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From Migration to Retirement: Explaining Retirement Pathways among Immigrants in Denmark

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Abstract

As immigrant populations age across Western welfare states, understanding how they exit the labor market becomes increasingly important. This study compares natives and immigrants in retirement pathways, distinguishing between regular retirement and health-related retirement. Using Danish population-wide register data for cohorts born between 1950 and 1962 (N = 876,785; 2000–2022) and discrete-time event history models, we analyze how institutional eligibility, health, socioeconomic position, and country-of-origin statutory pension age shape the timing and type of these transitions. The results reveal substantial differences in the timing, the type, and determinants of retirement. Non-Western migrants are more likely to retire during their fifties and early sixties than Western immigrants and natives. Concerning retirement type, immigrants, particularly from refugee-sending countries, are less likely than natives to enter regular retirement but more likely to exit through health-related pathways. Differences in health-related retirement are largely explained by accumulated disadvantages, including low socioeconomic position and poor health. A contrasting pattern emerges for regular retirement: controlling for socioeconomic position and health widens the gap between immigrants and natives. This indicates that immigrants are less able to translate similar socioeconomic resources and labor market positions into access to regular retirement pathways. Further analyses among immigrants show that immigrants from countries with higher pension ages are less likely to transition into regular retirement once they become eligible in Denmark, suggesting that retirement behavior reflects institutional environments and incentives linked to pension systems across national contexts. Together, the findings highlight that later-life inequality reflects both differential exposure to disadvantage and unequal access to retirement institutions.

Introduction

The ageing of immigrant populations is transforming retirement into an increasingly important site of social stratification in Western welfare states. Between 2010-2023, the number of migrants aged 65+ in the European Union grew from 5.2 million to 9.5 million (+82%) (Eurostat, 2025). As immigrants who arrived in earlier migration waves now approach retirement age, questions about how individuals exit the labor market become closely tied to broader inequalities in labor market attachment, welfare-state incorporation, and later-life economic security (Liversage and Jakobsen, 2016; Ciobanu, Fokkema, and Nedelcu, 2017).

Pathways into retirement reflect cumulative advantages and disadvantages across the life course, shaped by institutional arrangements, labor market attachment, health trajectories, and culturally embedded norms (Wang, Henkens, and van Solinge, 2011). Importantly, retirement is not a uniform process but occurs through different exit pathways, such as regular retirement or health-related retirement. These pathways reflect different forms of social stratification in later life, with distinct consequences for economic security, health, and welfare-state dependence.

Immigrants often occupy structurally disadvantaged positions in Western labor markets. Compared to native-born populations, they tend to have later entry, more frequent unemployment, and lower earnings which often result in lower private savings and insufficient pension contributions (Veldman et al., 2026; Heisig, Lancee, and Radl, 2018). These inequalities may translate into unequal access to retirement schemes and pension entitlements later in life. Building on research on latent cumulative disadvantage, we conceptualize retirement as a transition point at which migration-related inequalities accumulated across working life become visible in distinct pathways out of employment (Ye, 2024). Retirement systems may therefore reproduce or amplify migration-related inequalities in pathways out of working life.

Yet despite growing interest in cumulative inequality and later-life transitions, empirical research on retirement among immigrants remains surprisingly scarce. Much of the immigrant integration literature focuses on younger and middle-aged immigrants' integration, examining employment, education, and social relations. How immigrants enter retirement has received much more limited attention. While some research has examined inequalities in pension income (Bridgen, Meyer, and Davison, 2023; Heisig, Lancee, and Radl, 2018; Vaalavuo, Riekhoff, and Karhula, 2026), less attention has been paid to how migration-related inequalities shape pathways out of working life itself. Some existing evidence from the United States,

Sweden, and Norway suggests that migration background shapes both the timing and pathways of retirement. Compared to natives, immigrants are more likely to experience greater reliance on unemployment or health-related exit routes, and lower participation in voluntary pension pathways (Lopez and Slavov, 2020; Åslund, Larsson, and Laun, 2024; Hansen and Vignes, 2022). These studies also point to substantial heterogeneity within immigrant populations. For example, a study of the Swedish retirement transition found that immigrants from African and Asian countries¹ are a more disadvantaged group, with higher early exit rates and a greater reliance on unemployment and disability-related pathways compared to both native Swedes and immigrants from Western countries (Åslund, Larsson, and Laun, 2024). Similar heterogeneity is also indicated by a study of retirement transitions in Norway. The study distinguishes between broad immigrant origin groups and additionally includes an indicator for origin in a refugee-sending country. While the effects vary across retirement pathways and between men and women, the study finds substantial differences in retirement behavior associated with refugee-country origin, particularly lower transitions into ordinary retirement. Together, these findings underscore the importance of examining heterogeneity within immigrant populations rather than treating immigrants as a homogeneous group (Hansen and Vignes, 2022).

The key challenge in understanding migration-related inequalities in retirement is not only to document differences in retirement pathways, but also to explain how these inequalities become translated into distinct routes out of working life. We therefore ask: *Through which mechanisms do migration-related inequalities become translated into distinct retirement pathways?* Using Danish administrative register data, we distinguish between health-related retirement and regular retirement as distinct exit routes and differentiate between migrants from refugee-sending non-Western countries, other non-Western countries, Western countries, and native Danes.

To explain differences in retirement pathways across migrant groups, we focus on three sets of mechanisms from the migrant pension gap model by Veldman et al. (2026). First, we examine institutional eligibility, as access to various routes of regular retirement in Denmark is based on contribution years. This implies that migrants arriving at a later age face greater barriers to retirement eligibility than those arriving at a younger age, while native Danes face the

¹ In Sweden, the largest sources of Asian immigrants are Afghanistan, Iran, Iraq and Syria (Official Statistics of Sweden, 2025)

fewest barriers (Quitza and Pedersen, 2018). Second, we analyze health and socioeconomic disadvantages. Refugees, for example, are often less wealthy and healthy than other immigrants, which potentially delays their regular retirement (while placing them more at risk of receiving disability pension), especially in the case of those arriving at a later age (Evans and Fitzgerald, 2017; Di Thiene et al., 2021). Similar disadvantages may also apply to migrants with spells of unemployment. Third, institutional age norms are known to be important in explaining retirement behavior (Radl, 2012). Given that countries differ in retirement age norms and that these norms are shaped by statutory retirement ages (Riekhoff, 2024), we expect that migrants from different countries are socialized into thinking of different retirement ages as 'normal'. These norms plausibly carry over to the new country, influencing the timing of their regular retirement there. Together, these mechanisms highlight that retirement pathways are shaped by institutional arrangements, individual life-course trajectories, and culturally informed expectations about ageing and retirement (Hofäcker and Radl, 2016).

Denmark provides a useful setting for studying these mechanisms because its pension system includes multiple retirement pathways, while high-quality administrative registers enable long-term observation of labor market and retirement trajectories across diverse migrant populations. Using event-history models that treat health-related and regular retirement as competing exit routes, we analyze how retirement pathways differ across migrant groups, and which mechanisms account for these differences.

Overall, the paper contributes to research on migration, retirement, and cumulative inequality in three ways. First, it advances the limited literature on immigrant retirement pathways rather than retirement timing alone. Second, it highlights heterogeneity within immigrant populations by distinguishing between immigrants from refugee-sending countries, other non-Western migrants, Western migrants, and natives. Third, it explains these differences by jointly examining institutional eligibility, socioeconomic disadvantages, health inequalities, and institutional age norms. More broadly, the study shows how migration-related inequalities become translated into unequal pathways out of working life within contemporary welfare states.

The Case of Denmark

Our study focuses on Denmark, a Nordic welfare state with a comprehensive pension system and detailed administrative data on pensions. The Danish system aims to secure financial well-being in retirement through a combination of public and private sources. Public pensions

include the state and disability pensions, while occupational pensions, typically negotiated through collective agreements, provide additional income. Some pensioners also rely on personal savings or private pensions (Andersen, 2015). There are various early retirement programs. The most widely used is the *efterløn* early retirement scheme, which requires membership of an unemployment insurance fund and several years of paid contributions. There are also early retirement schemes specifically for those with long working careers.

Individuals who have not resided in Denmark long enough to qualify for the full public pension are considered partial pensioners. Full state pension eligibility requires 40 years of residence after the age of 15, while full disability pension requires residence for at least 9/10 of the period from age 15 until pension uptake. These rules also apply to Danish citizens who have lived abroad and later returned (Quitau and Pedersen, 2018). In 2022 (the most recent year of our analysis), the statutory retirement age was 67. Importantly, Denmark operates a relatively flexible retirement system that allows continued employment beyond the statutory retirement age and provides incentives for delayed retirement. Working beyond retirement age is relatively common in Denmark, with over one in five still at work at age 72. Continued employment is more common among individuals with higher incomes, better health, and stronger labor market attachment (Zaccagni et al., 2024).

The residence and contribution requirements embedded in the Danish pension system disproportionately affect immigrants who arrive later in life or have fragmented employment histories. Non-Western immigrants and refugees face shorter residence periods, limited access to occupational pensions, and barriers to labor market integration. Many are employed in physically demanding jobs, increasing the risk of early labor market exit due to health issues, while often not meeting contribution requirements for early retirement schemes. Consequently, they may rely more heavily on public transfers in old age. Compared to other West European countries, the retirement income gap between migrants and non-migrants is somewhat smaller than average (Heisig, Lancee, and Radl, 2018). Moreover, pension rules for refugees have also become more restrictive over time, particularly regarding how years spent abroad count toward pension eligibility.

The composition of the older immigrant population reflects Denmark's migration history. The earliest cohorts were predominantly labor migrants from Turkey, Pakistan, and the former Yugoslavia who arrived in the 1960s and 1970s. Many worked in low-skilled, unstable, physically demanding jobs, with limited contributions to occupational pensions. From the late

1980s, growing numbers of refugees arrived from conflict-affected regions such as Iran, Iraq, Somalia, Afghanistan, and later Syria; these groups are increasingly represented among the “old” immigrant population today. Many of them have experienced disrupted education, long asylum procedures, and health challenges associated with displacement (Roseveare and Jorgensen, 2004). Smaller but increasing numbers of EU migrants have begun to reach retirement age in recent years. As such, the older immigrant population in Denmark is highly diverse, shaped by different waves of labor migration, family reunification, and refugee inflows.

Overall, Denmark represents an analytically important case because it combines a relatively generous welfare state with comparatively restrictive immigration and integration policies. According to MIPEX (2025), Denmark performs relatively well on labor market integration and welfare access, while scoring lower on long-term integration security compared to many Western European countries. Because access to several retirement pathways depends on stable employment trajectories and contribution histories, inequalities in immigrant integration earlier in the life course may accumulate into unequal retirement pathways later in life.

Theoretical Framework and Hypotheses

Research on migrant retirement inequalities suggests that later-life disadvantages emerge not only from socioeconomic differences between migrants and natives, but also from how migrants are incorporated into labor markets and welfare-state institutions across the life course (Ye, 2024; Bridgen, Meyer, and Davison, 2023; Heisig, Lancee, and Radl, 2018). Migration-related inequalities may therefore reflect both unequal socioeconomic and health trajectories across the life course and unequal access to institutional resources, such as pension eligibility, which often depend on stable employment histories. Our theoretical framework explains immigrants’ retirement pathways through three mechanisms, in line with a recent systematic review (Veldman et al., 2026). We distinguish between (1) institutional barriers within the Danish pension system that shape eligibility to retirement; (2) health and socioeconomic position; and (3) statutory pension ages in immigrants’ country of birth that influence retirement norms and incentives. Together, these mechanisms shape whether retirement in the host country occurs through regular or health-related pathways and are therefore likely to explain the migrant-native gap in retirement outcomes.

Danish regular retirement pathways, such as early retirement schemes and full pension uptake, depend on stable employment, sufficient contribution years, and participation in occupational pension schemes. These institutional requirements may disadvantage immigrants because immigrants are more likely to experience later labor market entry and fragmented employment trajectories across the life course (Quitau and Pedersen, 2018). Even employed immigrants are often concentrated in temporary jobs, sectors with lower pension coverage, or positions with limited access to occupational pensions (Schultz-Nielsen, 2017). As a result, many immigrants reach older age without qualifying for regular retirement options, constraining their ability to exit the labor market on their own terms. These institutional barriers do not necessarily push immigrants directly into health-related retirement, but they restrict access to regular exit routes and increase “stuck” labor force participation (Madero-Cabib and Kaeser, 2016). Consequently, immigrants are less able than natives to retire in accordance with their preferences or financial planning. Instead, they are more likely to retire at statutory retirement age or when health limitations prevent continued work.

We expect this migrant-native gap in regular retirement to be explained by immigrants’ weaker institutional positioning within the Danish pension system, that is, limited eligibility for early retirement scheme, and fewer accumulated contribution years. Importantly, eligibility is not only determined by formal institutional rules but is also shaped by life-course employment trajectories. Previous unemployment spells, capturing fragmented work histories and periods of weak labor market attachment, also limit the accumulation of contribution years and thereby indirectly constrain access to regular retirement pathways (Radl, 2013).

Based on this reasoning, we propose the following hypotheses:

- H1: Immigrants in Denmark are less likely than natives to retire regularly (rather than retire via health-related retirement or not retiring).
- H1a: The lower likelihood of regular retirement among immigrants is explained by differences in eligibility for early retirement programs and unemployment spells.

Given these eligibility rules, we expect that poor health and low socioeconomic position further shape immigrants’ retirement behavior. As migration is a demanding transition, the selective group who migrates is generally healthier than the native population in their host country,

a pattern found in Europe, North America and Australia (Markides and Rote, 2019). After migration, this gap gradually wanes due to less favorable job conditions, such as work stress (Pérez et al., 2012), shift work (Herold et al., 2023), and working in industries with higher injury rates (Orrenius and Zavodny, 2012). Immigrants are also more at risk of health deterioration in their private lives, for instance due to experiencing more barriers in accessing healthcare facilities (Mucci et al., 2019). Hence, older immigrants are often *less* healthy than natives of the same age. This pattern of recently arrived migrants being more healthy, and older immigrants being less healthy, is known as the *immigrant health paradox* (Ferrara, Grindel, and Brunori, 2024). Indeed, Dutch register data published in 2025 shows that among non-European immigrants aged 55-67, the number of people receiving disability benefits had increased by 75% in the preceding twelve years, whereas the number for non-immigrants remained stable (Statistics Netherlands, 2025). Naturally, it can be expected that those in poor health are more likely to receive a disability pension.

The second individual disadvantage concerns socioeconomic position. Previous research highlights that immigrants are more likely to experience lower incomes, physically demanding jobs and unemployment (Kahanec and Zaiceva, 2009), which may push them toward health-related retirement. For individuals, health-related retirement pathways may be more attractive than being unemployed or being ‘stuck’ in a job. Unsurprisingly, disability benefits are higher in periods of unemployment, as well as in regions with more unemployment (Benítez-Silva, Disney, and Jiménez-Martín, 2010; Kahanec and Zaiceva, 2009). Hence, those with a weaker economic position (i.e., lower income, less favorable job) have less attractive alternatives and may be more likely to receive disability benefits. Based on this reasoning, we propose the following hypotheses:

- H2: Immigrants in Denmark are more likely than natives to retire through health-related pathways (rather than regular retirement or not retiring).
- H2a: The higher likelihood of health-related retirement pathways among immigrants is explained by differences in health, income, and concentration in physically demanding occupations.

Differences According to Immigrants’ Country of Origin

In addition to these characteristics of individuals and the Danish retirement system, retirement behavior of migrants may also reflect statutory retirement age in immigrants’ country of origin, for different reasons.

First, a reason may be retirement age norms, which are prescriptive ideas about what an appropriate age is for retirement: a higher retirement age norm suggests that people should retire later. Retirement age norms vary substantially between different social groups in a country (Radl, 2012) and they are higher in countries where statutory retirement ages are higher (Riekhoff, 2024). In Denmark, perceptions of being “too young” and “too old” to retire closely align with the age threshold embedded in the pension system, which is a pattern that is observed among the general population, older workers, and employers (Larsen and Qvist, 2025). We argue that such norms from immigrants’ country of origin continue to influence immigrants after migration. An Australian study shows that migrants’ well-being is still influenced by the economic situation in their country of origin (Nguyen and Duncan, 2020), supporting the argument that economic conditions in the country of birth remain important to migrants.

Second, because country-of-origin retirement ages may be connected to retirement income accrued in the country of origin, it is financially attractive for immigrants to behave in accordance with the country-of-origin pension regulations. These mechanisms are primarily expected to affect regular retirement, where individuals have greater discretion over timing, rather than health-related retirement, which is more strongly determined by health and socioeconomic position. Moreover, these mechanisms are expected to influence retirement behavior beyond differences in health, income, and occupational position, because they shape culturally informed expectations about appropriate retirement timing and incentives linked to pension rights accumulated across national systems.

Importantly, these mechanisms are not expected to operate independently of the Danish pension system, but rather through how immigrants respond to retirement opportunities within the host-country context. We therefore expect immigrants from countries with higher statutory pension ages to be less likely to transition into regular retirement immediately upon becoming eligible for retirement in Denmark.

Accordingly, we propose the following hypothesis:

- H3: Country-of-origin statutory pension age moderates the association between eligibility for the main Danish regular-retirement routes and entry into regular retirement, such that immigrants from countries with higher pension ages are less likely to transition into regular retirement upon becoming eligible for the main regular-retirement routes in Denmark.

Data and Methods

This study employs comprehensive register data from Statistics Denmark, covering the entire population of first-generation older immigrants and natives born between 1950 and 1962 and follows individuals from age 50 during the period from 2000 to 2022, thus enabling differentiation between various immigrant groups. The selected cohorts ensure observation before retirement and at ages at risk of exit, while also allowing key variables to be measured prior to age 50, which would not be possible for older cohorts and is not yet relevant for younger cohorts. Second-generation immigrants, that is, those who are born in Denmark by immigrant parents, are excluded from the analysis. In total, our study population consisted of 876,785 individuals and 11,222,833 person years, of whom 92 % were natives, 3 % Western immigrants, 2 % non-Western immigrants from the largest refugee groups in Denmark, and 3 % non-Western immigrants from other countries. In total, the immigrant population originates from 166 countries.

Classifying countries of origin into categories such as refugee-sending or labor migration origins is inherently complex. Many countries contributed to both types of migration, depending on political and economic conditions at different times. In this study, we attempt to capture this complexity by including the largest groups from refugee-sending countries, based on their historical migration patterns to Denmark. Appendix Table A1 shows the influx of immigrants from refugee-sending countries.

Outcome Variable

We distinguish between two mutually exclusive retirement routes based on the first observed pension receipt (the alternative being continued work). The first route is health-related retirement, which includes receipt of disability pension, senior pension, or flexible retirement benefits. All three are granted to individuals with reduced work capacity or health-related limitations to continued employment. Among individuals entering this route, 78 % receive disability pension, 12 % receive senior pension, and 9 % flexible retirement benefits. The second route is regular retirement, comprising non-disability-related pension pathways, including the main early retirement scheme (57 %), statutory old-age pension (30 %), other pensions (e.g., private pension funds – 12 %), and other early pension (1 %). Between 2000 and 2022, the eligibility age for old-age pension varied between 65 and 67 years. During the same period, the age threshold for early retirement schemes also increased, from 60 years to the current 64 years. Because the pension schemes in the regular pension route are only available from the

age of 60 and onwards, we set the risk start time at age 59 for these analyses. This results in different risk sets across the two pathways, as eligibility for regular retirement is age-restricted, while health-related retirement is not. Although pension regulations changed over time, these are not modeled explicitly, as the regular retirement pathway encapsulates multiple coexisting schemes.

Independent Variables

Eligibility is proxied by three variables: *efterløn* early retirement eligibility, unemployment history, and (for immigrants) age on arrival in Denmark. *Efterløn* early retirement eligibility is a binary indicator of whether someone is (1) eligible for this or not (0), based on whether they pay early retirement contributions at age 50 and have reached the age where they can retire through early retirement, which is cohort specific. For unemployment history, we use cumulative spells of unemployment during the ten years prior to entering the study at age 50. Unemployment spells reduce eligibility for regular early retirement schemes and hamper savings for retirement. The variable has values from 0 to 10, indicating the number of years unemployed between age 40-50. For immigrants, we additionally include age at arrival in Denmark as an indicator of exposure to the Danish labor market and pension system. Age at arrival is calculated with the first year of residence in Denmark, available from 1985 onward. For immigrants who arrived prior to 1985, age at arrival is approximated by their age in 1985.

To proxy health, we included the yearly number of healthcare contacts, retrieved from the National Health Insurance Service Register. Specifically, we measured: (1) visits to general practitioners (GPs), (2) contacts to medical specialists, and (3) psychiatric contacts, including psychological consultations. GP visits were categorized into 0 visits, 1–2 visits, 3–5 visits, and 6 or more visits per year to reduce the influence of outliers. For specialists and psychiatric contacts, we considered whether the individual had at least one visit in the year, reflecting more serious health conditions. Given that migrants may experience additional hurdles to accessing medical help, there may be some who are unhealthy yet not captured by this variable; therefore, this is a conservative estimate of the importance of health.

Socioeconomic position is proxied by occupation and personal income. Using the International Standard Classification of Occupations (ISCO) we classify people as self-employed, employees with management tasks, employee with high skills, employee with medium and basic skills, unskilled employee, and non-employed. Personal income includes earnings, transfers, and capital income. We divide this into deciles in Danish kroner (DKK) with an

inflation adjustment to 2022 values. We have not included education, because qualifications obtained abroad are not systematically recorded in Danish administrative registers. Furthermore, self-reported educational information is difficult to validate and may not align with Danish classification standards. Therefore, education is not a robust variable for measuring socioeconomic position. Thus, occupational status and income offer more consistent and comparable measures across population groups (Statistics Denmark, 2026).

To include pension age in the country of origin, we used the database from the Social Security Programs Throughout the World published by the US Social Security Administration. We use the statutory retirement age linked to each country’s main public pension system (Social Security Administration (SSA), 2026). This database has also been used in other studies looking at retirement ages in different countries (Åslund and Cronert, 2024).

To examine whether the association between country-of-origin statutory pension age and regular retirement depends on institutional opportunity structures in Denmark, we constructed a time-varying indicator capturing eligibility for the two main public regular-retirement routes: the early retirement scheme (*efterløn*) and statutory old-age pension (*folkepension*). The variable equals 1 from the year individuals became eligible for either scheme, taking into account cohort-specific age thresholds, and 0 otherwise. Although our measure of regular retirement also includes other pathways, eligibility for these routes cannot be directly observed in the register data.

Control Variables

The following demographic covariates are included: cohabitant labor market status, gender, birth-cohort groups, and number of children residing in Denmark. Cohabitant labor market status is included as time-varying variables. Cohabitant labor market status is included because being separated or single is related to a higher risk of receiving a disability pension (Krokstad, Johnsen, and Westin, 2002). Broad birth-cohort groups (1950–1953, 1954–1957, and 1958–1962) are included to account for cohort-specific differences in exposure to retirement and pension reforms during the observation period. These cohort groups distinguish individuals observed well beyond retirement age from those observed primarily around or before statutory retirement ages by the end of follow-up. Gender is included given the well-documented gender differences in labor market participation, health outcomes, and retirement patterns, all of which can impact pathways into retirement (Radl, 2013). Number of children is a proxy for family obligations and potential care responsibilities, which may affect labor

market participation, particularly among women, and can thus be indirectly related to exit pathways. It is important to note that register data only capture children and cohabiting partners residing in Denmark; children and partners living abroad could not be observed.

Statistical Model and Empirical Strategy

The study employs event history analysis to examine the timing and pathways of retirement. We distinguish between two mutually exclusive exit routes from employment: health-related retirement and retirement through the regular pension system.

We estimate separate cause-specific discrete-time logit event history models for each pathway. In each model, the dependent variable indicates the occurrence of the focal retirement event at time t , conditional on the individual not having experienced any retirement event prior to t (Allison, 2010). Hence, the odds ratios in our tables reflect both timing and probability effects (Bernardi, 2001). Individuals who experience the alternative retirement event are treated as right censored at the time of that event. A discrete-time specification is appropriate because all variables are observed in one-year intervals. Duration dependence is modeled by including yearly time intervals as a categorical variable. Individuals were additionally censored if they migrated out of the country (1.5 %) or died (5 %) or remained at risk at the end of the observation period in 2022 (43 %).

In the second part of the analysis, we estimate multilevel discrete-time logit event history models for the migrant population only, in which individuals are nested within their country of origin. This approach allows us to account for unobserved heterogeneity at the country-of-origin level.

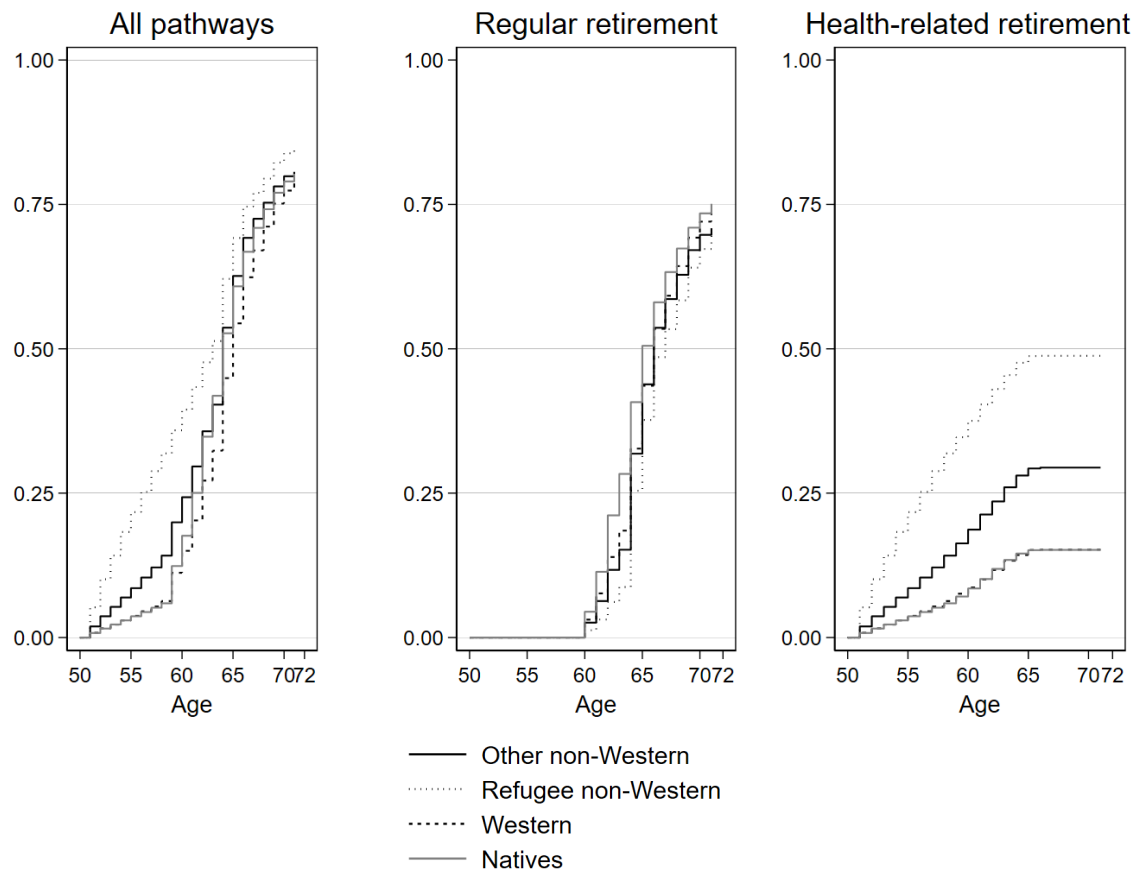
Results

Descriptive statistics of the sample are presented in Table 1. Non-Western immigrants from refugee-sending countries stand out with the highest non-employment rate (57 %), lowest income deciles, and greater reliance on health services, with 37 % having six or more GP visits and 9 % having psychiatric or psychological contact. They also have the largest average number of children living in Denmark (2.19) and originate from countries with relatively low pension ages (60.9 years). Compared to this group, non-Western immigrants from other countries have slightly less unemployment, higher incomes, fewer children, and lower health service use, though both groups differ markedly from natives and Western immigrants in socioeconomic profiles.

Table 1. Descriptive statistics measured the last year before retiring or censoring.

	Natives	Western immigrants	Refugee non-Western immigrants	Other non-Western immigrants
Female	49 %	49 %	39 %	56 %
Cohort 1950-1953	31 %	31 %	21 %	23 %
Cohort 1954-1957	31 %	28 %	29 %	29 %
Cohort 1958-1962	39 %	41 %	50 %	48 %
No partner	29 %	39 %	33 %	34 %
Partner self-employed	5 %	5 %	2 %	3 %
Partner employed	42 %	34 %	25 %	25 %
Partner unemployed	4 %	7 %	15 %	12 %
Partner retired	22 %	16 %	25 %	25 %
No. of children	1.76	1.31	2.29	2.11
0 visits to GP	53 %	55 %	42 %	51 %
1-2 visits to GP	14 %	14 %	8 %	9 %
3-5 visits to GP	16 %	14 %	14 %	13 %
+6 visits to GP	17 %	17 %	37 %	26 %
Medical specialist contact	21 %	21 %	32 %	29 %
Psychiatric or psychological contact	2 %	3 %	9 %	3 %
Self-employed	7 %	8 %	4 %	6 %
Employee with management tasks	4 %	2 %	0 %	1 %
Employee, high skilled	18 %	18 %	6 %	6 %
Employee, medium and basic skilled	40 %	26 %	19 %	18 %
Employee, unskilled	13 %	14 %	13 %	20 %
Non-employed	18 %	32 %	57 %	49 %
Personal income (deciles)	5.13	4.22	2.77	2.84
Previous spells of unemployment (0-10)	0.80	1.62	3.96	3.29
Eligible for early retirement	49 %	30 %	11 %	22 %
Age at arrival	.	33.25	34.34	31.78
Pension age in country of origin	.	64.90	60.86	59.65
N	814,450	25,647	18,364	18,324

Figure 1. Cumulative predicted probability of retirement by immigrant group



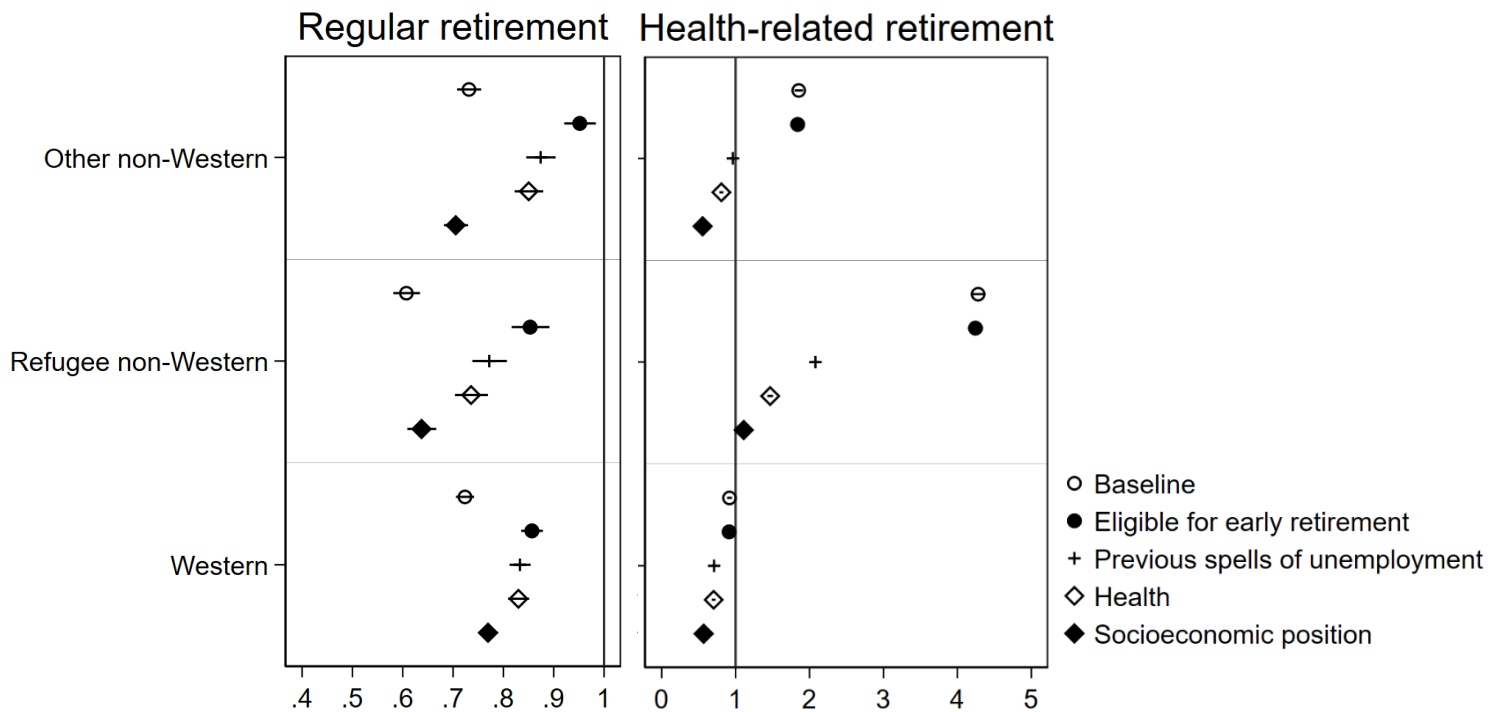
Immigrant-Native Gaps in Retirement Pathways

Figure 1 shows cumulative predicted probabilities of all retirement pathways, as well as regular and health-related retirement, by immigrant background. On the left, the graph on all pathways clearly shows that both refugee non-Western and other non-Western immigrants are substantially more likely to retire in their fifties and early sixties than natives and Western immigrants. In the middle, the cumulative predicted probabilities of regular retirement uptake by age 67 show a clear stratification across groups. Natives have the highest cumulative probability (0.67), followed by Western immigrants (0.64). Other non-Western immigrants reach 0.63, while immigrants from non-Western refugee countries display the lowest probability (0.58). Thus, immigrants, particularly refugees, are less likely than natives and Western immigrants to transition into regular retirement.

The pattern for health-related retirement is reversed and even more pronounced. Immigrants from non-Western refugee countries exhibit the highest cumulative probability (0.49 at age 67), followed by other non-Western immigrants (0.29). Western immigrants and natives show

substantially lower probabilities (0.15 each). The divergence in the curves highlights pronounced inequalities in health-related retirement, with immigrants from refugee-sending countries experiencing nearly four times the risk compared to Western immigrants and natives.

Figure 2. Odds ratio plots from discrete-time logit models predicting retirement (ref. natives) with 95 % confidence intervals



Note: Full models available in appendix Table A1.

Figure 2 (left panel) presents odds ratios from discrete-time logistic regression models predicting entry into regular retirement; the independent variables are included stepwise. The baseline estimates include controls for gender, birth cohort, partner labor market status, number of children and time dummies. Across all model specifications, individuals with immigrant backgrounds exhibit substantially lower odds of entering regular retirement than natives. In the baseline model, this disadvantage is most pronounced among immigrants from refugee-sending countries (OR = 0.61), supporting H1.

Adding eligibility for early retirement leads to a marked reduction in group differences, indicating that limited access to early retirement schemes explains an important part of the immigrant–native gap. However, the inclusion of previous unemployment spells leads the coefficients to move further away from unity. Individuals with higher previous unemployment

spells are more likely to enter regular retirement pathways, and immigrants, particularly refugees, are disproportionately exposed to fragmented employment histories. This means that, all else equal, their higher levels of unemployment spells would predict a higher likelihood of retirement. Yet empirically, immigrants are even less likely to enter regular retirement than previously observed, thereby exposing a larger underlying disadvantage. These findings therefore only partially support H1a. A similar pattern is observed when adjusting for health and socioeconomic position. Although poorer health, lower income, and disadvantaged occupational positions are all associated with a higher likelihood of regular retirement, controlling for these factors further widens the immigrant–native gap. This indicates that these characteristics do not explain immigrants’ lower likelihood of retirement but instead mask deeper structural inequalities.

To further investigate the mechanisms underlying the suppressor effects observed for regular retirement, we estimated models including interactions between immigrant background and socioeconomic characteristics (Appendix Table A2). The results indicate that the association between socioeconomic position and regular retirement differs across groups. In particular, occupational position and income appear less strongly associated with regular retirement among immigrants than among natives. For example, the positive association between medium- and basic-skilled occupations and non-employment and regular retirement is substantially weaker among immigrants, particularly among immigrants from refugee-sending countries and other non-Western countries. Likewise, higher income is associated with a lower likelihood of regular retirement among natives, whereas this negative association is weaker among immigrant groups. By contrast, there is less consistent evidence that the associations between previous unemployment or GP visits and regular retirement differ systematically across groups. Appendix Figure A2 illustrates these patterns. In addition to persistent level differences, whereby immigrants exhibit lower probabilities of regular retirement than natives across comparable socioeconomic positions, the figure shows flatter gradients for occupational position and income among immigrant groups. This suggests that similar socioeconomic positions do not translate into equivalent retirement outcomes across groups.

Together, these findings help explain the suppressor patterns observed in the main models. Immigrants often possess characteristics that would typically be associated with higher rates of retirement, yet the association between these characteristics and regular retirement is weaker than among natives. As a result, controlling for these factors reveals a larger underlying disadvantage. One possible explanation is that access to regular retirement depends not

only on current socioeconomic position but also on accumulated pension rights and eligibility conditions, which may be more difficult for immigrants to fulfil due to shorter contribution histories and time spent outside the Danish labour market.

Figure 2 (right panel) presents odds ratios from similar models predicting the risk of health-related retirement. For this pathway a different pattern emerges. In the baseline model, immigrants from refugee-sending countries and other non-Western immigrants exhibit substantially higher odds of health-related retirement than natives ($OR = 4.28$ and 1.85 , respectively), supporting H2. Adding eligibility for early retirement only modestly reduces these differences. In contrast, the inclusion of previous unemployment substantially reduces the immigrant coefficients, indicating that fragmented employment histories explain a large share of the elevated risk. Further adjustments for health and socioeconomic position continue to attenuate the differences, although their additional explanatory power is more limited once labor market instability is taken into account. This pattern likely reflects that these factors capture overlapping dimensions of disadvantage. Indeed, when entered separately in the models, health accounts for a larger share of the immigrant–native gap. After accounting for all factors, the excess risk among immigrants from refugee-sending countries is reduced to near unity ($OR = 1.11$), while other immigrant groups exhibit lower odds than natives.

Overall, these results indicate that the higher likelihood of health-related retirement among immigrants is largely explained by accumulated disadvantage, including poorer health, previous unemployment, and lower socioeconomic position. These findings therefore support H2a. In contrast to regular retirement, suppression effects are not observed for health-related retirement where group differences are largely attenuated after accounting for health and labor market disadvantage, and there is more limited and less systematic evidence of heterogeneous associations across immigrant groups for health-related retirement (for the latter, see also Appendix Table A4 and Figure A3). This contrast suggests that the mechanisms underlying group differences differ across retirement pathways.

Differences According to Immigrants' Country of Origin

To further examine heterogeneity within the immigrant population, we estimated multilevel discrete-time logit models comparing immigrants from refugee-sending countries, other non-Western immigrants, and Western immigrants. Table 2 presents models predicting regular and health-related retirement among immigrants only, using other non-Western immigrants as the reference category.

The results show that immigrants from refugee-sending countries are substantially more likely to enter health-related retirement than other non-Western immigrants. Although the association is attenuated after adjusting for health, labor market position, and income, immigrants from refugee-sending countries remain significantly more likely to exit through health-related pathways, indicating that their disadvantage cannot be fully explained by observable socioeconomic and health-related characteristics. In contrast, differences in regular retirement between immigrants from refugee-sending countries and other non-Western immigrants become statistically insignificant once previous spells of unemployment, age on arrival, and eligibility for early retirement are taken into account.

We further examined whether country-of-origin statutory pension age shapes retirement behavior in Denmark. Model 4 in Table 2 shows limited evidence of a direct association between country-of-origin pension age and regular retirement. However, introducing a time-varying indicator for eligibility for the two main Danish public retirement routes, *efterløn* and statutory old-age pension (*folkepension*), reveals a significant interaction effect. Specifically, immigrants from countries with higher statutory pension ages are less likely to transition into regular retirement once they become eligible for main retirement routes in Denmark, supporting Hypothesis 3. This suggests that country-of-origin pension institutions primarily influence how immigrants respond to retirement opportunities once these become institutionally available in the host country. By contrast, the corresponding interaction term is not statistically significant for health-related retirement, which is consistent with the expectation that disability-related exits are driven more strongly by health and labor market disadvantage.

Figure 3 illustrates the interaction between country-of-origin statutory pension age and eligibility for the main Danish public retirement routes. Among immigrants who are not yet eligible for *efterløn* or statutory old-age pension, the predicted annual probability of entering regular retirement remains very low across all levels of country-of-origin pension age. In contrast, once individuals become eligible, the probability of regular retirement increases substantially. However, this increase is less pronounced among immigrants from countries with higher statutory pension ages. For example, among eligible immigrants, the predicted yearly probability of entering regular retirement declines from approximately 15 % for immigrants from countries with pension ages around 60 to approximately 13 % for immigrants from countries with pension ages around 68.

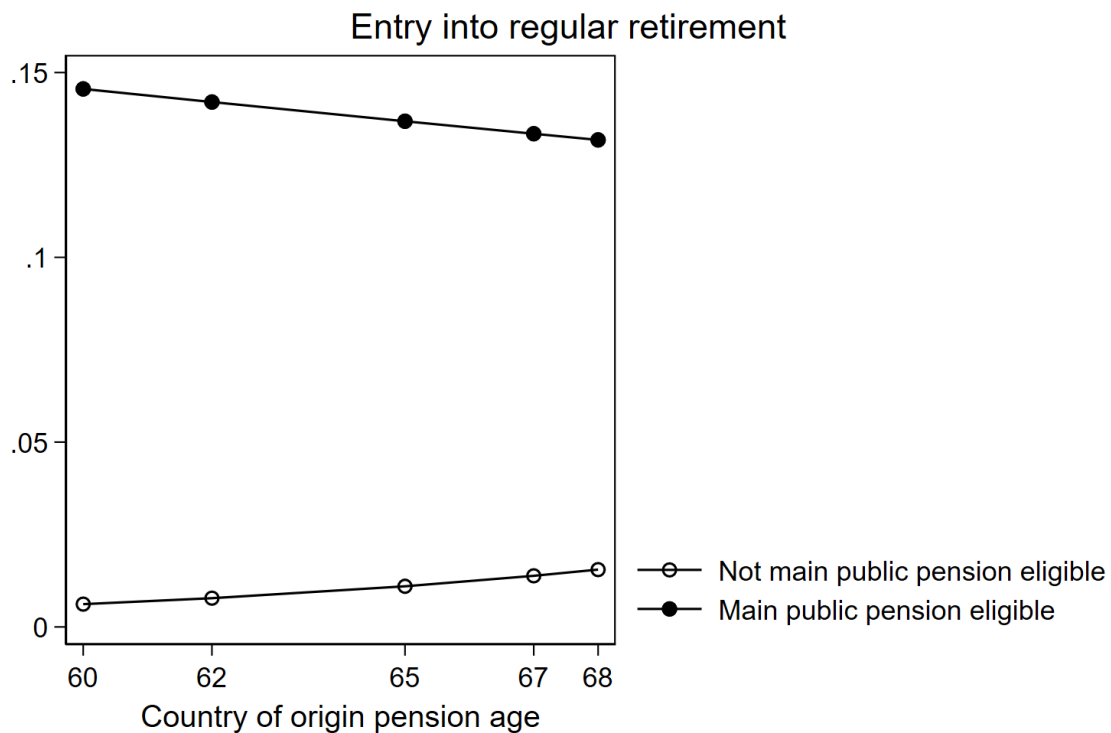
Table 2. Multilevel discrete time-logit models predicting regular retirement and health-related retirement (among immigrant groups). Odds ratios.

	Regular retirement					Health-related retirement				
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10
Refugee (Ref: Other non-Western)	0.844*	0.952	0.959	0.959	1.024	2.092***	1.873***	1.653***	1.655***	1.653***
	(0.061)	(0.059)	(0.053)	(0.053)	(0.056)	(0.303)	(0.253)	(0.184)	(0.182)	(0.183)
Western	1.046	0.998	1.087	1.088	1.095	0.688**	0.791	0.970	0.906	0.908
	(0.062)	(0.051)	(0.050)	(0.058)	(0.058)	(0.094)	(0.101)	(0.101)	(0.097)	(0.097)
Early retirement eligibility		3.113***	3.631***	3.631***			1.124**	1.306***	1.309***	
		(0.069)	(0.084)	(0.084)			(0.045)	(0.054)	(0.054)	
Age on arrival		0.989***	0.978***	0.978***	0.981***		1.003	0.979***	0.979***	0.978***
		(0.002)	(0.002)	(0.002)	(0.002)		(0.001)	(0.001)	(0.001)	(0.001)
Previous unemployment spells		1.041***	0.967***	0.967***	0.985***		1.139**	0.997	0.997	0.995
		(0.004)	(0.004)	(0.004)	(0.004)		(0.003)	(0.003)	(0.003)	(0.003)
1-2 GP visits (ref. 0 visits)			1.587***	1.587***	1.622***			1.741***	1.740***	1.751***
			(0.048)	(0.048)	(0.050)			(0.073)	(0.073)	(0.073)
3-5 GP visits			1.675***	1.675***	1.709***			2.628***	2.628***	2.649***
			(0.050)	(0.050)	(0.053)			(0.101)	(0.101)	(0.102)
6+ GP visits			1.732***	1.732***	1.792***			4.322***	4.328***	4.367***
			(0.054)	(0.054)	(0.057)			(0.158)	(0.158)	(0.160)
Medical specialist contact			1.101***	1.101***	1.107***			1.009	1.010	1.011
			(0.023)	(0.023)	(0.024)			(0.018)	(0.018)	(0.018)
Psychiatric or psychological contact			0.932	0.932	0.983			2.026***	2.026***	2.029***
			(0.060)	(0.060)	(0.068)			(0.051)	(0.051)	(0.051)
Employee with management tasks (Ref: self-employed)			0.324***	0.324***	0.334***			0.630***	0.630***	0.631***
			(0.016)	(0.016)	(0.016)			(0.045)	(0.045)	(0.045)

Employee, high skilled			0.794*	0.794*	0.824*			0.350***	0.352***	0.352***
			(0.073)	(0.073)	(0.075)			(0.107)	(0.107)	(0.107)
Employee, medium and basic skilled			0.860***	0.860***	0.875***			0.556***	0.554***	0.559***
			(0.032)	(0.032)	(0.033)			(0.044)	(0.043)	(0.044)
Employee, unskilled			0.950	0.950	0.946			0.586***	0.585***	0.587***
			(0.029)	(0.029)	(0.029)			(0.029)	(0.029)	(0.029)
Non-employed			1.714***	1.714***	1.936***			5.842***	5.846***	5.825***
			(0.054)	(0.054)	(0.062)			(0.211)	(0.211)	(0.211)
Personal income			0.888***	0.888***	0.898***			0.880***	0.881***	0.883***
			(0.004)	(0.004)	(0.004)			(0.006)	(0.006)	(0.006)
Pension age in country of origin				1.000	1.125***				1.018**	1.017*
				(0.006)	(0.012)				(0.007)	(0.007)
Eligible for main public pension routes					94159.727***					0.323
					(58601.609)					(0.211)
Pension age in country of origin# Eligible for main public pension routes					0.875***					1.017
					(0.009)					(0.011)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country-level random intercept variance	1.044***	1.026***	1.017***	1.017***	1.016***	1.417***	1.340***	1.192***	1.188***	1.189***
	(0.010)	(0.007)	(0.005)	(0.005)	(0.005)	(0.078)	(0.064)	(0.038)	(0.037)	(0.038)
N	215834	215834	215834	215834	215834	687050	687050	687050	687050	687050

Exponentiated coefficients; Standard errors in parentheses. $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Full models in appendix Tables A3 and A4.

Figure 3. Predicted probability of regular retirement by country-of-origin pension age and Danish retirement eligibility.



Note: Predicted probabilities calculated based on Table 2, Model 5.

As supplementary analyses, we examined whether the association between country-of-origin pension age and regular retirement varied by Western origin and age on arrival (see Appendix, Table A5). These analyses were exploratory and motivated by migration research suggesting that norms and practices acquired in the country of origin may persist more strongly when they are institutionally compatible with the receiving society (Berry, 1997) and by arguments that migrants who spend a larger share of their adult lives in the country of origin may remain more strongly influenced by origin-country institutions and norms due to longer exposure and stronger transnational ties (Jones, 2020). The analysis provides some evidence of heterogeneity. The association between country-of-origin pension age and retirement behavior is stronger among immigrants who arrived at older ages, consistent with the argument that longer exposure to origin-country institutions may strengthen the persistence of retirement norms and pension-related incentives after migration. However, we find no clear evidence that the association differs systematically between Western and non-Western immigrants.

Discussion and conclusion

This paper has examined how retirement pathways differ between natives and immigrants in Denmark, and to what extent these differences are shaped by institutional eligibility, health and socioeconomic disadvantage, and country-of-origin statutory pension age. More broadly, the paper contributes to a still limited literature on migration and retirement transitions. Moving beyond a focus on retirement timing alone, the analysis distinguished between regular retirement and health-related retirement as distinct pathways out of the labor market and compared natives with Western immigrants, other non-Western immigrants, and immigrants from refugee-sending non-Western countries.

Three main findings stand out. First, immigrants, and especially immigrants from refugee-sending countries, are substantially less likely than natives to enter regular retirement, but considerably more likely to exit through health-related retirement. These differences are not simply matters of timing but reflect qualitatively different forms of labor market exit with unequal implications for financial security and later-life well-being. This pattern aligns with prior research showing that immigrants are more likely to exit through non-standard or involuntary pathways (Hansen and Vignes, 2022; Qvist and Qvist, 2022). Immigrants from refugee-sending countries are consistently more disadvantaged than other non-Western immigrants, while Western immigrants are often closer to natives.

Second, the mechanisms underlying these two pathways differ sharply. For health-related retirement, the higher risks among immigrants are largely explained by accumulated disadvantage, including poorer health, previous unemployment, and lower socioeconomic position. By contrast, for regular retirement, these same factors do not explain immigrant disadvantage. Instead, they suppress it: immigrants possess characteristics that would ordinarily be associated with higher rates of regular retirement, such as lower income and weaker labour market attachment. However, these characteristics are less strongly associated with regular retirement among immigrants than among natives. As a result, controlling for these factors reveals a larger underlying disadvantage among immigrant groups. This implies that later-life inequality is shaped not only by differential exposure to disadvantage, but also by differential access to socially legitimate exit routes. This interpretation is consistent with previous research showing that migration-related inequalities in later life are not only driven by differences in resources, but also by differences in how these resources are translated into outcomes. For instance, Bridgen, Meyer, and Davison (2023) find that highly educated migrants

receive lower pension returns to their human capital than comparable non-migrants. Similarly, our results indicate that immigrants are less able to convert labor market positions into access to regular retirement pathways. Moreover, the findings may also relate to broader discussions of migrant optimism and work orientation. Although the present study cannot directly assess such mechanisms, the results overall suggest that delayed regular retirement among immigrants reflects constrained access to regular retirement pathways more than purely voluntary postponement. However, stronger labor market attachment among some immigrant groups may also play a role.

Third, retirement behavior among immigrants also appears to be shaped by statutory pension ages in the country of origin. Immigrants from countries with higher pension ages are less likely to enter regular retirement once they become eligible for the main Danish public retirement routes. This suggests that retirement timing may continue to reflect institutional environments in the country of origin, potentially through both culturally shaped expectations about appropriate retirement timing and financial incentives linked to pension rights accumulated across national systems. Supplementary analyses further indicated that the association was stronger among immigrants who arrived at older ages. This is consistent with the idea that migrants who spent a larger share of their working lives in the country of origin may have accumulated more pension rights abroad and have been socialized in their country of origin for a longer period and therefore remain more influenced by origin-country retirement institutions.

Finally, the paper advances research on heterogeneity within the immigrant population. Previous studies have often relied on broad origin categories, which can obscure important differences. Here, distinguishing immigrants from refugee-sending non-Western countries from other non-Western immigrants reveals a more pronounced disadvantage among refugees that for health-related retirement also persists even after adjustment for health and socioeconomic position. This suggests that migration background matters not only for retirement outcomes in broad ethnic or regional terms, but also through differences in migration trajectories, labour market incorporation, and the accumulation of pension rights over the life course.

Several limitations apply. First, the register data does not allow direct observation of preferences, informal care obligations, perceived discrimination, or subjective understandings of retirement, all of which may shape labor market exit. Second, the measure of health is based on healthcare use and therefore likely underestimates health problems among groups facing

barriers to healthcare access, thus providing a conservative estimate of the role of health. Third, although the paper captures important dimensions of eligibility, it cannot fully reconstruct all pension-relevant employment histories or occupational pension entitlements; in particular, the data do not capture periods of residence or employment in third countries between migration from the country of origin and settlement in Denmark. Such transnational trajectories may influence both pension accumulation and exposure to retirement norms. An additional consideration here concerns return migration. Selective return migration may partly shape observed retirement patterns if some immigrants leave Denmark before entering retirement or choose to retire in their country of origin (Van Hook and Zhang, 2011). This mechanism could particularly affect estimates of regular retirement among groups with stronger transnational ties or pension rights accumulated abroad. Future research could therefore also examine more directly how return migration interacts with retirement behavior. Fourth, while the Danish case is analytically valuable because of its detailed data and multi-pillar pension system, the magnitude and form of the patterns observed here may differ in countries with other pension institutions and migration histories.

Beyond these limitations, several avenues for future research remain. Future research could examine more directly how occupational pension entitlements and employer-specific arrangements shape later-life inequalities among immigrants. It could also investigate whether similar patterns emerge in other institutional contexts. Comparative studies show that pension system design shapes inequality in retirement opportunities, with more fragmented or privatized systems making early retirement more selective and favoring those with stronger labor market positions (Schils, 2008). Our findings suggest that similar mechanisms may disadvantage immigrants, who are less able to translate comparable resources into access to regular retirement pathways.

As immigrant populations continue to age across Western welfare states, understanding how migration shapes retirement is increasingly important. This paper shows that later-life labor market exit is not only stratified between immigrants and natives, but also within the immigrant population itself. More broadly, it demonstrates that inequalities in retirement are not simply the result of who is more disadvantaged, but also of who is able to translate their life-course trajectory into access to different institutional pathways out of work. In that sense, retirement is a key site where migration-related inequalities are carried into old age.

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Appendix:

Figure A1. Number of immigrants in Denmark from refugee-sending countries.

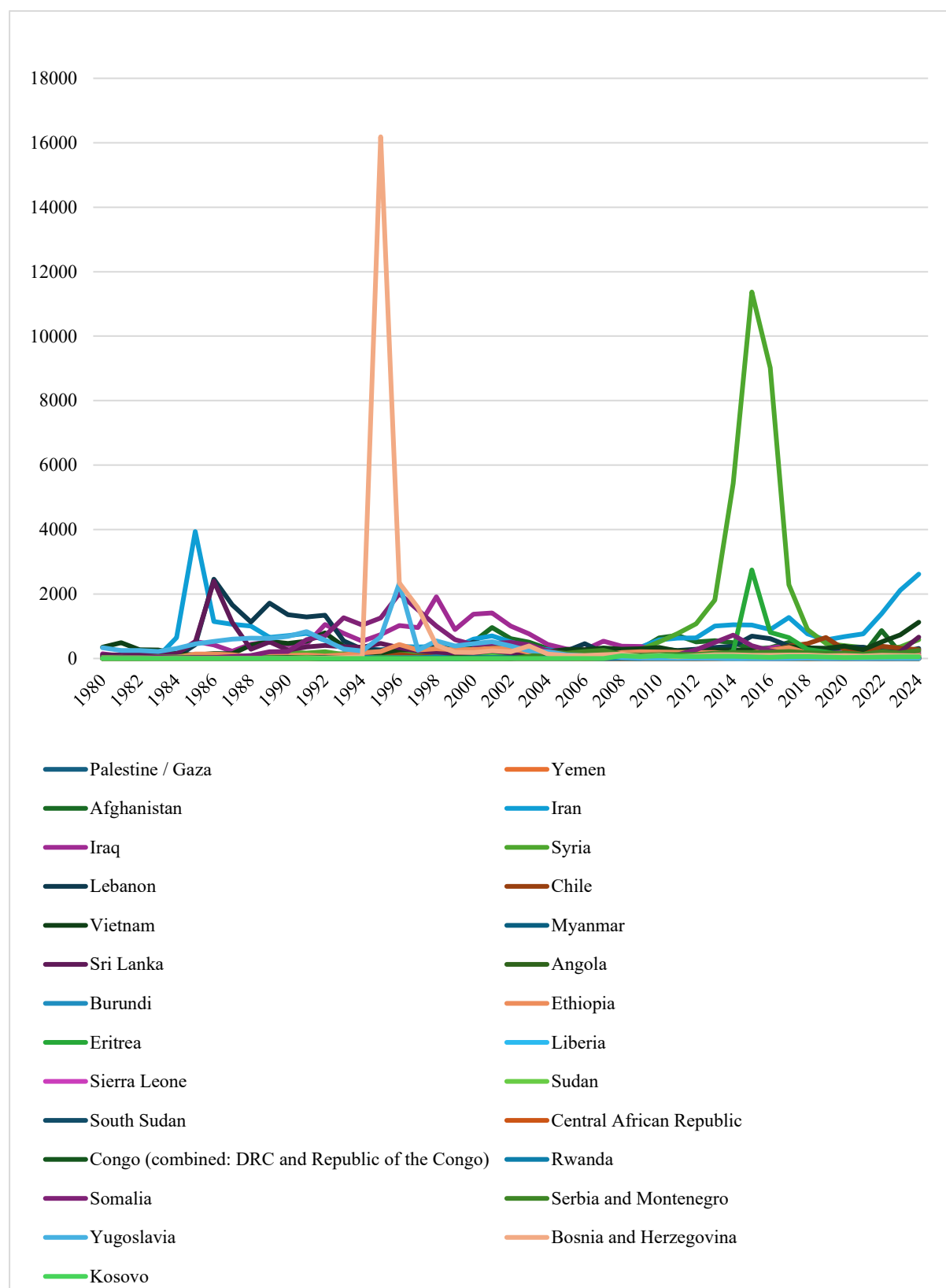


Figure A2. Predicted annual probability of regular retirement by immigrant group across occupation, income, unemployment history, and health

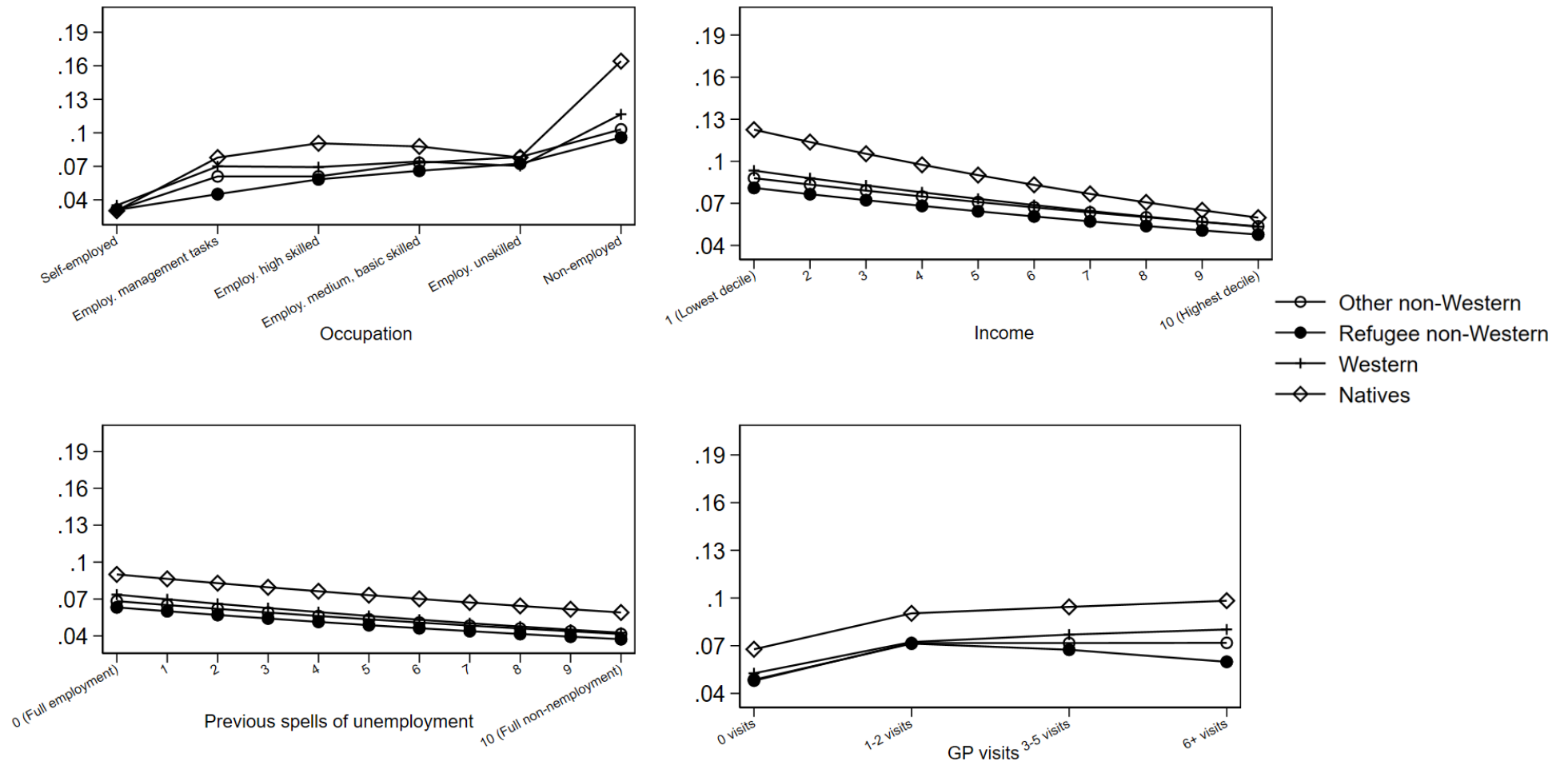


Figure A3. Predicted annual probability of health-related retirement by immigrant group across occupation, income, unemployment history, and health.

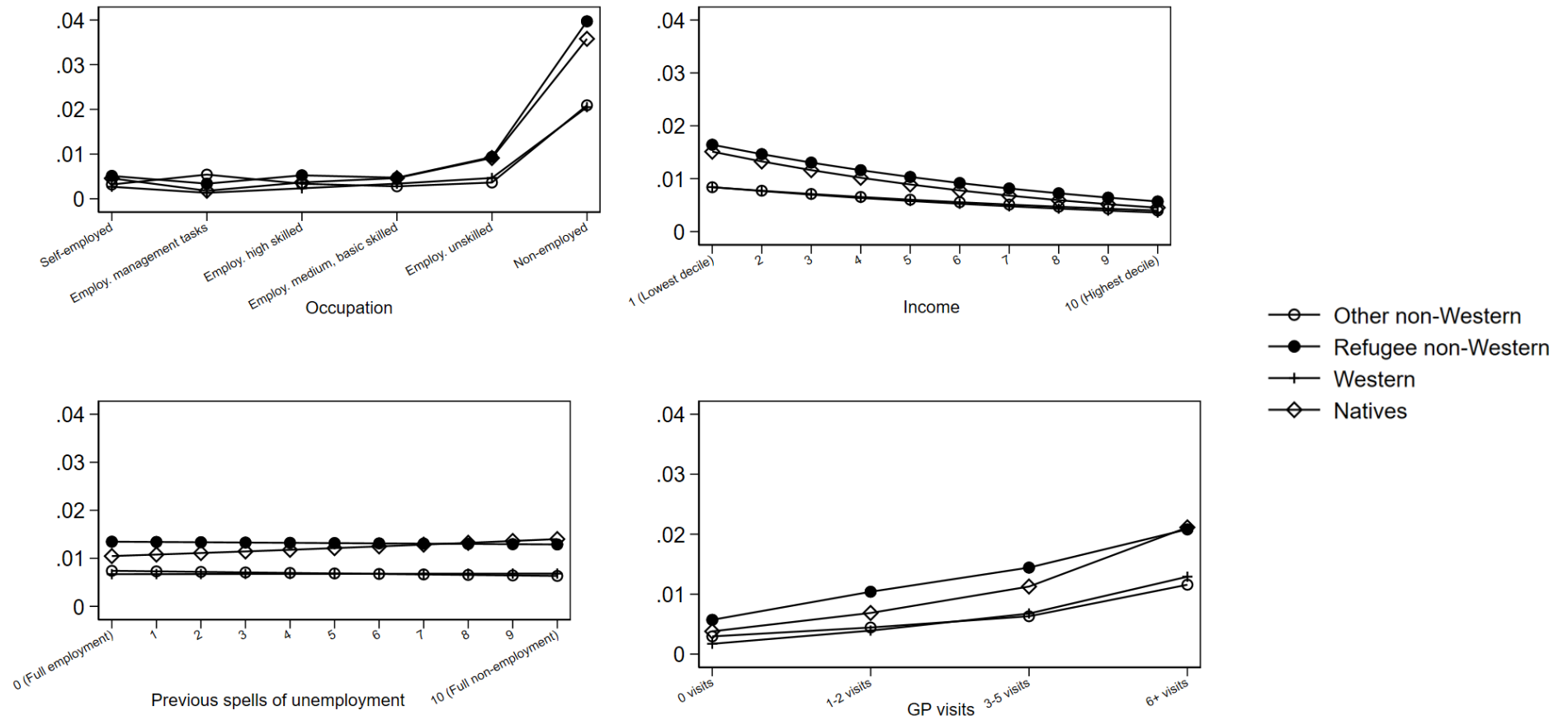


Table A1. Discrete-time logit models predicting regular retirement and health-related retirement

	Regular retirement					Health-related retirement				
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10
Other non-Western (ref. natives)	0.732***	0.952**	0.874***	0.850***	0.705***	1.854***	1.840***	0.964*	0.808***	0.555***
	(0.012)	(0.016)	(0.015)	(0.015)	(0.012)	(0.029)	(0.029)	(0.016)	(0.013)	(0.009)
Refugee non-Western	0.607***	0.853***	0.772***	0.736***	0.637***	4.281***	4.245***	2.081***	1.468***	1.110***
	(0.014)	(0.019)	(0.018)	(0.017)	(0.015)	(0.052)	(0.051)	(0.027)	(0.020)	(0.015)
Western	0.724***	0.857***	0.833***	0.830***	0.769***	0.918***	0.913***	0.710***	0.704***	0.569***
	(0.009)	(0.011)	(0.011)	(0.011)	(0.010)	(0.017)	(0.017)	(0.013)	(0.013)	(0.011)
Female	1.739***	1.660***	1.639***	1.593***	1.431***	1.286***	1.288***	1.188***	0.964***	1.006
	(0.007)	(0.007)	(0.007)	(0.006)	(0.006)	(0.008)	(0.008)	(0.007)	(0.006)	(0.006)
Cohort 1954-1957	0.510***	0.573***	0.576***	0.594***	0.573***	1.010	1.002	1.059***	1.041***	1.009
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.007)	(0.007)	(0.008)	(0.008)	(0.008)
Cohort 1958-1962	0.127***	0.200***	0.204***	0.230***	0.228**	0.881**	0.865***	0.968***	1.062***	1.026***
	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.006)	(0.007)	(0.007)	(0.008)	(0.008)
Partner self-employed	0.900***	0.948***	0.966***	0.977*	1.094***	0.325***	0.325***	0.411***	0.465***	0.533***
	(0.009)	(0.009)	(0.009)	(0.010)	(0.011)	(0.006)	(0.006)	(0.007)	(0.008)	(0.010)
Partner employed	1.060***	1.001	1.019***	1.018***	1.070***	0.361***	0.361***	0.464***	0.498***	0.653***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.006)	(0.003)	(0.003)	(0.003)	(0.004)	(0.005)
Partner unemployed	1.133***	1.141***	1.153***	1.150***	1.150***	0.675***	0.676***	0.752***	0.755***	0.734***
	(0.012)	(0.013)	(0.013)	(0.013)	(0.013)	(0.009)	(0.009)	(0.010)	(0.010)	(0.010)
Partner retired	1.655***	1.554***	1.575***	1.568**	1.588**	0.808**	0.812***	0.915***	0.919***	0.986
	(0.009)	(0.008)	(0.009)	(0.009)	(0.009)	(0.007)	(0.007)	(0.008)	(0.008)	(0.009)
Partner unclassified	0.914	0.906	0.907	0.876	0.867	0.618*	0.619*	0.616*	0.595*	0.624*
	(0.179)	(0.179)	(0.179)	(0.173)	(0.173)	(0.130)	(0.131)	(0.131)	(0.128)	(0.135)
No. of children	0.928***	0.935***	0.935***	0.931***	0.948***	1.042***	1.042***	1.016***	0.994*	1.033***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)	(0.002)	(0.002)	(0.003)
Early retirement payment		2.798***	2.871***	2.883***	3.047***		0.910***	1.146***	1.039***	1.335***
		(0.013)	(0.014)	(0.014)	(0.015)		(0.009)	(0.011)	(0.010)	(0.013)
Previous spells of unemployment			1.041***	1.039***	0.950***			1.242***	1.225***	1.025***

			(0.001)	(0.001)	(0.001)			(0.001)	(0.001)	(0.001)
1-2 GP visits (ref. 0 visits)				1.371***	1.414***				1.765***	1.839***
3-5 GP visits			(0.008)	1.485***	1.493***			(0.023)	3.203***	3.072***
6+ GP visits			(0.009)	1.651***	1.564***			(0.039)	7.429***	5.937***
Medical specialist contact			(0.010)	1.050***	1.077***			(0.086)	0.984**	1.030***
Psychiatric or psychological contact			(0.004)	1.131***	1.002			(0.006)	3.246***	2.347***
Employee with management tasks			(0.016)		0.348***			(0.033)		0.504***
Employee, high skilled					0.984					0.198***
Employee, medium and basic skilled					1.176***					0.404***
Employee, unskilled					1.137***					0.510***
Non-employed					2.501***					4.230***
Personal income					0.908***					0.870***
Time dummies					0.001					0.001
Constant	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	0.090***	0.050***	0.048***	0.034***	0.046***	0.014***	0.014***	0.009***	0.003***	0.006***
	(0.001)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
N	3758328	3758328	3758328	3758328	3758328	11021040	11021040	11021040	11021040	11021040

Exponentiated coefficients; Standard errors in parentheses. $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table A2. Discrete-time logit models predicting retirement with interaction terms between immigrant and independent variables, odds ratios.

	Regular retirement				Health-related retirement			
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Other non-Western (ref. natives)	0.717*** (0.017)	0.674*** (0.027)	1.005 (0.035)	0.637*** (0.017)	0.691*** (0.019)	0.773*** (0.044)	0.393*** (0.024)	0.506*** (0.013)
Refugee non-Western	0.655*** (0.022)	0.683*** (0.037)	0.916 (0.047)	0.579*** (0.021)	1.314*** (0.029)	1.522*** (0.079)	1.025 (0.050)	1.077*** (0.022)
Western	0.783*** (0.012)	0.748*** (0.021)	0.885*** (0.032)	0.692*** (0.016)	0.622*** (0.016)	0.448*** (0.030)	0.506*** (0.033)	0.514*** (0.015)
Early retirement payment	3.047*** (0.015)	3.047*** (0.015)	3.044*** (0.015)	3.044*** (0.015)	1.340*** (0.013)	1.337*** (0.013)	1.334*** (0.013)	1.335*** (0.013)
Previous spells of unemployment	0.951*** (0.001)	0.950*** (0.001)	0.951*** (0.001)	0.950*** (0.001)	1.032*** (0.001)	1.025*** (0.001)	1.025*** (0.001)	1.025*** (0.001)
1-2 GP visits (ref. 0 visits)	1.414*** (0.008)	1.411*** (0.008)	1.414*** (0.008)	1.414*** (0.008)	1.840*** (0.024)	1.838*** (0.025)	1.839*** (0.024)	1.839*** (0.024)
3-5 GP visits	1.493*** (0.009)	1.490*** (0.009)	1.492*** (0.009)	1.493*** (0.009)	3.073*** (0.038)	3.089*** (0.040)	3.071*** (0.038)	3.071*** (0.038)
6+ GP visits	1.564*** (0.010)	1.566*** (0.010)	1.565*** (0.010)	1.564*** (0.010)	5.942*** (0.070)	6.092*** (0.075)	5.935*** (0.070)	5.936*** (0.070)
Medical specialist contact	1.077*** (0.005)	1.077*** (0.005)	1.077*** (0.005)	1.077*** (0.005)	1.032*** (0.007)	1.033*** (0.007)	1.030*** (0.007)	1.031*** (0.007)
Psychiatric or psychological contact	1.002 (0.015)	1.003 (0.015)	1.004 (0.015)	1.002 (0.015)	2.351*** (0.024)	2.349*** (0.024)	2.345*** (0.024)	2.347*** (0.024)
Employee with management tasks (Ref: self-employed)	0.348*** (0.004)	0.348*** (0.004)	0.347*** (0.004)	0.348*** (0.004)	0.506*** (0.009)	0.505*** (0.009)	0.495*** (0.010)	0.505*** (0.009)
Employee, high skilled	0.984 (0.012)	0.984 (0.012)	0.998 (0.012)	0.986 (0.012)	0.199*** (0.010)	0.199*** (0.010)	0.194*** (0.010)	0.200*** (0.010)
Employee, medium and basic skilled	1.176*** (0.009)	1.176*** (0.009)	1.198*** (0.009)	1.177*** (0.009)	0.405*** (0.007)	0.405*** (0.007)	0.396*** (0.007)	0.406*** (0.007)
Employee, unskilled	1.137*** (0.007)	1.137*** (0.007)	1.152*** (0.008)	1.137*** (0.007)	0.512*** (0.006)	0.510*** (0.006)	0.502*** (0.006)	0.511*** (0.006)
Non-employed	2.502*** (0.020)	2.502*** (0.020)	2.601*** (0.021)	2.510*** (0.020)	4.228*** (0.042)	4.235*** (0.042)	4.176*** (0.043)	4.240*** (0.042)
Personal income	0.908*** (0.001)	0.908*** (0.001)	0.908*** (0.001)	0.908*** (0.001)	0.871*** (0.001)	0.870*** (0.001)	0.870*** (0.001)	0.869*** (0.001)

Other non-Western # Previous spells of unemployment	0.994 (0.005)	0.953*** (0.004)	
Refugee non-Western # Previous spells of unemployment	0.991 (0.007)	0.964*** (0.004)	
Western # Previous spells of unemployment	0.987* (0.005)	0.971*** (0.006)	
Other non-Western # 1-2 GP visits	1.124* (0.061)	0.826* (0.062)	
Other non-Western # 3-5 GP visits	1.064 (0.055)	0.705*** (0.047)	
Other non-Western # 6+ GP visits	1.014 (0.050)	0.674*** (0.040)	
Refugee non-Western # 1-2 GP visits	1.101 (0.081)	1.014 (0.066)	
Refugee non-Western # 3-5 GP visits	0.976 (0.068)	0.855** (0.050)	
Refugee non-Western # 6+ GP visits	0.809** (0.053)	0.646*** (0.035)	
Western # 1-2 GP visits	1.023 (0.039)	1.254** (0.106)	
Western # 3-5 GP visits	1.044 (0.039)	1.309*** (0.102)	
Western # 6+ GP visits	1.043 (0.040)	1.307*** (0.095)	
Other non-Western # Employee with management tasks			1.774*** (0.231)
Other non-Western # Employee, high skilled			7.716*** (3.919)
Other non-Western # Employee, medium, basic skilled			2.333*** (0.391)
			1.520*** (0.154)
Other non-Western # Employee, not skilled			1.436*** (0.093)
Other non-Western # Non-employed			

Refugee non-Western # Employee with management tasks				1.120				1.094
				(0.134)				(0.122)
Refugee non-Western # Employee, high skilled				0.585				1.844
				(0.218)				(1.313)
Refugee non-Western # Employee, medium, basic skilled				0.650***				1.404**
				(0.062)				(0.177)
Refugee non-Western # Employee, unskilled				0.780***				0.993
				(0.052)				(0.075)
Refugee non-Western # Non-employed				0.539***				1.093
				(0.034)				(0.055)
Western # Employee with management tasks				1.323***				1.159
				(0.085)				(0.154)
Western # Employee, high skilled				0.997				1.472
				(0.099)				(0.670)
Western # Employee, medium and basic skilled				0.821***				1.268*
				(0.037)				(0.152)
Western # Employee, unskilled				0.927				1.438***
				(0.039)				(0.122)
Western # Non-employed				0.713***				1.093
				(0.032)				(0.075)
Other non-Western # Personal income					1.033***			1.057***
					(0.007)			(0.012)
Refugee non-Western # Personal income					1.030***			1.017
					(0.009)			(0.009)
Western # Personal income					1.024***			1.044***
					(0.004)			(0.009)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.046***	0.046***	0.045***	0.046***	0.006***	0.006***	0.006***	0.006***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	3758328	3758328	3758328	3758328	11021040	11021040	11021040	11021040

Exponentiated coefficients; Standard errors in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A3. Multilevel discrete-time logit models predicting regular retirement (Between immigrant groups). Odds ratios.

	Model 1	Model 2	Model 3	Model 4	Model 5
Refugee (Ref: other non-Western)	0.844*	0.952	0.959	0.959	1.024
	(0.061)	(0.059)	(0.053)	(0.053)	(0.056)
Western	1.046	0.998	1.087	1.088	1.095
	(0.062)	(0.051)	(0.050)	(0.058)	(0.058)
Female	1.309**	1.306***	1.125***	1.124***	1.130***
	(0.026)	(0.027)	(0.024)	(0.027)	(0.027)
Cohort 1954-1957 (ref. cohort 1950-1953)	0.401***	0.443***	0.436***	0.436***	0.679***
	(0.008)	(0.009)	(0.009)	(0.010)	(0.016)
Cohort 1958-1962	0.087***	0.125***	0.149***	0.149***	0.386***
	(0.004)	(0.005)	(0.007)	(0.007)	(0.018)
Partner self-employed	0.838***	0.877**	0.997	0.997	0.985
	(0.040)	(0.043)	(0.050)	(0.050)	(0.050)
Partner employed	1.010	0.956	1.023	1.023	0.988
	(0.025)	(0.024)	(0.026)	(0.026)	(0.026)
Partner unemployed	0.971	1.042	1.008	1.008	0.987
	(0.038)	(0.041)	(0.040)	(0.040)	(0.041)
Partner retired	1.386***	1.364***	1.360***	1.360***	1.353***
	(0.034)	(0.034)	(0.035)	(0.035)	(0.036)
Partner unclassified	1.496	1.380	1.218	1.218	1.114
	(0.711)	(0.663)	(0.595)	(0.595)	(0.574)
No. of children	1.010	0.969***	0.980*	0.980*	0.987
	(0.007)	(0.007)	(0.008)	(0.008)	(0.008)
Early retirement payment		3.113***	3.631***	3.631***	
		(0.069)	(0.084)	(0.084)	
Age at arrival		0.989***	0.978***	0.978***	0.981***
		(0.002)	(0.002)	(0.002)	(0.002)
Previous spells of unemployment		1.041***	0.967***	0.967***	0.985***
		(0.004)	(0.004)	(0.004)	(0.004)
1-2 GP visits (ref. 0 visits)			1.587***	1.587***	1.622***
			(0.048)	(0.048)	(0.050)

3-5 GP visits	1.675*** (0.050)	1.675*** (0.050)	1.709*** (0.053)
6+ GP visits	1.732*** (0.054)	1.732*** (0.054)	1.792*** (0.057)
Medical specialist contact	1.101*** (0.023)	1.101*** (0.023)	1.107*** (0.024)
Psychiatric or psychological contact	0.932 (0.060)	0.932 (0.060)	0.983 (0.068)
Employee with management tasks (Ref: self-employed)	0.324*** (0.016)	0.324*** (0.016)	0.334*** (0.016)
Employee, high skilled	0.794* (0.073)	0.794* (0.073)	0.824* (0.075)
Employee, medium and basic skilled	0.860*** (0.032)	0.860*** (0.032)	0.875*** (0.033)
Employee, unskilled	0.950 (0.029)	0.950 (0.029)	0.946 (0.029)
Non-employed	1.714*** (0.054)	1.714*** (0.054)	1.936*** (0.062)
Personal income	0.888*** (0.004)	0.888*** (0.004)	0.898*** (0.004)
Pension age in country of origin		1.000 (0.006)	1.125*** (0.012)
Eligible for main public pension routes			94159.727*** (58601.609)
Pension age in country of origin# Eli- gible for main public pension routes			0.875*** (0.009)
Time dummies	Yes	Yes	Yes
Country-level random intercept vari- ance	1.044*** (0.010)	1.026*** (0.007)	1.017*** (0.005)
<i>N</i>	215834	215834	215834

Exponentiated coefficients; Standard errors in parentheses. $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table A4. Multilevel discrete-time logit models predicting health-related retirement (Between immigrant groups). Odds ratios.

	Model 1	Model 2	Model 3	Model 4	Model 5
Refugee (Ref: other non-Western)	2.092***	1.873***	1.653***	1.655***	1.653***
	(0.303)	(0.253)	(0.184)	(0.182)	(0.183)
Western	0.688**	0.791	0.970	0.906	0.908
	(0.094)	(0.101)	(0.101)	(0.097)	(0.097)
Female	1.316**	1.103**	0.862***	0.909**	0.906**
	(0.023)	(0.020)	(0.016)	(0.025)	(0.025)
Cohort 1954-1957 (ref. cohort 1950-1953)	0.955*	0.996	0.983	0.981	0.961
	(0.021)	(0.022)	(0.022)	(0.022)	(0.022)
Cohort 1958-1962	0.744***	0.853***	0.880***	0.875***	0.847***
	(0.016)	(0.020)	(0.021)	(0.021)	(0.020)
Partner self-employed	0.377***	0.432***	0.572***	0.571***	0.569***
	(0.022)	(0.025)	(0.034)	(0.034)	(0.034)
Partner employed	0.435***	0.514***	0.755***	0.755***	0.755***
	(0.010)	(0.012)	(0.018)	(0.018)	(0.018)
Partner unemployed	0.791**	0.839**	0.796**	0.794**	0.795**
	(0.020)	(0.021)	(0.021)	(0.021)	(0.021)
Partner retired	1.024	1.068*	1.136**	1.136**	1.138**
	(0.023)	(0.024)	(0.027)	(0.027)	(0.027)
Partner unclassified	0.728	0.716	0.819	0.816	0.820
	(0.193)	(0.190)	(0.222)	(0.222)	(0.223)
No. of children	1.097**	1.064**	1.062**	1.062**	1.062**
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Early retirement payment		1.124**	1.306***	1.309***	
		(0.045)	(0.054)	(0.054)	
Age at arrival		1.003	0.979***	0.979***	0.978***
		(0.001)	(0.001)	(0.001)	(0.001)
Previous spells of unemployment		1.139***	0.997	0.997	0.995
		(0.003)	(0.003)	(0.003)	(0.003)
1-2 GP visits (ref. 0 visits)			1.741***	1.740***	1.751***
			(0.073)	(0.073)	(0.073)

3-5 GP visits			2.628*** (0.101)	2.628*** (0.101)	2.649*** (0.102)
6+ GP visits			4.322*** (0.158)	4.328*** (0.158)	4.367*** (0.160)
Medical specialist contact			1.009 (0.018)	1.010 (0.018)	1.011 (0.018)
Psychiatric or psychological contact			2.026*** (0.051)	2.026*** (0.051)	2.029*** (0.051)
Employee with management tasks (Ref: self-employed)			0.630*** (0.045)	0.630*** (0.045)	0.631*** (0.045)
Employee, high skilled			0.350*** (0.107)	0.352*** (0.107)	0.352*** (0.107)
Employee, medium and basic skilled			0.556*** (0.044)	0.554*** (0.043)	0.559*** (0.044)
Employee, unskilled			0.586*** (0.029)	0.585*** (0.029)	0.587*** (0.029)
Non-employed			5.842*** (0.211)	5.846*** (0.211)	5.825*** (0.211)
Personal income			0.880*** (0.006)	0.881*** (0.006)	0.883*** (0.006)
Pension age in country of origin				1.018** (0.007)	1.017* (0.007)
Eligible for main public pension routes					0.323 (0.211)
Pension age in country of origin# Eli- gible for main public pension routes					1.017 (0.011)
Time dummies	Yes	Yes	Yes	Yes	Yes
Country-level random intercept vari- ance	1.417*** (0.078)	1.340*** (0.064)	1.192*** (0.038)	1.188*** (0.037)	1.189*** (0.038)
<i>N</i>	687050	687050	687050	687050	687050

Exponentiated coefficients; Standard errors in parentheses. $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table A5. Multilevel discrete-time logit models predicting regular retirement with interaction terms, odds ratio.

	Model 1	Model 2
Refugee (Ref: other non-Western)	1.017 (0.055)	1.167 (0.927)
Western	1.071 (0.057)	1.822 (1.551)
Pension age in country of origin	1.057*** (0.017)	1.003 (0.009)
Eligible for main public pension	23.341*** (0.883)	23.237*** (0.878)
Age at arrival	1.092** (0.032)	0.982*** (0.002)
Pension age in country of origin # Age at arrival	0.998*** (0.000)	
Pension age in country of origin # Refugee non-Western		0.998 (0.013)
Pension age in country of origin # Western		0.992 (0.013)
Previous spells of unemployment	0.984*** (0.004)	0.983*** (0.004)
1-2 GP visits (ref. 0 visits)	1.618*** (0.050)	1.619*** (0.050)
3-5 GP visits	1.703*** (0.052)	1.704*** (0.053)
6+ GP visits	1.781*** (0.056)	1.783*** (0.057)
Medical specialist contact	1.106*** (0.024)	1.106*** (0.024)
Psychiatric or psychological contact	0.981 (0.067)	0.980 (0.067)
Employee with management tasks (Ref: self-employed)	0.334*** (0.016)	0.333*** (0.016)
Employee, high skilled	0.811* (0.073)	0.812* (0.074)
Employee, medium and basic skilled	0.868*** (0.033)	0.867*** (0.033)
Employee, unskilled	0.942* (0.029)	0.941* (0.029)
Non-employed	1.924*** (0.062)	1.923*** (0.062)
Personal income	0.897*** (0.004)	0.897*** (0.004)
Control variables	Yes	Yes
Time dummies	Yes	Yes
Country-level random intercept variance	1.015*** (0.004)	1.015*** (0.004)
N	215834	215834

Exponentiated coefficients; Standard errors in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$



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