition is an important element of immigrants' settlement process. Because naturalised immigrants may not be confronted to the same extent with nationality-based discrimination, they are also less likely to be impeded in their spatial assimilation trajectory. This contrasts sharply with the view that considers citizenship acquisition the final stage of the integration process. Moreover, it casts doubts on the appropriateness of the last reforms of the Dutch nationality act that have aimed at increasing the eligibility requirements for naturalisation. By making access to citizenship more restrictive, such reforms may substantially delay the naturalisation procedure and slow down immigrants' integration process. Third, findings from Chapters 3 and 4 suggest that actors in the Dutch housing market may use Dutch citizenship as a source of discrimination. This echoes with existing studies that have found evidence of

discrimination against minority groups in European housing markets and sheds light on a specific form of discrimination that is often neglected in public discourse, namely nationality-based discrimination. This highlights the need for public policy aiming at tackling this issue, and more specifically targeting private renters and mortgage lenders.

These research findings are not only relevant for other researchers working in the field of migration studies but are also important for policy makers and advocacy groups interested in issues related to immigration. They offer an interesting view on the questions of immigrants' integration and citizenship acquisition and shed light on key societal issues that will need to be addressed in the future. They also portray how immigrants' post-settlement trajectory can be influenced by neighbourhoods' resources. This stresses the need for public policies that are not only designed to improve individual-level outcomes but that also take into consideration the broader context in which immigrants reside.

In order to attain these different target groups, I disseminate the results on different types of platforms. First, these empirical findings are compiled in four different papers that have been published in (Chapters 3 and 4), or are under review (Chapters 2 and 5), at reputed international journals in full open-access. This strategy is primarily addressed at academics but may also reach other interest groups. To ensure that the results from this dissertation are also shared with a wider audience, they are publicised through the website of the larger project of which my dissertations is a part (www.milifestatus.com), my individual Twitter account (@Chris_Lec1), as well as the Twitter account of the MiLifeStatus project (@MiLifeStatus). This is all done with the aim of increasing the visibility of the research and reaching out to a wider audience.

Nederlandse samenvatting

Het verkrijgen van de nationaliteit van het bestemmingsland is een belangrijk moment in het vestigingsproces van immigranten. In Nederland kunnen genaturaliseerde immigranten stemmen bij nationale verkiezingen, komen in aanmerking voor specifieke banen die alleen toegankelijk zijn voor burgers met de Nederlandse nationaliteit, en mogen zonder beperkingen reizen en werken in de Europese Unie. Bovendien laat recent onderzoek zien dat genaturaliseerde immigranten minder te maken hebben met discriminatie op de arbeids- en woningmarkt, wat tot uiting komt in betere huisvesting en economische integratie (Peters, 2020; Peters et al., 2018).

Studies die zich richten op de rol van naturalisatie in de levensloop van immigranten hebben vooral aandacht besteed aan persoonskenmerken. De beslissing om te naturaliseren wordt beschouwd als een individuele keuze waarbij immigranten de kosten en baten van naturalisatie afwegen (Yang, 1994). In deze context worden factoren als sociaal-economische status, leeftijd of het land van herkomst gezien als belangrijke determinanten voor de beslissing van immigranten om al dan niet te naturaliseren (Chiswick & Miller, 2009; Peters et al., 2016; Yang, 1994). Dit zien we ook terug in de literatuur over mogelijke positieve effecten van naturalisatie, waar vooral gekeken wordt naar individuele kenmerken, waaronder huisvesting en economische integratie (Hainmueller et al., 2019; Peters et al., 2018; Peters, 2020; Peters et al., 2020).

Afwegingen van immigranten worden echter niet louter bepaald door individuele factoren, maar ook gevormd door de sociale contacten die immigranten onderhouden en de netwerken waarin zij zich begeven. Dit samenspel tussen sociale structuur en de ontwikkeling van de levensloop kan in kaart gebracht worden door te kijken naar de directe omgeving van individuen: de buurt. Omdat de sociaal-economische samenstelling van de buurt mede bepalend is voor de sociale interacties die mensen dagelijks hebben en de activiteiten die zij ondernemen, speelt de buurt een belangrijke rol bij het creëren van kansen en ontwikkelen van normen (Friedrichs & Blasius, 2003; Joshi et al., 2017; Meijer et al., 2012; Mouratidis, 2020).

Onderzoek toont aan dat de woonomgeving met name van belang is voor immigranten die vaker in buurten met lage inkomens en een hoge mate van etnische diversiteit wonen. Vanwege hun precaire sociaal-economische positie zijn zij voor een groot deel afhankelijk van buurtbewoners en andere lokale hulpbronnen (Ryan et al., 2008). Toch is er in de literatuur weinig aandacht voor de wisselwerking tussen naturalisatie en de leefomgeving van immigranten. Dit proefschrift brengt daar verandering in door de rol van de nationaliteit van immigranten te onderzoeken vanuit een nieuw perspectief dat meer aandacht heeft

voor de leefomgeving. Daarbij staat de volgende onderzoeksvraag centraal: *hoe is de wisselwerking tussen de leefomgeving en naturalisatie van immigranten nadat ze zich in Nederland hebben gevestigd?*

Dit proefschrift richt zich op in het buitenland geboren personen die naar Nederland zijn gemigreerd en staan ingeschreven bij een Nederlandse gemeente. Om deze populatie te analyseren wordt gebruik gemaakt van registerdata van het Centraal Bureau voor de Statistiek. Deze gegevens bevatten een breed scala aan sociaal-economische en demografische kenmerken (Bakker, 2014). Op basis van unieke identificatiesleutels zijn deze data te koppelen aan alle in Nederland woonachtige personen. In dit proefschrift worden twee belangrijke analysemethoden toegepast. Hoofdstuk 2, 3 en 5 maken gebruik van Cox Proportional Hazard modellen, een specifieke vorm van survival analyse, en Hoofdstuk 4 past een individual fixed-effects benadering toe.

Theoretische bijdrage: naturalisatie en de woonomgeving van immigranten in de context van spatial assimilation theorie

Er is veel onderzoek gedaan naar vraagstukken omtrent naturalisatie en de woonomgeving van immigranten. Echter, beide concepten worden traditioneel afzonderlijk bestudeerd. Als gevolg daarvan is er weinig kennis over de mate waarin en hoe beide concepten zich tot elkaar verhouden. In dit proefschrift formuleer ik een theoretisch raamwerk om beter te begrijpen hoe naturalisatie en de woonomgeving van immigranten met elkaar samenhangen. Dit raamwerk is verankerd in de *spatial assimilation* theorie.

Spatial assimilation theorie is een belangrijk uitgangspunt om het post-vestigingstraject van immigranten te doorgronden. Volgens deze theorie zouden nieuwkomers in eerste instantie verhuizen naar etnisch geconcentreerde en economisch achtergestelde buurten om zich vervolgens, naarmate zij meer cultureel en economisch integreren, te verplaatsen naar meer welvarende en minder geconcentreerde buurten. Binnen de context van dit proefschrift kan de *spatial assimilation* theorie helpen om beter te begrijpen hoe de kenmerken van de buurt van belang kunnen zijn voor het naturalisatieproces van immigranten. Meer specifiek is de verwachting dat immigranten die in een etnisch diverse of economisch achtergestelde buurt wonen in beperktere mate geïntegreerd zijn en daarom minder geneigd zijn te naturaliseren (Alba & Nee, 1997). Het integratieproces van immigranten wordt daarnaast ook bepaald door hulpbronnen die op buurtniveau beschikbaar zijn. Mogelijk hebben immigranten in etnisch diverse buurten minder contacten

met personen zonder migratieachtergrond, wat het proces van culturele integratie kan belemmeren (Liang, 1994). Bovendien kunnen belangrijke sociale en materiële hulpbronnen ontbreken in buurten met lagere inkomens (Pinkster, 2007, 2009), waardoor de economische integratie van immigranten moeilijker wordt. Dit kan op zijn beurt van invloed zijn op het naturalisatieproces van immigranten.

De *spatial assimilation* theorie kan ook gebruikt worden om beter te begrijpen hoe naturalisatie een rol kan spelen bij de mobiliteit van immigranten op de woningmarkt. Volgens de theoretische verwachting verhuizen genaturaliseerde immigranten, die gemiddeld cultureel en economisch meer geïntegreerd zijn, eerder naar welvarende en overwegend autochtone buurten. Immigranten worden echter vaak in hun mobiliteit belemmerd door discriminatie op de woningmarkt, een proces dat in de literatuur *spatial stratification* genoemd wordt. Het verkrijgen van het Nederlanderschap kan in deze context een positief signaal geven richting hypotheekverstrekkers, verhuurders en verhuurbedrijven over de mate van integratie en toekomstperspectieven van immigranten, waardoor de kans op dergelijke 'statistische discriminatie' kleiner wordt.

Het theoretisch raamwerk kan ook bijdragen aan een beter begrip van buurteffecten. Omdat factoren die samenhangen met economische en culturele integratie een belangrijke rol spelen in het post-vestigingsproces van immigranten, is het belangrijk om te controleren voor ruimtelijke assimilatiefactoren om het unieke effect van buurtkenmerken vast te stellen. In dit verband is meer aandacht voor staatsburgerschap en naturalisatie belangrijk. Onderzoek toont aan dat een stabiele verblijfstatus kan bijdragen aan een betere gezondheid en meer gebruik van diensten van zorginstellingen (Aranda et al., 2014; Aung et al., 2010; Gonzales et al., 2013; Javier et al., 2010; Ortega et al., 2007; Roberson & Runganaikaloo, 2014; Tarraf et al., 2014; Winters et al., 2018). Bovendien kan naturalisatie bijdragen aan de arbeidsmarktintegratie van immigranten (Peters et al., 2020).

Conform de spatial assimilation theorie hebben immigranten in etnisch geconcentreerde of economisch achtergestelde buurten vaak niet de nationaliteit van het vestigingsland. Derhalve zou het verkrijgen van de nationaliteit een belangrijke en onderbelichte factor kunnen zijn voor het verbeteren van hun leefsituatie.

Empirische bevindingen: naturalisatie en de woonomgeving van migranten in Nederland

De onderzoeksvraag wordt beantwoord in vier empirische hoofdstukken. In hoofdstuk 2 wordt het effect van de etnische concentratie van de buurt op het naturalisatiegedrag van immigranten in die buurt onderzocht. Dit hoofdstuk bouwt voort op onderzoek naar de rol van persoons- en buurtkenmerken bij de kans op naturalisatie (Liang, 1994; Logan et al., 2012; Mossaad et al., 2018; Peters et al., 2016). Daarbij worden twee theoretische mechanismen uit de literatuur getoetst: de *migrant enclosure* en *naturalisation diffusion* hypothese. De *migrant enclosure* hypothese stelt dat wonen in een etnisch geconcentreerde buurt de mate van contact met de groep zonder migratieachtergrond vermindert en de kans op interacties binnen de eigen groep vergroot. De verwachting is derhalve dat immigranten minder zullen naturaliseren (Liang, 1994). De gedachte achter het principe van *naturalisation diffusion* is echter dat buurten met veel migranten ook meer personen zullen bevatten die ervaring hebben met het naturalisatieproces. Dit vergroot de kans op het verkrijgen van belangrijke informatie over de voordelen van naturalisatie en hoe de naturalisatieaanvraag succesvol doorlopen kan worden. Bovendien kunnen genaturaliseerde immigranten een signaal geven dat het gastland positief staat tegenover de komst van immigranten (Abascal, 2015; Logan et al., 2012). Om deze redenen zou de verwachting zijn dat immigranten in dergelijke buurten vaker naturaliseren. De resultaten in dit hoofdstuk laten zien dat immigranten in met migranten geconcentreerde buurten een lagere kans op naturalisatie hebben. Deze relatie lijkt te worden verklaard door een grotere beschikbaarheid van migrantennetwerken in deze buurten. Echter, het effect van migranten geconcentreerde buurten wordt minder sterk wanneer deze buurt een groot aandeel genaturaliseerde immigranten bevat. In die zin wordt er gedeeltelijke ondersteuning gevonden voor beide mechanismen. Meer algemeen wordt de relevantie van factoren op buurtniveau voor het naturalisatiegedrag van immigranten onderstreept.

Het derde hoofdstuk van dit proefschrift onderzoekt de mogelijke relatie tussen naturalisatie en het verlaten van met migranten geconcentreerde buurten. Voortbouwend op het principe van de naturalisatiepremie, dat eerder ontwikkeld werd om het effect van naturalisatie op de arbeidsmarkt te verklaren (Bratsberg et al., 2002; Peters et al., 2018, 2020), wordt in dit hoofdstuk beargumenteerd dat naturalisatie een positief signaal kan geven aan actoren op de woningmarkt, waardoor de kans op statistische discriminatie kleiner wordt. Dit is met name de verwachting onder immigranten met een middeninkomen en een vaste baan. De resultaten bevestigen een positieve relatie tussen naturalisatie en het verlaten van met

migranten geconcentreerde buurten. Echter, deze relatie wordt geconditioneerd door de economische situatie van immigranten. In het algemeen ondersteunen de resultaten de gedachte dat naturalisatie de integratie van immigranten kan verbeteren.

Hoofdstuk 4 bouwt voort op de bevindingen uit het voorgaande hoofdstuk door te onderzoeken of naturalisatie een modererende factor is in de relatie tussen inkomen en de economische kenmerken van de buurt waarin immigranten wonen. Dit hoofdstuk veronderstelt eveneens dat genaturaliseerde immigranten minder risico lopen om geconfronteerd te worden met statistische discriminatie, waardoor hogere lonen kunnen resulteren in mobiliteit op de woningmarkt. Om dit nader te onderzoeken is er speciale aandacht voor twee factoren die van invloed kunnen zijn op de kans dat immigranten gediscrimineerd worden op grond van hun nationaliteit: het type actoren in de woningmarkt waar immigranten mee te maken hebben en het land van herkomst van immigranten. De analyses tonen aan dat immigranten met een hoger inkomen over het algemeen in welvarendere buurten wonen. Deze relatie is sterker voor genaturaliseerde immigranten, maar alleen wanneer zij afkomstig zijn van buiten de EU of al huiseigenaar zijn geworden. Dit suggereert dat naturalisatie inderdaad vooral relevant is voor immigrantengroepen die sneller te maken krijgen met discriminatie op de woningmarkt. Bovendien komen de resultaten overeen met de bevindingen uit hoofdstuk 3 waarin is aangetoond dat naturalisatie een belangrijke signaalfunctie kan vervullen, en dat er sprake is van discriminatie op de Nederlandse woningmarkt.

Ten slotte richt hoofdstuk 5 zich op de gezondheid van immigranten. In het bijzonder wordt in dit hoofdstuk gekeken naar de relatie tussen de economische situatie in buurten en de gezondheid van immigranten. De bijdrage van dit hoofdstuk is echter niet alleen het buurtperspectief maar ook de mogelijke rol van naturalisatie als mediërende factor in deze relatie. Op basis van eerder onderzoek dat het verband tussen deprivatie van buurten en slechte gezondheid van immigranten heeft aangetoond (Agyemang et al., 2007; Chang et al., 2012; Denney et al., 2018; Hajat et al., 2010; Pruitt et al., 2016; Raphael et al., 2020) formuleer ik de hypothese dat immigranten in achterstandswijken een grotere kans hebben om binnen de observatieperiode te overlijden. Echter, de verwachting is dat deze relatie deels wordt toegeschreven aan twee sociaal-economische hulpbronnen die verband houden met zowel mobiliteit op de woningmarkt als gezondheid, namelijk het huishoudensinkomen en de nationaliteit van immigranten. De resultaten in dit hoofdstuk laten zien dat immigranten die in een economisch zwakkere buurt wonen een grotere kans

hebben om binnen de observatieperiode te overlijden. Deze relatie verdwijnt echter wanneer gecontroleerd wordt voor huishoudensinkomen en het Nederlanderschap van immigranten. Deze bevindingen druisen in tegen eerdere studies die een negatieve relatie tussen de kwaliteit van de buurt en de kans op overlijden onder immigranten hebben aangetoond, zelfs na correctie voor sociaal-economische status op persoonsniveau (Denny et al., 2018; Hajat et al., 2010). Een verdere bevinding is dat naturalisatie negatief samenhangt met de kans op sterfte. Dit benadrukt de relevantie van de verblijfstatus van immigranten voor hun gezondheid, en onderstreept de positieve rol die naturalisatie kan spelen in het post-vestigingstraject van immigranten.

Antwoord op de onderzoeksvraag

De empirische hoofdstukken in dit proefschrift tonen aan dat naturalisatie en de woonomgeving van immigranten nauw met elkaar samenhangen. In Hoofdstuk 2 komt naar voren dat kenmerken op buurtniveau, en meer specifiek de beschikbaarheid van migrantennetwerken, een belangrijke predictor zijn voor de keuze om al dan niet te naturaliseren. Deze relatie is echter niet eenduidig. Hoewel het hebben van regelmatig contact met andere immigranten de kans op naturalisatie verkleint, kan contact met genaturaliseerde immigranten juist aansporen tot naturalisatie. Hoofdstuk 3 en 4 laten zien dat het Nederlanderschap mobiliteit op de woningmarkt stimuleert door de kans op discriminatie op grond van nationaliteit te verkleinen. Vanuit dit oogpunt kan de nationaliteit van immigranten een bepalende factor zijn voor het type buurt waarin men woont, wat op haar beurt weer van belang is in het post-vestigingsproces in het algemeen. Tot slot geven de resultaten in Hoofdstuk 5 geen bevestiging voor de endogene rol van naturalisatie in de relatie tussen de kwaliteit van de buurt en de kans op sterfte onder immigranten. Dit wordt mogelijk verklaard door de aard van de Nederlandse verzorgingsstaat, waarin het Nederlanderschap van weinig belang is voor toegang tot gezondheidszorg, en een hoge mate van segregatie van buurten voorkomen wordt.

Theoretische en methodologische bijdragen

Dit proefschrift brengt verschillende onderzoeksvelden samen die vooralsnog afzonderlijk bestudeerd zijn. Ten eerste wordt geput uit literatuur die zich richt op determinanten van naturalisatie, waarbij de rol van omgevingskenmerken en de beschikbaarheid van sociale netwerken benadrukt wordt. Ten tweede draagt dit proefschrift bij aan onderzoek naar mobiliteit van immigranten op de woningmarkt door aan te tonen dat naturalisatie kan bijdragen aan de mogelijkheid van immigranten om naar kwalitatief betere buurten te verhuizen. Hoewel in deze literatuur vaak nadruk wordt gelegd op de rol van sociaal-demografische en sociaal-economische kenmerken is er vooralsnog weinig aandacht voor de rol van staatsburgerschap (Bolt & van Kempen, 2010; Vaalavuo et al., 2019; Zorlu & Mulder, 2008). Dit proefschrift levert nieuw bewijs op voor de rol van naturalisatie in het integratieproces van immigranten, en bouwt voort op onderzoek dat zich richt op de relatie tussen naturalisatie en arbeidsmarktintegratie (Peters et al., 2018, 2020). Ten slotte draagt Hoofdstuk 5 bij aan een beter begrip van de relatie tussen buurtkenmerken en de gezondheid van immigranten door een theoretisch raamwerk aan te bieden dat rekening houdt met de mogelijk verstorende rol van financiële middelen en de nationaliteit van immigranten.

Dit proefschrift bevat ook verschillende methodologische innovaties. Het gebruik van registerdata stelt mij in staat kenmerken van buurten te meten met indicatoren die afgeleid zijn van de gehele geregistreerde Nederlandse bevolking. Door deze kenmerken op buurtniveau te meten kan ik bovendien de sociale en economische context waarin immigranten zich bevinden beter in kaart brengen dan eerdere studies die minder gedetailleerde regionale kenmerken gebruikt hebben (Abascal, 2015; Yang, 1994). Registerdata maken het tevens mogelijk om verschillende obstakels te overbruggen waar surveyonderzoek onder migranten doorgaans in het bijzonder mee te maken heeft, waaronder non-respons en sociale wenselijkheid. Bovendien is het mogelijk immigranten gedurende aanzienlijk langere perioden te volgen door het longitudinale karakter van registers. Dit is niet alleen inhoudelijk belangrijk, maar biedt ook methodologisch mogelijkheden om deels te corrigeren voor vertekening door selectiviteit.

De bevindingen in dit proefschrift zijn niet alleen gericht aan onderzoekers die werkzaam zijn op het gebied van migratie, integratie en staatsburgerschap, maar ook relevant voor beleidsmakers. Ten eerste benadrukt het proefschrift het belang van de woonomgeving in het integratieproces van immigranten, en daarmee de noodzaak om bij beleidsaanbevelingen rekening te houden met de bredere context waarin

immigranten wonen. Bovendien onderstreept dit proefschrift opnieuw het belang van naturalisatie voor het vestigingstraject van immigranten door aan te tonen dat het Nederlanderschap de kans op discriminatie op basis van nationaliteit binnen de woningmarkt kan verminderen. Dit druist in tegen de opvatting dat het verkrijgen van het Nederlanderschap moet worden beschouwd als het eindpunt van het proces van integratie, en plaatst vraagtekens bij de recente hervormingen van de Nederlandse nationaliteitswetgeving gericht op het verder aanscherpen van de eisen voor naturalisatie. Door de toegang tot het Nederlanderschap restrictiever te maken kan het naturalisatieproces aanzienlijke vertraging oplopen en de integratie van immigranten achterblijven.

Acknowledgments

All kids and teenagers have dreams about who they want to become. My dreams were anything but special. I remember wanting to become an archaeologist, a journalist, a photographer and, even not so long ago, a DJ. I guess doing a PhD is not a very common dream to have as a child and it was, for sure, not something that I imagined myself doing while growing up. Even as a student, doing a PhD was never an option I had seriously considered, at least not until the end of my Masters. Yet, although this decision crystallized very late, I would be wrong to think that it came accidentally. On the contrary, I am convinced that it was the outcome of countless events, encounters and discussions that have somehow put me onto that path. The same goes, of course, for the successful completion of this manuscript that would have been inconceivable without the unconditional support and love of my family and my friends and the invaluable help of my supervisors and my colleagues. With these pages, I will try to bring to light all those who have made this adventure possible.

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Christophe Leclerc

Breda

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About the author

Christophe Leclerc was born in Montpellier, France, on the 10th of September 1989. He obtained his bachelor in European Studies in 2015 and his Research Master in European Studies in 2017 both at Maastricht University. Throughout his studies, he specialised in democracy and representation in European and quantitative methods.

After doing a one-year internship at Statistics Netherlands, Christophe started a PhD project in August 2017 at Maastricht University, at the Faculty of Arts and Social Science, in the research programme Globalisation, Transnationalism and Development (GTD) under the supervision of Maarten Vink and Hans Schmeets. During his PhD, he studied the interplay between citizenship acquisition, immigrants' settlement process and immigrants' residential environment. In this project, Christophe uses administrative data from Statistics Netherlands and applies longitudinal statistical methods. His PhD project is part of the ERC-project "Migrant Life Course and Legal Status Transitions" led by Prof. Dr. Maarten Vink.

As of August 2021, Christophe works as a senior research expert at the European Public Administration unit of IPSOS Belgium.