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Abstract

Non-Western immigrants in Scandinavia have a higher risk of early retirement on a disability pension than natives, but the reasons are unclear. One theory is that increased demands for standardization, efficiency, and productivity in advanced capitalist labor markets, such as the Scandinavian market, cause expulsion of the weakest and least qualified individuals from the labor market, including a disproportionate share of non-Western immigrants. Another theory is that non-Western immigrants already have poorer health than natives upon arrival in Scandinavia. This article examines the extent to which the native-immigrant gap in early retirement on a disability pension is explained by non-Western immigrants' disadvantaged position in the labor market when pre-existing health differences are controlled for. To this end, we draw on Danish register data, including all disability pensions granted in 2003-2012 to natives and non-Western immigrants who arrived in Denmark in 1998. Our results suggest that a minor proportion of the native-immigrant gap in disability pensions is explained by non-Western immigrants' health upon arrival, whereas the vast majority of the gap is explained by non-Western immigrants' disadvantaged position in the labor market.

Keywords: Denmark, Disability Pension, Health, Non-Western Immigrants, Social Class

Introduction

Non-Western immigrants in Scandinavia have a higher risk of early retirement on a disability pension than natives, but the reasons are unclear. One theory is that increased demands for standardization, efficiency, and productivity in advanced capitalist labor markets, such as the Scandinavian market, cause expulsion of the weakest and least qualified individuals from the labor market, including a disproportionate share of non-Western immigrants (Kolberg and Hagen, 1991). Expulsion theory emphasizes that non-Western immigrants are more likely than natives to work temporary, low-skilled and low-paid jobs (Brodmann and Polavieja, 2011; Statistics Denmark, 2018) that are typically characterized by harsh working conditions and associated with a high disability pension risk (Tufte, 2013). Expulsion theory is supported by evidence from Scandinavia that has shown that the size of the native-immigrant gap in disability pensions is significantly reduced when the labor market position, as indicated by socioeconomic status, social class, and/or unemployment history, is controlled for (Claussen et al., 2009; Helgesson et al., 2013; Johansson et al., 2012; Österberg and Gustafsson, 2006).

Another theory is that non-Western immigrants already have poorer health than natives upon arrival in Scandinavia. In other contexts, for example in the United States, immigrants have been found to be healthier than natives (Cunningham et al., 2008). However, this social phenomenon, commonly referred to as "the healthy migrant effect", does not seem to apply in the Scandinavian context. On the contrary, evidence from the Scandinavian countries suggests that non-Western immigrants suffer from more chronic diseases and poorer mental and self-reported health than natives, even though they actually appear to live longer than natives (Abebe et al., 2014; Helgesson et al., 2019; Jervelund et al., 2017; Missinne and Bracke, 2012; Syse et al., 2016).

In light of these two theories, an important shortcoming of previous research is that possible health differences that predated the non-Western immigrants' entrance into the labor market have not been

adequately controlled for. This failure to control for pre-existing health differences might have led previous research to overestimate the extent to which non-Western immigrants' disadvantaged position in the labor market explains the native-immigrant gap in early retirement on a disability pension.

This article addresses this shortcoming by examining to what extent the native-immigrant gap in early retirement on a disability pension is explained by non-Western immigrants' disadvantaged position in the labor market when health differences that predated the non-Western immigrants' entrance into the labor market are controlled for. To this end, we drew on Danish labor force register data, including information about all disability pensions granted during the period from 2003-2012 to non-Western immigrants who arrived in Denmark in 1998 as well as natives in comparable age groups (N = 2,515,958). To construct proxies for health status, these data were merged with information from the National Patient Register and the National Health Insurance Service Register, which allowed us to capture health upon arrival, as indicated by visits to general practitioners (GPs), contact with psychiatric or psychological health professionals, and the prevalence of circulatory system diseases, musculoskeletal diseases, and mental health diseases.

The native-immigrant gap in early retirement on a disability pension

This section describes how the native-immigrant gap in early retirement on a disability pension has developed over the past few decades in Denmark. Figure 1 shows the development in the number of new disability pensions (pr. 1000 individuals) during the period 1999-2016 for Western immigrants, non-Western immigrants, and natives. The term "non-Western immigrants" refers to immigrants from all countries other than those in the EU and Andorra, Iceland, Liechtenstein, Monaco, Norway, San Marino, Switzerland, the Vatican State, Canada, the USA, Australia and New Zealand (Statistics Denmark, 2018). The ten largest non-Western immigrant groups in Denmark are from Turkey, Syria,

Iraq, Lebanon, Pakistan, Bosnia-Herzegovina, Somalia, Iran, Afghanistan, and Vietnam (StatBank, 2018b).

Our article focuses on non-Western immigrants because, unlike the disability pension rate for Western immigrants, which largely follows the rate of natives, the disability pension rate of non-Western immigrants has been markedly higher than that for natives for all years considered, as shown in Figure 1. The figure moreover suggests that the native-immigrant gap in disability pensions widened markedly during our period of investigation because the disability pension rate of non-Western immigrants increased throughout the 2000s. This increase came to a sudden stop around 2010, after which it declined markedly before the 2013 reform, although the reform appears to have fueled further decline. It has been speculated that one reason why the decline in new disability pensioners appears to have started ahead of the 2013 reform could be an increased political and public focus on the fact that the 2003 reform had not succeeded in its aim of reducing the number of new disability pensioners. This increased attention might have led some local authorities to reject a larger number of applications for disability pensions than usual, but more evidence is needed before firm conclusions can be drawn (Star, 2018).

Figure 1. New disability pensioners per thousand individuals among natives, non-Western immigrants and Western immigrants aged 18-66 years from 1999-2016.

[Figure 1 about here]

Source: Authors' own calculations based on register data from Statistics Denmark.

Theoretical background and hypotheses

Our theoretical section is divided into three parts. First, we discuss likely reasons why non-Western immigrants already have poorer health than natives upon arrival in Denmark. Second, we discuss

why non-Western immigrants' working capacity is likely to deteriorate at a faster rate than that of natives because of their disadvantaged position in the labor market. Third, we conclude the section with a summary and describe a number of testable hypotheses.

The health of non-Western immigrants upon arrival

According to Spallek et al. (2011), it is necessary to adopt a life-course approach to understand the health status of immigrants in their host countries. The reason is that immigrants' health is affected by the complex interplay of conditions and events that take place prior to, during, and after the migration process.

Prior to the migration process, many non-Western immigrants may have been exposed to a range of environmental and social health risk factors in their home countries. Compared to high-income countries such as Denmark, these risk factors include a general decreased quality of living, local chronic disease patterns (Zimmerman et al., 2011), and less regulated and often harsh working conditions (Kortum et al., 2010). Moreover, a substantial proportion of non-Western immigrants are refugees who have fled from their home countries because they have experienced traumatizing events. Traumatizing events, including exposure to war, terrorism, losing relatives in armed conflicts or being politically or religiously persecuted, increase the risk of mental health problems during migration (Fazel et al., 2005). The journey from their country of origin to their new host country itself similarly often involves health risk factors, which also depend on the circumstances and means of transportation as well as the number and length of "transit" locations. The journey may involve physical strain, increasing the risk of adverse health outcomes (Zimmerman et al., 2011).

After arrival, the literature suggests that the process of acculturation, referring to the process by which immigrants adapt to the beliefs, behaviors, and practices of the host country (Berry,

1997), can cause “migration stress”, which refers to the adverse psychosocial effects of the process of settling into a different social, political, and cultural environment, that can adversely affect mental and physical health. Evidence suggests that refugees in Western countries have a higher prevalence of posttraumatic stress disorder, depression and anxiety than natives (Fazel et al., 2005, Lindert et al., 2009). Additionally, risk factors for disease, especially cardiovascular disease, are likely to emerge due to dietary acculturation, i.e., the adoption of Western dietary habits. This may have adverse effects on the health of immigrants because lifestyle factors such as unhealthy diets and reduced exercise account for a greater part of immigrants’ everyday lives in Western countries than in their respective countries of origin (Satia-Abouta et al., 2002). This interpretation is supported by evidence suggesting that non-Western immigrants are more likely to suffer from lifestyle-related diseases such as cardiovascular disease and cardiovascular risk factors such as diabetes than natives in Western countries, although the specific diseases vary according to the immigrant group and gender (Gadd et al., 2003; Jervelund et al., 2017).

When all these factors are viewed in conjunction, they suggest that non-Western immigrants could be expected to have poorer health than natives upon arrival in high-income Western countries. However, surprisingly, in many high-income Western countries, it has been observed that immigrants are healthier than natives, as indicated by mortality, chronic conditions, and mental health. One of the most frequently offered explanations for this “healthy migrant effect” is that people who are able to flee their home countries or migrate over long distances are, on average, healthier than those who are unable to do so (Agyemang et al., 2012). However, while a healthy migrant effect has been observed in the United States (Cunningham et al., 2008) and in some parts of Europe (Moullan and Jusot, 2014), it has not found support in the Scandinavian case. Non-Western immigrants in Scandinavia thus appear to have more chronic diseases and poorer mental and self-reported health than natives, even though they paradoxically appear to have a longer life expectancy than natives

(Abebe et al., 2014; Helgesson et al., 2019; Jervelund et al., 2017; Missinne and Bracke, 2012; Syse et al., 2016).

Labor market disadvantage and the native-immigrant gap in early retirement on a disability pension

In the social science literature, it is common to view early retirement on a disability pension in terms of "the triple notion", referring to labor market expulsion, hidden unemployment, and diswelfare (Kolberg and Hagen, 1991). The expulsion theory is particularly popular in sociology and suggests that increased demands for standardization, efficiency, and productivity in advanced capitalist labor markets, such as the Scandinavian market, cause expulsion of the weakest and least qualified individuals. The second notion suggests that a significant share of disability pensioners remain willing to work and capable of working despite being deemed eligible for disability pension. According to this notion, policy makers sometimes use the disability pension schemes to "hide" what, in effect, is unemployment because a high unemployment rate is politically undesirable. The third notion suggests that people who are granted disability pensions become idle, detached, and passive, but because this notion is concerned with the consequences rather than the causes of disability pensions, it is not relevant to our study.

A large body of research in political science and economics has aimed to estimate the proportion of disability pensioners who can be viewed as "hidden unemployed" (e.g., Koning and van Vuuren, 2007). Our aim in this article is different because we assume that the fraction of hidden unemployed among those who became disability pensioners during the period 2003-2012 (i.e., after the 2003 reform) is negligible. This assumption is grounded in the fact that the working capacity of all new disability pensioners during this period has been thoroughly examined and tested by various

professionals, and the new pensioners have been deemed unable to support themselves even partially (Bengtsson et al., 2014). Instead, our aim is to examine whether the expulsion theory that emphasizes the role of labor market inequality between non-Western immigrants and natives continues to be supported when health upon arrival is controlled for.

There are different reasons why people in a disadvantaged labor market position can be expected to lose their working capacity at a higher rate than people in a privileged labor market position. These reasons generally apply to non-Western immigrants and natives alike, but they may nevertheless explain part of the native-immigrant gap in disability pensions because a larger proportion of non-Western immigrants than natives work temporary unskilled manual jobs (Brodmann and Polavieja, 2011; Statistics Denmark, 2018).

First, working manual unskilled jobs may lead to physical strain because of heavy lifting or exposure to cleaning agents or other chemical substances. Second, working manual unskilled jobs may also lead to mental strain because of the close monitoring of productivity and low job control (Haukenes et al., 2011; Kristensen et al., 2002). Third, people who belong to the working class may lose their working capacity at a higher rate than people in a privileged class position because class position affects unemployment risk (Visser et al., 2016). Since the 1970s, the Danish economy, similar to other advanced capitalist economies, has been characterized by an increase in jobs in the service sector and a decrease in jobs in the manufacturing sector because technological development has reduced the demand for assembly line work and because globalization has made it possible to manufacture goods abroad in countries where wages are low (Kalleberg, 2009). The structural changes in the Danish economy have generated an increased demand for education and skills and thus limited the employment opportunities for people who belong to the working class, which includes a disproportionately large share of non-Western immigrants. The close connection between social class and

unemployment risk suggests that it would be inadequate to capture non-Western immigrants' disadvantaged position in the labor market solely by their class position as indicated by their contemporaneous occupation. Even though the long-term unemployed are spared from harsh working conditions and productivity monitoring, long-term unemployment nevertheless may affect the risk of early retirement on a disability pension through its adverse effects on mental health and wellbeing. The adverse effects of unemployment on mental health and wellbeing include lowered self-esteem, self-acceptance, self-confidence, morale, life satisfaction, sense of purpose, and sense of control; heightened apathy, idleness, and isolation; and the breakdown of social support (Brand, 2015). Moreover, unemployment may also indirectly affect physical health by increasing the likelihood of unhealthy dieting practices and excessive drinking (Virtanen et al., 2008). The risk of experiencing these adverse effects of unemployment on mental wellbeing has been found to be greater for men than for women (Artazcoz et al., 2004) and increases with the length of unemployment (Nurmela et al., 2018).

Summary and hypotheses

In the following, we describe testable hypotheses based on the theoretical background. First, the underlying basis for our study is that non-Western immigrants have a higher risk of early retirement on a disability pension than natives. We hypothesize that this also applies when sociodemographic covariates and municipality of residence are controlled for *(H1)*. Second, based on previous research that has disproved the healthy migrant hypothesis in the Scandinavian case, we expect that non-Western immigrants have worse physical and mental health upon arrival than natives. On these grounds, we hypothesize that the size of the native-immigrant gap in disability pensions will decrease when health upon arrival is controlled for *(H2)*. Because non-Western immigrants are more likely to assume a disadvantaged position in the labor market than natives, we hypothesize that the native-immigrant

gap in disability pensions will decrease further when social class is controlled for *(H3)*. Finally, because of the close connection between social class and unemployment risk in advanced capitalist societies, we hypothesize that the native-immigrant gap in disability pensions will decrease further when unemployment history is controlled for *(H4)*.

The Danish case

The Danish case offers an interesting setting to investigate possible theories about why native-immigrant gaps in early retirement on a disability pension exist for two main reasons. First, compared to other European Union (EU) member states, Denmark is by far the country that spends the largest share of its total social expenses on disability benefits, as shown in Figure 2. In 2017, the expenses related to disability benefits amounted to approximately 40 billion Danish kroners (DKK) (StatBank, 2018a). Second, Denmark offers a fruitful research setting because of the availability of high-quality longitudinal administrative register data covering the whole population. The ability to link information from different administrative registers at the individual level, for example, made it possible to construct proxies for health differences between non-Western immigrants and natives that predated the non-Western immigrants' entrance into the labor market, which was essential to achieving our objective.

Figure 2. Share of disability benefits among EU member states, 2017 (as a percentage of total social benefits).

[Figure 2 about here]

Source: Eurostat (2020)

Data and methods

For our study, we drew on Danish administrative register data that contain information on all individuals registered as residing in Denmark. Each individual in Denmark is required to hold a unique individual identification number that is available to researchers in an anonymized form through Statistics Denmark, allowing the construction of datasets by merging different administrative registers at the individual level.

Study population

Our study population consists of non-Western immigrants who arrived in Denmark in 1998 and who were between 19 and 59 years old as of 1 January 1999 and natives who were in the same age range. We limited the sample of non-Western immigrants to those who arrived in Denmark in 1998 to ensure that we could proxy their health status in a period immediately upon their arrival in Denmark and until 2003. These restrictions resulted in a study population of 2,515,958 individuals, of whom 6,212 were non-Western immigrants.

Outcome variable: disability pension receipt

The outcome variable is the event of disability pension receipt during the period 2003-2012. We chose to focus on this period for two main reasons. First, the native-immigrant gap in disability pension was particularly large during this period (see Figure 1). Second, this period is the longest period in recent times during which the eligibility criteria for a disability pension has remained unchanged. Before 2003, a disability pension was granted based on "loss of employability". After 2003, the descriptions of the eligibility criteria changed from using the term "loss of employability" to using the term "working capacity" (Jensen, 2004). The term working capacity, which we have

adopted in this article, refers to the capability to be self-supported or partly self-supported. To be eligible for a disability pension, an individual had to be unable to work even in a flexible job, meaning that his or her work capacity had to be permanently reduced by at least 67 percent (Kvist, 2003). In 2013, the disability pension system was reformed again. The 2013 reform, among other things, required that a disability pension could no longer, except for under very rare circumstances, be awarded to individuals under 40 years of age (Bengtsson et al., 2014).

Information on disability pensions was obtained from the Register-based Labor Force Statistics with no missing cases. Because the information was obtained with no missing cases, our measure is likely to be more reliable than the self-reported measures of disability pension receipt used in most previous research (Svedberg et al., 2010). Individuals who reached the age of 65 years, which was the statutory pension age in the years investigated, whose duration exceeded the investigation period (2012), who experienced another retirement event (most often an early retirement scheme), who died, or who migrated were treated as right-censored.

Non-Western immigrant status

The definition of being a non-Western immigrant as opposed to a native is consistent with the definition used by Statistics Denmark. Natives are people born in Denmark who have at least one parent who is a Danish citizen. Immigrants are people who were born in a foreign country and whose parents were not Danish citizens and were not born in Denmark. Western countries include all countries in the European Union as well as Andorra, Iceland, Liechtenstein, Monaco, Norway, San Marino, Switzerland, the Vatican State, Canada, the USA, Australia and New Zealand. Non-Western countries are all other countries (Statistics Denmark, 2018). We did not include second-generation immigrants, i.e., descendants of non-Western immigrants, in the study because they constitute a very young population with few cases of disability pension receipt.

Health upon arrival

Health status upon arrival was proxied by diagnosis information and health care utilization in the period 1999-2002 upon the arrival of the non-Western immigrants in 1998. We chose to measure health status over a four-year period because many diseases are diagnosed over a period of time. Moreover, measuring health status during a period of time reduces the impact of volatility in the health measures.

Information on disease diagnoses was retrieved from the National Patient Register, which includes diagnoses and supplementary diagnoses of outpatients, inpatients and patients visiting emergency wards. We included mental, musculoskeletal and circulatory system diseases because they are the most frequent reasons for disability pension uptake (Star, 2018). Mental diseases were captured by an indicator variable equal to 1 if an individual was diagnosed with a mood disorder or posttraumatic stress disorder during the period and 0 otherwise. Musculoskeletal diseases were captured by an indicator variable equal to 1 if an individual was diagnosed with diseases of the musculoskeletal system and 0 otherwise. Circulatory diseases were captured by an indicator variable equal to 1 if an individual was diagnosed with diseases of the circulatory system or cardiovascular risk factors, including diabetes or obesity, at a hospital during the period and 0 otherwise. The ICD-10 codes that were used to generate the variables are listed in the supplemental material (Table S1).

An important drawback of using diagnosis data to proxy health status is that hospitalization is required for them to be registered. Hence, these data capture only severe health problems. Therefore, we included the number of visits to GPs and contact with psychiatric or psychological health professionals as additional proxies for health status. Both these variables were retrieved from the National Health Insurance Service Register. To reduce the impact of outliers in number of visits to GPs, we divided the number of visits into deciles in the regression models. Contact with psychiatric

or psychological health professionals was an indicator variable equal to 1 if an individual had visited or had contact with psychiatric or psychological professionals during the period and 0 otherwise.

Social class

The features that define social class positions and their measurement are contested issues in sociology. In this article, we take our point of departure in the notion of social class that guides the Erikson-Goldthorpe-Portacero (EGP) class scheme (Erikson and Goldthorpe, 1992). A basic distinction in the EGP scheme is between employers, the self-employed, and the employed. Among the employed, the organizing principle that guides the division of classes is the nature of the employment relationship. Unlike the trust-based employment relations that characterize service class occupations due to the diffuse tasks these occupations involve, the employment relations in working-class occupations is based on the employers' continuous monitoring of the workers' productivity (Goldthorpe and McKnight, 2004). Between the two polar opposites, the service class and the working class, an intermediate class can be distinguished whose employment relationship has features resembling both the service and the working class.

Following Ganzeboom and Treiman (1996), individuals were classified into social classes according to the EGP class scheme based on the International Standard Classification of Occupations from 1988 (ISCO88). We used the five-category version of the EPG scheme (EGP-5) proposed by Halpin (1999), which distinguishes between the following classes: 1) *The service class,* consisting of higher- and lower-grade professionals, managers and administrators; 2) *the intermediate class*, consisting of higher- and lower-grade routine, nonmanual workers; 3) *the self-employed*; 4) *skilled manual workers*; and 5) *unskilled manual workers*. The latter two classes together constituted the working class but differed in skill level. Following the EGP scheme, supervisors of manual workers

and lower-grade technicians are usually coded into the intermediate class. However, because information on supervisory status was not available with ISCO88, we coded these supervisors as skilled manual workers. Finally, we coded two additional categories, i.e., *6) class: missing*, comprising those who did not have a valid occupational code in the Danish registers but were employed at some point during the period of investigation, and *7) long-term unemployed*, comprising those who were unemployed during the whole period of investigation.

The class variable was coded as a time-varying variable. This step ensured that class mobility during the period of investigation was taken into account. However, for those who became unemployed during the period of investigation and therefore did not have an ISCO88 code that particular year, we retained their class position based on their last recorded occupation. It follows that those who were categorized as *6) class: missing* or *7) long-term unemployed* remained in these categories throughout the period of investigation.

Unemployment history

Unemployment history captures individuals' annual unemployment rate retrieved from the national labor force register. In the labor force register, the unemployment rate is measured in per thousand and is calculated as the ratio between the number of hours unemployed and the number of possible working hours. To aid intuitive interpretation and to avoid scaling problems, we divided this measure by 1000. Thus, the annual unemployment rate ranges from 0 to 1, with 1 indicating that the individual was unemployed for a whole year and 0 indicating that the individual was employed for the whole year. We measured unemployment history as an accumulated time-varying variable to ensure that not only contemporaneous unemployment but also individual unemployment history was taken into account.

Covariates

The following demographic covariates were included: cohabitant income, municipality of residence, and baseline age. Cohabitant income and municipality of residence were included as time-varying variables.

Cohabitant income was included because being separated or single is related to a higher risk of receiving a disability pension (Krokstad et al., 2002) because people who have cohabiting partners with high incomes are probably less likely to apply for a disability pension. Cohabitant income was measured in quartiles using the yearly disposable income of the partner in DKK with an inflation adjustment to the 2012 values. *Municipality of residence* dummy variables was controlled for because in Denmark, a disability pension is granted by the local municipality of residence. The decision process that determines whether an individual is eligible for a disability pension is organized locally within each municipality. Within the municipalities, the decision is based on expert advice from social workers, job consultants, and medical professionals. Nevertheless, the exact nature of the process varies to some degree between municipalities. This variability is probably why previous research has shown that the award rates vary between municipalities even when the socioeconomic and demographic characteristics of the individuals residing in the municipalities are controlled for (Bengtsson, 2002; Caswell et al., 2012). The municipality dummies were thus included to control for differences in granting practice differences that we did not observe. As a robustness check, we also ran our analyses without municipality dummies. These results are available in Tables S4-S5 in the supplemental material. Table 1 presents the descriptive statistics of the variables.

Table 1. Descriptive statistics (measured during the last year before the disability pension/censoring)

[Table 1 about here]

Statistical model and empirical strategy

To model the risk of disability pension, we used a discrete-time logit regression model, which is a type of event history model that predicts the conditional probability of being granted a disability pension at time *t*, given that the individual has not already been granted a disability pension (Allison, 2010). We used a discrete-time model because we observed the variables in discrete one-year time intervals. The dependence of the hazard on time was specified with yearly time intervals that were included in the models as a categorical variable. We used time-on-study as the time scale and therefore controlled for baseline age to account for the fact that individuals entered our period of study at different ages.

Our empirical analysis proceeded in four steps. First, we estimated the size of the native-immigrant gap while controlling for covariates but not health upon arrival, social class, and unemployment history. Next, we sequentially introduced variables for health upon arrival, social class, and unemployment history. This approach allowed us to examine the extent to which the native-immigrant gap was reduced when health upon arrival, social class, and unemployment history were controlled for. We ran separate models for men and women and for age group at arrival because we expected that the relative impact of the variables was likely to depend on gender and age group at arrival. We ran separate analyses for those who were 19-29, 30-39, and 40-59 years old upon arrival because immigrants who were older when they arrived in Denmark had been exposed to health risks in their home countries for a longer period than those who were younger when they arrived.

Because we introduced the variables sequentially, we estimated the discrete-time logit models using the reformulated KHB method (Breen et al., 2018). The reformulated KHB method, similar to the original (Karlson et al., 2012), addresses the problem that coefficients based on logit

regressions cannot be compared across models because scaling bias is conflated with confounding/mediation. The benefit of using the reformulated KHB method rather than the original is that it is computationally more convenient when variables are introduced sequentially (Breen et al., 2018).

Results

Irrespective of age upon arrival, the descriptive statistics in Table 1 show that a considerably larger share of male and female non-Western immigrants than natives were granted a disability pension during the period of investigation. However, the relatively largest differences between non-Western immigrants and natives were found in the oldest age groups. For men, 8 percent of non-Western immigrants who arrived at age 18-29 years received disability pensions during the period 2003-2012 compared to 2 percent of natives in a comparable age group. Similarly, 47 percent of non-Western immigrant men who arrived at age 40-59 years received disability pensions in the period 2003-2012 compared to 6 percent of natives in a comparable age group. Moreover, among non-Western immigrants, while a larger proportion of men than women received disability pensions in the period 2003-2012, the opposite pattern was found among natives: a larger proportion of women than men received disability pensions.

As expected, Table 1 suggests that non-Western immigrants had poorer health upon arrival than natives, especially within the older age groups. Accordingly, non-Western immigrants were more likely to have been diagnosed with the included diseases and visited health professionals more frequently than natives. However, one exception was among women, where a higher share of natives than of non-Western immigrants visited psychiatric or psychological health professionals.

Regarding differences in labor market position, the table shows that non-Western immigrants were more likely than natives to belong to the unskilled working class and to the long-term

unemployed category and less likely to belong to the service class. Notably, more than half of the non-Western immigrant men and women aged 40-59 years upon arrival were unemployed throughout the period of investigation. The differences in unemployment risk between non-Western immigrants and natives for men and women were also evident from the differences in the accumulated unemployment until disability pension or censoring.

Table 2. Rescaled discrete-time logit models based on the reformulated KHB method by regressing disability pension receipt on health upon arrival and labor market disadvantage indicators. Men, 2003-2012

[Table 2 about here]

Table 3. Rescaled discrete-time logit models based on the reformulated KHB method by regressing disability pension receipt on health upon arrival and labor market disadvantage indicators. Women, 2003-2012

[Table 3 about here]

Tables 2 and 3 show the results of the discrete-time logit models based on the reformulated KHB method for men and women and different age groups. As expected, Tables 2 and 3 suggest that non-Western immigrant men and women have a significantly higher risk of early retirement on a disability pension when the included covariates and municipality dummies are controlled for, supporting hypothesis 1. The largest native-immigrant gaps in disability pension were found in the oldest age groups for both men and women. In the youngest age groups, the odds of disability pension receipt was 3.8 and 1.6 times higher for non-Western immigrant men and women, respectively ($e^{1.344}$ and

$e^{0.470}$, respectively). In the oldest age groups, the odds of disability pension receipt was 8.3 and 3.4 times higher for non-Western immigrant men and women, respectively ($e^{2.111}$ and $e^{1.220}$, respectively). Next, we introduced the variables that indicate health status upon arrival. First, we note that having been diagnosed with a circulatory system, musculoskeletal, or mental disease was associated with a significantly higher risk of disability pension receipt. Moreover, visits to psychologists or psychiatrics and GPs were also associated with a higher risk of disability pension receipt. As expected, Tables 2 and 3 suggest that the native-immigrant gap among men and women was significantly reduced by approximately one-fifth or one-fourth, depending on age group, when controlling for health upon arrival, supporting hypothesis 2.

We then introduced a variable that captures social class. First, we note that compared to the service class, men and women of all other classes had a higher risk of disability pension receipt, with the largest coefficients found for the long-term unemployed, manual unskilled workers and those whose class position is missing. Table 2 indicates that among non-Western immigrant men, the native-immigrant gap declined further, such that only approximately one-third remained when social class was controlled for. Moreover, Table 3 reveals that for women, the native-immigrant gap was not only significantly reduced when social class was controlled for but also that its operational sign was reversed. This finding suggests that non-Western immigrant women had a lower risk of disability pension than natives when health upon arrival and social class were controlled for.

Last, we introduced a variable that captures unemployment history. First, we note that the risk of disability pension receipt significantly increased with years of unemployment. Table 2 indicates that the native-immigrant gap for non-Western immigrant men was further reduced, such that only approximately one-tenth or one-fifth remained when controlling for health upon arrival, social class, and unemployment history, depending on age group. When all factors were controlled

for, the odds of disability pension receipt for men was 1.1 and 1.6 times higher for non-Western immigrants than for natives in the youngest and oldest age groups, respectively ($e^{0.132}$ and $e^{0.449}$, respectively). Moreover, Table 3 reveals that non-Western immigrant women had an even lower risk of disability pension when unemployment was controlled for in addition to health upon arrival and social class. When all factors were controlled for, the odds of disability pension receipt for women was 2.8 and 1.4 times higher for natives than for non-Western immigrants in the youngest and oldest age groups, respectively ($1/e^{-1.037}$ and $1/e^{-0.301}$, respectively).

Conclusion and discussion

In this article, we have used longitudinal Danish administrative register data to examine why non-Western immigrants in Scandinavia have a higher risk of early retirement on a disability pension than natives. More specifically, we have examined whether non-Western immigrants already have poorer health upon arrival than natives or whether their working capacity deteriorates after their arrival because of their disadvantaged position in the labor market, as argued by expulsion theory (Kolberg and Hagen, 1991).

Our results suggest that between one-fifth and one-fourth of the native-immigrant gap in disability pension receipt is explained by non-Western immigrants' health upon arrival, but the vast majority of the gap is explained by non-Western immigrants' disadvantaged position in the labor market, as argued by expulsion theory. For women, our results suggest that the native-immigrant gap in disability pension receipt can be completely explained by their disadvantaged position in the labor market, as indicated by social class and unemployment. In fact, our results suggest that non-Western immigrant women have a lower disability pension risk than natives when health upon arrival, social class, and unemployment history, along with the other covariates, are controlled for. Moreover, for

men, our results suggest that between nine-tenths and four-fifths of the native-immigrant gap is explained by health upon arrival, social class, and unemployment history, depending on age upon arrival.

The descriptive statistics in Table 1 show that particularly non-Western immigrants in the oldest age range were overrepresented among the long-term unemployed. As a robustness check, we therefore repeated all our analyses while excluding those who were unemployed throughout the period of investigation (see Tables S6-S7 in the supplemental material). While these analyses suggest that the native-immigrant gap in disability pension receipt is smaller when considered in absolute terms, particularly among the oldest age groups, they indicate the same overall pattern as the analyses we present in the article, namely, that a minor proportion of the native-immigrant gap in disability pension is explained by non-Western immigrants' health upon arrival, whereas the vast majority of the gap is explained by non-Western immigrants' disadvantaged position in the labor market.

In political science and economics, it is common to suspect that a fraction of disability pensioners are, in fact, "hidden unemployed" in the sense that they remain willing to work and capable of working. On the grounds of our empirical analysis, we cannot rule out that a small fraction of those who were granted disability pensions could be considered "hidden unemployed" by some standards. However, the size of this fraction is likely limited because the working capacity of all individuals who were granted disability pensions in the period of study (i.e., after the 2003 reform) was thoroughly examined by various professionals. In any case, our results imply that raising the labor market position of non-Western immigrants is key to reducing the native-immigrant gap in early retirement on a disability pension irrespective of whether a fraction of the disability pensioners might be considered "hidden unemployed". In fact, for women, our results suggest that the native-immigrant gap in early retirement on a disability pension would be reversed if the labor market inequality between

non-Western immigrants and natives were completely eliminated through methods such as skill development programs and inclusive labor market policies. For men, our results also suggest that the native-immigrant gap would be markedly reduced if labor market inequality between non-Western immigrants and natives were completely eliminated.

One possible limitation of our study is that we relied on proxy measures for health status in the form of diagnosis data and the number of visits to health professionals. A limitation of this approach is that even though the extent to which people seek medical help is strongly related to their health status, these variables are not perfectly related because the extent to which people seek medical help also depends on factors other than their health status. In particular, the previous literature suggests that, all else being equal, immigrants are less likely to seek medical help than natives (Fung and Wong, 2007). Given that this is the case, we might have underestimated the extent to which health upon arrival explains the native-immigrant gap in early retirement on a disability pension to some extent. On these grounds, we invite other researchers to examine the validity and reliability of our findings using alternative measures of health status.

Although our study improves on previous research by controlling for possible health differences between non-Western immigrants and natives upon arrival in Denmark, our data do not permit us to examine why these health differences exist. We assume that they are the consequences of a complex interplay of conditions and events that non-Western immigrants were exposed to prior to and during the migration process. However, our data do not permit us to empirically examine the nature of the possible health factors to which non-Western immigrants were exposed prior to and during the migration process. Ideally, to elucidate the reasons for the health status differences between non-Western immigrant and natives, information about the health risks that individual immigrants experienced in their countries of origin prior to the migration process would need to be collected.

Regardless of these limitations, our study adds to research on inequality in early retirement on a disability pension and emphasizes the need to consider the unequal positions that non-Western immigrants and natives assume in the labor market. Specifically, our results highlight that the main reason for the native-immigrant gap in early retirement on a disability pension in the Danish case is not that non-Western immigrants have poorer health than natives upon arrival but the fact that they are more likely to work temporary, low-skilled and low-paid jobs in harsh working conditions interrupted by frequent spells of unemployment, which are associated with a high disability pension risk for both immigrants and natives alike (Tufte, 2013).

References

Abebe DS, Lien L and Hjelde KH (2014) What we know and don't know about mental health problems among immigrants in Norway. *Journal of Immigrant and Minority Health* 16(1): 60-67

Agyemang C, de-Graft Aikins A and Bhopal R (2012) Ethnicity and cardiovascular health research: pushing the boundaries by including comparison populations in the countries of origin. *Ethnicity & Health* 17(6): 579–596.

Allison PD (2010) *Survival analysis using SAS: A practical guide*. Cary NA: SAS Institute Inc.

Artazcoz L, Benach J, Borrell C, et al. (2004) Unemployment and mental health: understanding the interactions among gender, family roles, and social class. *American Journal of Public Health* 94(1): 82–88.

Bengtsson S (2002) *Bestemmer forvaltningen om du får førtidspension? Kommunens forvaltningspraksis og tilkendelse af førtidspension 2:15*. Copenhagen: SFI - The Danish National Centre for Social Research.

Bengtsson S, Bengtsson K, Kjær AA, et al. (2014) *Hvilken forskel gør en tilkendelse af førtidspension 14:14*. Copenhagen: SFI - The Danish National Centre for Social Research.

Berry JW (1997) Immigration, acculturation, and adaptation. *Applied Psychology* 46(1): 5–68.

Brand JE (2015) The far-reaching impact of job loss and unemployment. *Annual Review of Sociology* 41(1): 359–375.

Breen R, Karlson KB and Holm A (2018) A note on a reformulation of the KHB method. *Sociological Methods and Research.* Epub ahead of print. DOI: 10.1177/0049124118789717.

Brodmann S and Polavieja JG (2010) Immigrants in Denmark: Access to employment, class attainment and earnings in a high-skilled economy. *International Migration* 49(1): 58-90.

Caswell D, Kleif HB, Thuesen SL, et al. (2012) *Veje til førtidspension : en undersøgelse af fire kommuner i Region Midt*. Copenhagen: AKF, Applied Municipality Research.

Claussen B, Dalgard OS and Bruusgaard D (2009) Disability pensioning: can ethnic divides be explained by occupation, income, mental distress, or health? *Scandinavian Journal of Public Health* 37(4): 395–400.

Cunningham SA, Ruben, JD and Narayan, KMV (2008) Health of foreign-born people in the United States: A review. *Health & Place* 14(4): 623-635.

Erikson R and Goldthorpe JH (1992) *The constant flux: A study og class mobility in industrial societies*. Oxford UK: Clarendon Press.

Eurostat (2020) *How much is spent on disability benefits in the EU?* Available at https://ec.europa.eu/eurostat/web/products-eurostat-news/-/DDN-20171202-1?inheritRedirect=true& (accessed 2 March 2021)

Fazel M, Wheeler J and Danesh J (2005) Prevalence of serious mental disorder in 7000 refugees resettled in western countries: A systematic review. *The Lancet* 365(9467): 1309–1314.

Fung K and Wong Y-LR (2007) Factors influencing attitudes towards seeking professional help among east and southeast Asian immigrant and refugee women. *International Journal of Social Psychiatry* 53(3): 216–231.

Gadd M, Johansson S-E, Sundquist J, et al. (2003) Morbidity in cardiovascular diseases in immigrants in Sweden. *Journal of Internal Medicine* 254(3): 236–243.

Ganzeboom HBG and Treiman DJ (1996) Internationally comparable measures of occupational status for the 1988 international standard classification of occupations. *Social Science Research* 25(3): 201–239.

Goldthorpe JH and McKnight A (2004) The economic basis of social class. In: Morgan S, Grusky DB, and Fields GS (eds) *Mobility and Inequality: Frontiers of Research from Sociology and Economics*. Stanford CA: Stanford University Press, pp. 109–136.

Halpin B (1999) Is class changing? A work-life history perspective on the salariat. *Sociological Research Online* 4(3): 220-250.

Haukenes I, Mykletun A, Knudsen AK, et al. (2011): Disability pension by occupational class – the impact of work-related factors: The Hordaland Health Study cohort. *BMC Public Health* 11: 406.

Helgesson M, Johansson B, Nordqvist T, et al. (2013) Unemployment at a young age and later sickness absence, disability pension and death in native Swedes and immigrants. *European Journal of Public Health* 23(4): 606–610.

Helgesson M, Johansson B, Nordquist T, et al. (2019): Healthy migrant effect in the Swedish context: a register-based longitudinal cohort study. *BMJ Open* (9)3: 1-10

Jensen PH (2004) Ageing and work: From 'early' exit to 'late' exit in Denmark. In: Maltby T, De Vroom B, Mirabile ML, et al. (eds) *Ageing and the Transition to Retirement. A Comparative Analysis of European Welfare States*. Aldershot: Ashgate.

Jensen PH and Øverbye E (2013) The work-retirement puzzle. In: Jensen PH and Øverbye E (eds) *Down and out – or free at last? Causes and effects of early exit/retirement in the Nordic countries*. Berlin: Logos Verlag Berlin, pp.9-27.

Jervelund SS, Malik S, Ahlmark N, et al. (2017) Morbidity, self-perceived health and mortality among non-Western immigrants and their descendants in Denmark in a life phase perspective. *Journal of Immigrant and Minority Health* 19(2): 448–476.

Johansson B, Helgesson M, Lundberg I, et al. (2012) Work and health among immigrants and native Swedes 1990–2008: A register-based study on hospitalization for common potentially work-related disorders, disability pension and mortality. *BMC Public Health* 12(1):845.

Kalleberg AL (2009) Precarious work, insecure workers: Employment relations in transition. *American Sociological Review* 74(1): 1–22.

Karlson KB, Holm A and Breen R (2012) Comparing regression coefficients between same-sample nested models using logit and probit: A new method. *Sociological Methodology* 42(1): 286–313.

Kolberg JE and Hagen K (1991) The rise of disemployment. *International Journal of Sociology* 21(4): 112–142.

Koning P and van Vuuren D (2007) Hidden Unemployment in Disability Insurance. *Labour* 21(4):

611–636.

Kortum E, Leka A and Cox T (2010) Psychosocial risks and work-reated stress in developing countries: health impact, priorities, barriers and solutions. *International Journal of Occupational Medicine and Enviromental Health* 23(3):225-238.

Kristensen TS, Borg V and Hannerz H (2002) Socioeconomic status and psychosocial work environment: results from a Danish national study. *Scandinavian Journal of Public Health* 30(59_suppl): 41-48.

Krokstad S, Johnsen R and Westin S (2002) Social determinants of disability pension: A 10-year follow-up of 62 000 people in a Norwegian county population. *International Journal of Epidemiology* 31(6): 1183–91.

Kvist J (2003) A Danish welfare miracle? Policies and outcomes in the 1990s. *Scandinavian Journal of Public Health* 31(4): 241–245.

Lindert J, Von Ehrenstein OS, Priebe S, et al. (2009): Depression and enxiety in labor migrants and refugees – A systematic review and meta-analysis. *Social Science & Medicine* (69)2: 246-257

Missinne S and Bracke P (2012) Depressive symptoms among immigrants and ethnic minorities: a population based study in 23 European countries. *Social Psychiatry and Psychiatric Epidemiology* 47(1): 97–109.

Moullan Y and Jusot F (2014) Why is the 'healthy immigrant effect' different between European countries? *European Journal of Public Health* 24(suppl_1): 80-86.

Nurmela K, Mattila A, Heikkinen V, et al. (2018) Identification of major depressive disorder among the long-term unemployed. *Social Psychiatry and Psychiatric Epidemiology* 53(1): 45–52.

Österberg T and Gustafsson B (2006) Disability pension among immigrants in Sweden. *Social Science & Medicine* 63(3): 805–816.

Satia-Abouta J, Patterson RE, Neuhouser ML, et al. (2002) Dietary acculturation: applications to nutrition research and dietetics. *Journal of the American Dietetic Association* 102(8): 1105–18.

Spallek J, Zeeb H and Razum O (2011) What do we have to know from migrants' past exposures to understand their health status? A life course approach. *Emerging Themes in Epidemiology* 8(1): 6.

Star (2018) *Udviklingen i tilkendelser af førtidspension før og efter reformen af førtidspension og fleksjob i 2013*. Copenhagen: The Danish Agency for Labour Market and Recruitment (STAR).

StatBank (2018a) General government, income transfers (to households) by type of income. Available at: https://www.statbank.dk/statbank5a/default.asp?w=1680 (accessed 2 March 2021).

StatBank (2018b) Population 1. January by sex, age, ancestry, country of origin and citizenship. Available at: https://www.statbank.dk/statbank5a/default.asp?w=1920 (accessed 2 March 2021).

Statistics Denmark (2018) *Indvandrere i Danmark 2018*. Copenhagen: Statistics Denmark.

Svedberg P, Ropponen A, Lichtenstein P, et al. (2010) Are self-report of disability pension and long-term sickness absence accurate? Comparisons of self-reported interview data with national register data in a Swedish twin cohort. *BMC Public Health* 10(1): 763.

Syse A, Strand BH, Naess O, et al. (2016): Differences in all-cause mortality: A comparison between immigrants and the host population in Norway 1990-2012. *Demographic Research* (34):615-656.

Tufte PA (2013) Risky professions? Risk of disability in professions in Norway. *Professions and Professionalism* 3(1): 1-22.

Virtanen P, Vahtera J, Broms U, et al. (2008) Employment trajectory as determinant of change in health-related lifestyle: the prospective HeSSup study. *The European Journal of Public Health* 18(5): 504–508.

Visser M, Gesthuizen M, Kraaykamp G, et al. (2016): Inequality among older workers in the Netherlands: A life course and social stratification perspective on early retirement. *European Sociological Review* 32(3): 370-382.

Zimmerman C, Kiss L, Hossain M (2011): Migration and health: A framework for 21st century policymaking. *PLoS Med* 8(5): e1001034.

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Table 1. Descriptive statistics (measured the last year before disability pension/censoring)

	Men						Women					
	Non-Western immigrants			Natives			Non-Western immigrants			Natives		
Age in 1999/ upon arrival	19-29	30-39	40-59	19-29	30-39	40-59	19-29	30-29	40-59	19-29	30-39	40-59
Disability pension (2003-2012)	0.08	0.21	0.47	0.02	0.04	0.06	0.06	0.17	0.37	0.03	0.05	0.08
Circulatory system diseases	0.01	0.04	0.17	0.02	0.03	0.09	0.01	0.06	0.11	0.02	0.03	0.06
Musculoskeletal diseases	0.07	0.10	0.14	0.04	0.06	0.08	0.05	0.07	0.13	0.05	0.06	0.07
Mental health diseases	0.01	0.01	0.01	0.00	0.00	0.00	0.01	0.02	0.01	0.01	0.00	0.00
Contact with psychiatric or psychological health professionals	0.03	0.06	0.08	0.03	0.03	0.02	0.02	0.05	0.07	0.07	0.06	0.05
Visits to general practitioners	2.78 (2.41)	3.45 (3.09)	4.65 (4.09)	1.91 (1.98)	2.01 (2.38)	2.27 (2.88)	5.36 (3.59)	5.16 (3.85)	5.43 (4.35)	4.16 (2.88)	3.69 (3.07)	3.28 (3.15)
Service class	0.10	0.08	0.05	0.36	0.35	0.32	0.09	0.06	0.04	0.33	0.30	0.26
Routine, non-manual workers	0.08	0.06	0.05	0.14	0.10	0.09	0.21	0.18	0.08	0.43	0.43	0.41
Self-employed	0.13	0.13	0.08	0.06	0.09	0.12	0.03	0.05	0.03	0.03	0.04	0.06
Manual, skilled workers	0.10	0.07	0.04	0.19	0.18	0.16	0.02	0.03	0.01	0.04	0.03	0.02
Manual, unskilled workers	0.44	0.38	0.23	0.20	0.24	0.26	0.30	0.29	0.26	0.13	0.16	0.19
Class missing	0.03	0.04	0.03	0.03	0.02	0.03	0.04	0.04	0.01	0.01	0.02	0.03
Long-term unemployed	0.12	0.24	0.52	0.02	0.02	0.02	0.31	0.34	0.57	0.03	0.02	0.05
Accumulated unemployment until disability pension/censoring	2.75 (2.35)	3.12 (2.54)	3.41 (2.48)	0.96 (1.67)	0.72 (1.55)	0.56 (1.29)	4.46 (3.04)	4.34 (3.12)	4.75 (3.08)	1.31 (1.90)	0.90 (1.71)	0.72 (1.58)

Mean age in 1999/ upon arrival	24.6 (2.94)	33.71 (2.83)	45.3 (4.78)	24.2 (3.11)	34.38 (2.82)	48.51 (5.27)	23.89 (3.12)	33.72 (2.81)	45.83 (5.22)	24.18 (3.10)	34.40 (2.82)	48.12 (5.10)
No cohabitant	0.37	0.35	0.27	0.31	0.29	0.22	0.29	0.36	0.36	0.26	0.26	0.26
Cohabitant, low income	0. 26	0.34	0.46	0.12	0.11	0.26	0.29	0.33	0.45	0.09	0.09	0.18
Cohabitant, medium income	0.29	0.24	0.22	0.31	0.30	0.31	0.25	0.16	0.12	0.23	0.22	0.24
Cohabitant, high income	0.08	0.07	0.05	0.26	0.30	0.21	0.17	0.15	0.07	0.42	0.43	0.32
N	1.513	865	344	354.910	358.521	578.113	2.097	992	401	341.180	347.953	529.069

Note: Standard errors in parentheses.

Table 2. Rescaled discrete-time logit models based on the reformulated KHB-method by regressing disability pension receipt on health upon arrival and labor market disadvantage indicators. Men, 2003-2012

	Age in 1999/upon arrival: 19-29				Age in 1999/upon arrival: 30-39				Age in 1999/upon arrival: 40-59			
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11	Model 12
Native-Immigrant gap	1.344***	1.093***	0.449***	0.132***	1.536***	1.167***	0.455***	0.139***	2.111***	1.650***	0.777***	0.449***
	(0.055)	(0.057)	(0.014)	(0.000)	(0.064)	(0.042)	(0.017)	(0.000)	(0.062)	(0.063)	(0.027)	(0.000)
Health upon arrival:												
Circulatory system diseases		0.639***	0.589***	0.553***		0.539***	0.517***	0.491***		0.630***	0.629***	0.623***
		(0.019)	(0.007)	(0.000)		(0.010)	(0.004)	(0.000)		(0.004)	(0.002)	(0.000)
Musculoskeletal diseases		0.362***	0.306***	0.248***		0.530***	0.452***	0.400***		0.560***	0.509***	0.492***
		(0.011)	(0.005)	(0.000)		(0.010)	(0.003)	(0.000)		(0.005)	(0.002)	(0.000)
Mental diseases		1.185***	0.940***	0.775***		1.145***	0.971***	0.868***		0.925***	0.861***	0.806***
		(0.022)	(0.014)	(0.000)		(0.028)	(0.011)	(0.000)		(0.027)	(0.015)	(0.000)
Contact with psychiatric or psychological health professionals		0.921***	0.843***	0.689***		0.679***	0.677***	0.584***		0.606***	0.645***	0.593***
		(0.011)	(0.006)	(0.000)		(0.008)	(0.005)	(0.000)		(0.007)	(0.004)	(0.000)
Visits to general practitioners		0.192***	0.169***	0.156***		0.199***	0.180***	0.170***		0.180***	0.169***	0.164***
		(0.002)	(0.001)	(0.000)		(0.001)	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)
Labor market disadvantage:												
Routine, non-manual			1.037***	0.978***			0.979***	0.913***			0.710***	0.651***
			(0.004)	(0.000)			(0.003)	(0.000)			(0.003)	(0.000)
Self-employed			0.889***	0.892***			0.805***	0.774***			0.649***	0.640***
			(0.012)	(0.000)			(0.008)	(0.000)			(0.004)	(0.000)
Manual, skilled			0.957***	0.954***			0.939***	0.892***			0.741***	0.696***

			(0.006)	(0.000)			(0.006)	(0.000)			(0.003)	(0.000)
Manual, unskilled			1.508***	1.390***			1.363***	1.247***			1.124***	1.033***
			(0.010)	(0.000)			(0.006)	(0.000)			(0.003)	(0.000)
Class missing			1.743***	1.716***			1.467***	1.419***			0.887***	0.869***
			(0.009)	(0.000)			(0.006)	(0.000)			(0.002)	(0.000)
Long-term unemployed			3.252***	2.002***			3.123***	1.807***			2.570***	1.482***
			(0.023)	(0.000)			(0.032)	(0.000)			(0.034)	(0.000)
Unemployment history				0.533***				0.478***				0.429***
				(0.000)				(0.000)				(0.000)
Controls and municipality dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Native-immigrant gap reduced by		0.251*** (0.007)	0.895*** (0.019)	1.212 *** (0.019)		0.369*** (0.010)	1.082*** (0.018)	0.925*** (0.018)		0.462*** (0.015)	1.334*** (0.030)	1.663*** (0.031)
Total percent explained		18.7 %	66.6 %	90.2 %		24 %	70.4 %	91 %		21.9 %	63.2 %	78.7 %
Years of observations	3.396.578	3.396.578	3.396.578	3.396.578	3.451.480	3.451.480	3.451.480	3.451.480	4.591.248	4.591.248	4.591.248	4.591.248

Note: All models include an intercept and controlled for baseline age, time, cohabitant income and municipality of residence. Results from full models including the coefficients of control variables are available in Table S2 in the supplemental material. Reference group for social class is the service class. Bootstrapped standard errors in parentheses (100 replications).

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 3. Rescaled discrete-time logit models based on the reformulated KHB-method by regressing disability pension receipt on health upon arrival and labor market disadvantage indicators. Women, 2003-2012.

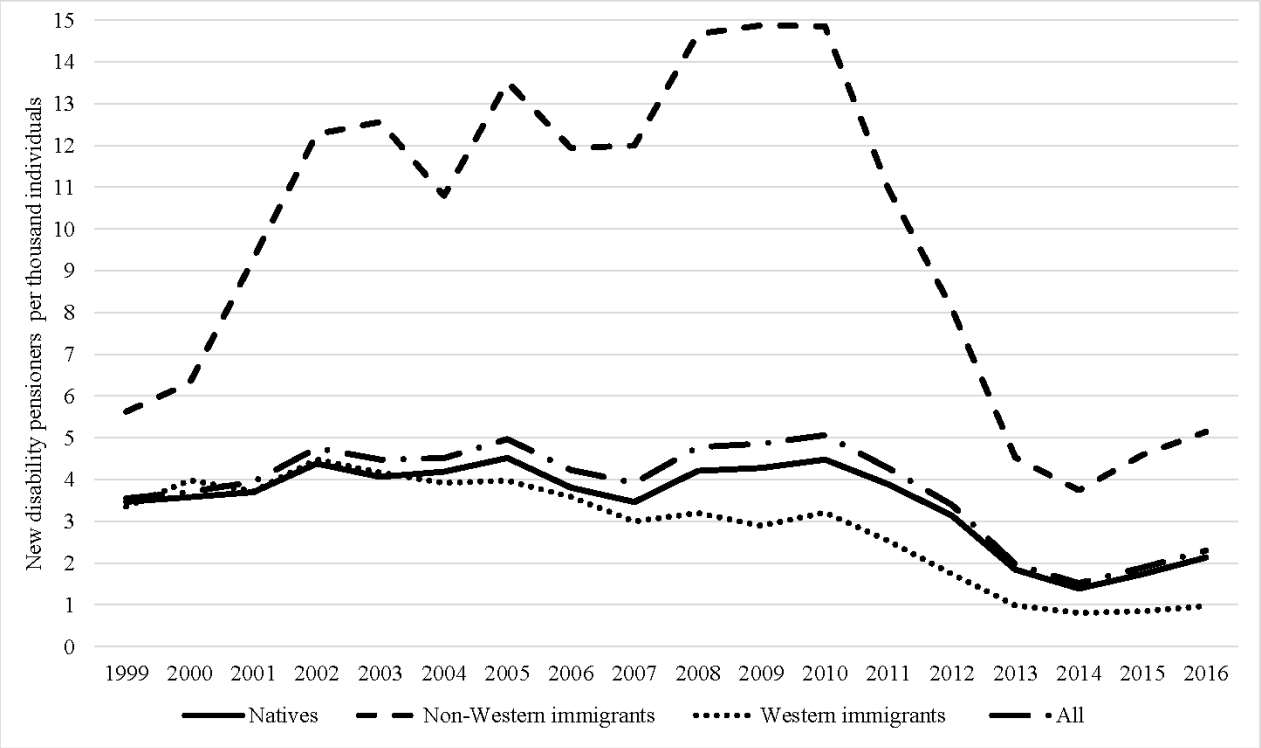
	Age in 1999/upon arrival: 19-29				Age in 1999/upon arrival: 30-39				Age in 1999/upon arrival: 40-59			
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11	Model 12
Native-Immigrant gap	0.470***	0.352***	-0.608***	-1.037***	0.737***	0.565***	-0.348***	-0.754***	1.220***	0.936***	-0.033	-0.301***
	(0.065)	(0.047)	(0.014)	(0.000)	(0.070)	(0.053)	(0.017)	(0.000)	(0.073)	(0.049)	(0.024)	(0.000)
Health upon arrival:												
Circulatory system diseases		0.703***	0.605***	0.535***		0.598***	0.544***	0.522***		0.531***	0.509***	0.504***
		(0.012)	(0.006)	(0.000)		(0.008)	(0.004)	(0.000)		(0.003)	(0.001)	(0.000)
Musculoskeletal diseases		0.606***	0.536***	0.433***		0.685***	0.601***	0.507***		0.651***	0.615***	0.594***
		(0.008)	(0.009)	(0.000)		(0.006)	(0.004)	(0.000)		(0.004)	(0.002)	(0.000)
Mental diseases		1.109***	0.912***	0.751***		0.995***	0.846***	0.707***		0.897***	0.820***	0.744***
		(0.044)	(0.017)	(0.000)		(0.037)	(0.014)	(0.000)		(0.012)	(0.007)	(0.000)
Contact with psychiatric or psychological health professionals		0.895***	0.854***	0.725***		0.724***	0.713***	0.619***		0.680***	0.692***	0.640***
		(0.008)	(0.004)	(0.000)		(0.005)	(0.005)	(0.000)		(0.006)	(0.003)	(0.000)
Visits to general practitioners		0.202***	0.180***	0.160***		0.205***	0.193***	0.177***		0.198***	0.192***	0.188***
		(0.003)	(0.002)	(0.000)		(0.001)	(0.001)	(0.000)		(0.001)	(0.000)	(0.000)
Labor market disadvantage:												
Routine, non-manual			0.744***	0.690***			0.655***	0.601***			0.465***	0.415***
			(0.004)	(0.000)			(0.003)	(0.000)			(0.002)	(0.000)
Self-employed			0.974***	0.914***			0.797***	0.731***			0.843***	0.788***
			(0.007)	(0.000)			(0.004)	(0.000)			(0.002)	(0.000)

Manual, skilled			0.766***	0.705***			0.797***	0.703***			0.695***	0.611***
			(0.007)	(0.000)			(0.006)	(0.000)			(0.005)	(0.000)
Manual, unskilled			1.171***	1.021***			1.073***	0.933***			0.908***	0.831***
			(0.005)	(0.000)			(0.005)	(0.000)			(0.003)	(0.000)
Class missing			1.430***	1.329***			1.025***	0.943***			0.881***	0.843***
			(0.006)	(0.000)			(0.006)	(0.000)			(0.002)	(0.000)
Long-term unemployed			2.654***	1.491***			2.626***	1.380***			2.217***	1.138***
			(0.017)	(0.000)			(0.028)	(0.000)			(0.010)	(0.000)
Unemployment history				0.484***				0.457***				0.338***
				(0.000)				(0.000)				(0.000)
Controls and municipality dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Native-immigrant gap reduced by		0.118*** (0.007)	1.078*** (0.015)	1.507*** (0.017)		0.172*** (0.007)	1.085*** (0.016)	1.491*** (0.018)		0.284*** (0.014)	1.253*** (0.022)	1.521*** (0.025)
Total percent explained		25.1 %	229.5 %	320.7 %		23.3 %	147.2 %	202.3 %		23.3 %	102.7 %	124.7 %
Years of observations	3.298.821	3.298.821	3.298.821	3.298.821	3.360.785	3.360.785	3.360.785	3.360.785	4.079.938	4.079.938	4.079.938	4.079.938

Note: All models include an intercept and controlled for baseline age, time, cohabitant income and municipality of residence. Results from full models including the coefficients of control variables are available in Table S3 in the supplemental material. Reference group for social class is the service class. Bootstrapped standard errors in parentheses (100 replications).

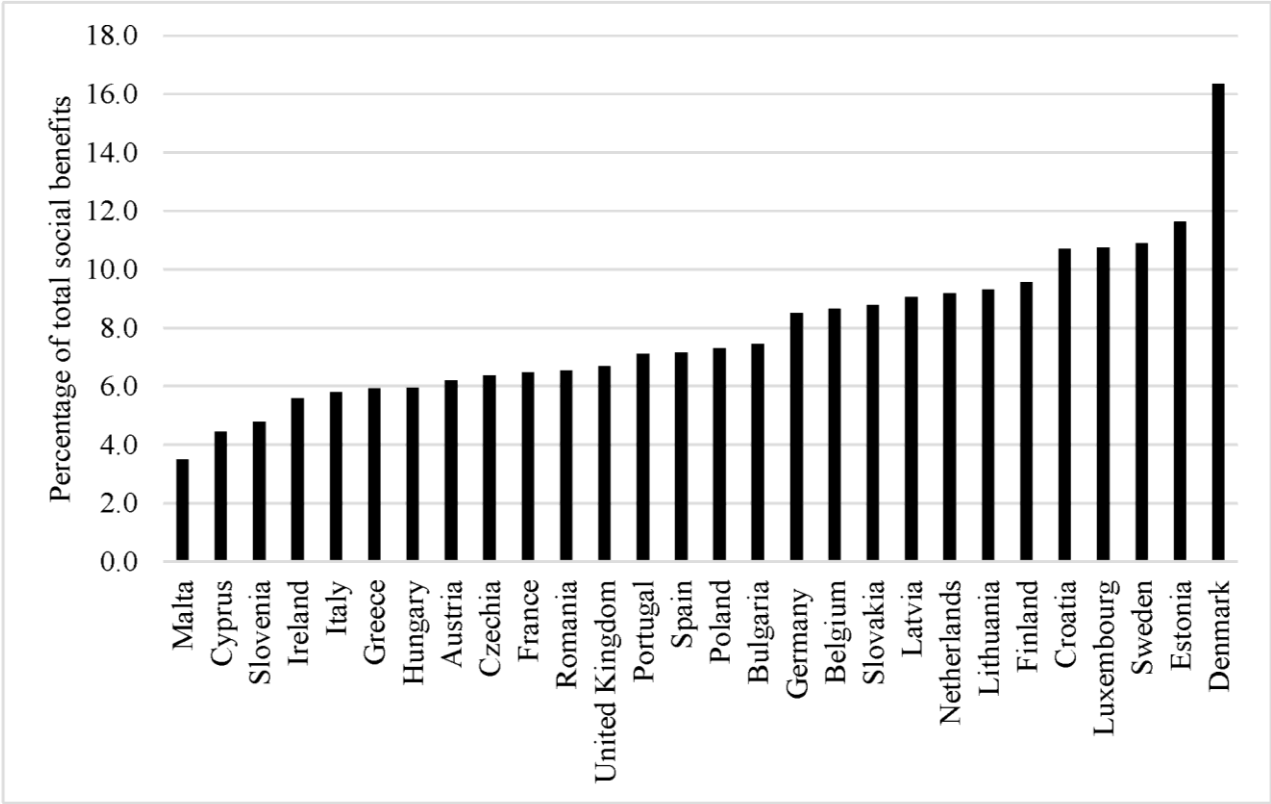
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Figure 1. New disability pensioners per thousand individuals among natives, non-Western immigrants and Western immigrants aged 18-66 years from 1999-2016.



Source: Authors' own calculations based on register data from Statistics Denmark.

Figure 2. Share of disability benefits among EU member states, 2017 (as a percentage of total social benefits).



Source: Eurostat (2020)