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The Retirement Patterns and
Retirement Expectations of
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Abstract

This paper addresses two research questions: (1) labor force participation and (2) expected retirement age of ethnic Dutch and immigrants. We aim to map out the differences and similarities between ethnic Dutch and immigrants with western/ non-western backgrounds in the Netherlands in making their decisions regarding the two addressed research questions. For the first topic, we use cross sectional data from the LISS Health Survey and the Immigrant Health Survey to tip out the interplay between health, demographic characteristics, and labor market participation in the later part of individuals' working life (between 50 years old and 64 years old). Immigrants with non-western background form their work participation decisions significantly different from ethnic Dutch, while immigrants with western background exhibit an intermediate pattern between ethnic Dutch and immigrants with non-western background. For the second topic, we use two waves from the LISS Health Survey and the LISS Work and Schooling Survey to analyze the dynamic relationship between socio-demographic characteristics and expected retirement age transitions. From our research results, we do not see significant behavior differences between different ethnical groups, that is to say, ethnic background does not really play an important role in explaining individuals' expected retirement age. However, gender, age, whether one lives with a partner, and one's primary occupation do influence the results of people's expected retirement age.

Keywords: Ethnic Dutch; Immigrant; Labor force participation; Expected retirement age

1. Introduction

Since World War II, five subsequent waves of immigration¹ have taken place in the Netherlands, which contribute to 19 percent the total Dutch population. In the labor market, a higher life expectancy and feminization of work as well as an increasing credit crisis call for a smoothly functioning job market for both the ethnic Dutch and, at the same time, the immigrants. The ethnic Dutch and immigrants living in the Netherlands differ in some ways, including socioeconomic and demographic characteristics (Veenman and Ours, 2001). Such differences might lead to distinctive patterns of their labor market participation and expected retirement age. Moreover, because the Dutch government has admitted that its immigration system is “complex and unwieldy” (Guild, 2004), an up-to-date legislation system should be attached an increasing importance. This system should cherish the labor capital and should make the talents optimally utilized for both the ethnic Dutch and immigrants. Meanwhile an insight into the differences and the factors which lead to the differences in the labor force patterns between the Dutch and the immigrants carries great importance in such a multi-ethnic country as the Netherlands.

For the labor market patterns between the ethnic Dutch and immigrants, we will mainly focus on two aspects, labor market participation and expected retirement age. To look into the explanations for the similarities or variations in individuals’ decisions in the labor market, we will discuss the interrelation between the aforementioned perspectives with financial incentives, health conditions, and other explanatory factors for ethnic Dutch and immigrants, respectively.

For the first research topic, we will only focus on the labor force participation decisions of the older population (those between 50 years old and 64 years old). We will first use cross-sectional data to map out the general characteristics of ethnic Dutch and immigrants separately, such as the labor participation rate, the average self-reported health status, the educational background and so on. Then we will look deeper into the mechanism of how individuals form their labor force participation decisions. We will study the interaction between socioeconomic and demographic characteristics and the employment status within different ethnic groups.

¹₁st: After World War II in the 1940s and the 1950s people from the newly independent Indonesian republic repatriated or migrated to the Netherlands - mainly Indo-European and supporters of the Republic of South Maluku.

²_{nd}: In the 1960s and 1970s migrants from Southern Europe, West Asia, and northern Africa, Turkey and Morocco came to work in the Netherlands as guest workers. They were expected to return to their own country and many did.

³_{rd}: In the 1970s and 1980s people migrated from the newly independent Surinam and from the Netherlands Antilles, which remained part of the Kingdom of the Netherlands.

⁴_{th}: In the 1990s the Netherlands saw increasing migration of asylum seekers. Most notably are Iraqis, Iranians, Thais, Burmese, Chileans and Argentines fleeing from political oppression and/or persecution.

⁵_{th}: In the 2000s, migrant workers from new EU member states in Eastern Europe like Poland, Romania and Bulgaria, and non-EU states Moldova, Ukraine and former Yugoslavia in Southern Europe.)

For the second research topic, we will use panel data to illustrate the patterns of individuals' expected retirement age. Previous research shows that individuals base their expected retirement age on their expectations towards other activities, such as future pension benefits, health status, et cetera (Van Soest and Bissonnette, 2010). We will combine people's outlook on other relevant factors, including financial incentives and health status and their current circumstance to research the differences and similarities for ethnic Dutch and immigrants in forming their expected retirement age.

Limited research has been conducted in the Netherlands on the costs and benefits of migration. Not much statistical data has been collected by the government collect yet, such as the rate of unemployment among migrants and the number of immigrants on welfare. The primary purpose of this paper is to estimate how health conditions, pension incentives, and varying background affect the labor participation patterns and retirement expectations for ethnic Dutch and immigrants, respectively. We want to find out if the interactions influence the two ethnic groups in the same way or in a distinctive way. With a better insight into the patterns of all the citizens with different ethnic background, we will be able to work out more flexible and suitable systems to increase the labor participation rate. In the end, based on the estimated model we will also comment on the previous and current policies which aim at raising employment rates and the participation rate of immigrants. Also, we will simulate some policy changes and discuss their potential effects to boost the employment rates. This paper contributes to the current literature by paying special attention to the employment patterns of immigrants separately from the ethnic Dutch group which takes the majority in the country. However, due to the limited data of different ethnic groups at the moment, the research results drawn in the paper might suffer from bias. In the future, data collectors should work on building a more thorough database of immigrants and ethnic Dutch which would enable researchers to carry out more precise and contributing studies.

The paper proceeds as follows: Section 2 surveys the literature and relevant aspects of the topic. In Section 3 and Section 4 we will elaborate on our empirical analysis of our two topics and the data we use to carry out these empirical analyses. Finally, we summarize and conclude in Section 5.

2. Background

2.1 Labor Force Participation

For most European countries and the United States, older men's attachment to the labor force continued to fall over the last few decades (Lumsdaine and Mitchell, 1999). OECD has also shown that labor force participation rates fall rapidly after the age of 45. Thus, to successfully increase the participation rates for older workers, the participation rates of the middle aged are of great importance to policy makers. In this section we are going to discuss previous research which has shown that the observed differences in

retirement behavior across countries and ethnics are largely due to health situation and financial incentives. As for the role health condition plays in individuals' retirement patterns, the famous model established by Grossman (1972) sheds lights on this problem. Grossman illustrates theoretically why people with more human capital tend to be healthier and enjoy a longer working life. However, empirical facts show that in developed countries people are likely to live longer but retire at increasingly younger ages. Having an insight into the story, we may find that the trend can be explained by the following reasoning: with a larger health endowment people become wealthier at an earlier stage of their life, and consequently, they would choose more leisure over work. A lot of research has provided the evidence on how population health translates into limited work ability. Health and labor are positively related, and ill health indeed seems to be negatively related with all the labor outcomes (Currie and Madrian, 1999). Studies have traditionally focused on older workers who are between 50 to 64 years old and retirement transitions from activity to inactivity (Bound et al., 1999; Disney et al., 2006). For the UK, Berthoud (2008) finds employment rates around 76% for those without a health problem, whereas the participation for those with a health problem is only 29%. Riphahn (1999) finds that health shocks increase the probability of unemployment by 84% and the probability of dropping out of the labor force by 200% for individuals aged 40 to 59 in Germany. Lechner and Vazquez-Alvarez (2004) use the German Socio Economic Panel (1984-2001) and find that those who are not disabled experience higher employment rates and higher earnings relative to those who have become disabled.

The influence of different types of health problems, including chronic vs. temporary diseases and physical vs. psychiatric disorders, have also been touched upon in previous studies. Mitchell and Burkhauser (1990) analyze the effects of arthritis, one of the most common chronic diseases, and Ettner et al. (1997) explore the effects of several psychiatric disorders. The latter study finds that among psychiatric disorders, major depression and drug dependence show the strongest association with labor market participation. Pelkowski and Berger (2004) examine the association between temporary and permanent illness and labor market outcomes in the US. Their results show that while a temporary health problem is not significantly associated with labor market outcomes, a permanent health condition is associated with a reduction in earnings of around 50%.

However, there is no consensus regarding the relative importance of health, as compared to financial incentives. The reasons for this dispute include difficulties in measuring health and the joint determination of health and work (Lindeboom, 2006). Banks et al. (2007) find that financial incentives are important determinants of transitions into retirement for men aged 50 to 59 in the UK, while poor health plays a more important role in transitions into other types of inactivity. Kerkhofs et al. (1999) show for the Netherlands in the early nineties that health is dominant in explaining transitions into Disabled Insurance (DI) and Unemployment Insurance (UI), but that financial incentives are more important in transitions into early retirement.

Regarding the specific immigrants' labor force patterns, there is limited research about the labor market behavior of older immigrant workers in the Netherlands despite an explosion of research analyzing retirement decisions of the whole population in general. These gaps are unfortunate because in many countries, especially in the Netherlands, large numbers of immigrants are approaching their retirement ages. The fiscal pressures stemming from an aging immigrant population will depend on immigrants' retirement decisions. In particular, host countries will experience lower costs associated with old-age pensions and health care if immigrants delay their retirement. Recent research work from Zorlu (2011) shows that migrants in the Netherlands are more likely to have a benefit, in particular social assistance and disability benefits. But as for reasons, Zorlu finds that a large part of migrants' dependence can be explained by their background characteristics and immigration history but still a significant unexplained residual is left. Deborah et al. (2008) use data from Australia and find that immigrants, particularly immigrant women, are more likely to be retired than native-born men and women with the same demographic, human capital, and family characteristics. Farre et al. (2009) find that immigration inflows over the last decade in Spain have led to a substantial increase in the labor supply of skilled native women, with no effects on highly skilled native men.

2.2 Retirement Expectation

Expectations play a crucial role in the models that economists and policy makers use to analyze how people prepare for retirement. A better understanding of how people form their expectations will make these models more realistic and will improve their predictive performance. Moreover, gaining insight into how expectations vary across socioeconomic groups and groups with different financial and economic knowledge will help in understanding why retirement planning varies across groups with different background.

When people face the question, "At what age do you expect to retire?", the factors they may take into consideration might not be restricted to current preferences, but also expectations towards future preferences, benefits, health conditions, et cetera. As Van Soest and Bissonnette (2010) summarized: "in economic models in which agents take account of the future consequences of their current decisions, expectations play a crucial role."

Previous studies of retirement-related behaviors rely on the assumption concerning expectations. The common practice in empirical literature is to rely on the assumption that economic agents form 'rational expectations', where everybody correctly anticipates the distribution of future asset returns, wages, inflation and other relevant variables (Muth, 1961). This leads to a large number of subsequent articles which follow the 'rational expectation' assumption and ignore the bias this assumption might raise. Indeed, research concerning expectations toward retirement can be divided into two categories. In the 1980s, researchers such as Douglas Bernheim were mainly concerned

with the validity of the elicited expectations. Then, mostly following methodological development by Charles Manski in the 1990s, researchers saw an increase in models trying to predict economic behavior using information on subjective expectations. Wolpin and Gonul (1985) compare the predictive values of standard structural prediction of retirement age with the elicited subjective expectation. They conclude that elicited expectations might provide a better estimate of the objective beliefs than the model. Bernheim (1989) conclude in his work that most individuals are reasonably competent at forming relatively accurate expectations about the timing of retirement. Despite of a large number of discussions on the assumption of rational expectation, Pust and Phelan (1997) conclude that a harsh rational assumption is often explicitly acknowledged as undesirable but necessary.

One of the first papers to study a question related to beliefs concerning the economics of aging was Hall and Johnson (1980), who analyze the determinants of the expected retirement age. Hamermesh (1985) studies subjective life-expectancy and its role in the life-cycle model. A large amount of related studies followed (Hurd and McGarry, 2002; Hurd, Smith, and Zissimopoulos, 2004). Research on the effects of mid-life experiences on retirement intentions shows that the effects of most mid-life experiences in the educational, health, and family spheres remained significant after controlling for different aspects of the preretirement financial situation (Damman, Henkens and Kalmijn, 2010). A survey on financial literacy and retirement preparedness in 2000 shows that there are vast differences in levels of financial knowledge among the Dutch population and that higher levels of financial literacy go hand in hand with lower expected replacement rates, given income, age, education, etcetera (Alessie et al. 2011). Manski and Dominitz (1990, 2006) conclude, among other things, that younger Americans are more pessimistic about the future of social security than older Americans. They also found that different demographic groups have different average beliefs, and hence may act on different premises when deciding how much to set aside for retirement. Wong and Hardy (2009) find substantial heterogeneity in women's retirement expectations (for example, associated with age, race, marital status, and job tenure). Expectations not only vary across respondents but also fluctuate over time for a given respondent (particularly, if they change jobs), implying that retirement planning is a dynamic process.

For policy makers, an important question is whether subjective beliefs concerning retirement help to predict actual behavior, such as saving. Haider and Stephens Jr. (2006) show that answers to probability questions concerning expected savings at retirement have significant predictive power for actual savings. Bottazzi, Jappelli, and Padula (2006) show that Italian workers with more accurate expectations concerning the outcome of a given policy change adapted better to the new rules than their less-informed peers.

3. Empirical Health Analysis

3.1 Data

Our analysis is based on survey data, which we obtain from CentERdata. CentERdata is an eminent research institute and a center of expertise for policy analysis and model development, focusing on the labor market, pensions, social security, and so on. In our study, we will utilize two databases: The LISS panel and the Immigrant Panel. The LISS panel (Longitudinal Internet Studies for the Social Sciences) is the principal component of the MESS project. It consists of approximately 5000 households, comprising around 8000 individuals. The panel is based on a random sample of households drawn from the population register by Statistics Netherlands. Households that could not participate are otherwise provided with a computer and Internet connection. In addition to the LISS Panel, the Immigrant Panel we will use is comprised of around 1600 households (2400 individuals) of which 1100 households (1700 individuals) are of non-Dutch origin. Panel members complete online questionnaires every month requiring about 15 to 30 minutes in total.

For the LISS Panel, we will use the data from the core studies “Health” and “Work and Schooling”. “Health” focuses on health, health perception, and health related to job situation problems. “Work and Schooling” includes information about labor market participation, job characteristics, pensions, schooling, and courses. In addition to the LISS Panel we will also use the data from the Immigrant Panel. However, so far there is only one wave available for all the survey topics of the Immigrant Panel and “Work and Schooling” is not completed for the Immigrant Panel yet. Thus we can carry out cross-sectional studies using the one wave data from the core study “Health” from the Immigrant Panel.

For the first research question “labor market participation among different ethnic groups”, we will use a combined cleaned sample drawn from both the LISS Panel and the Immigrant Panel which took place in November, 2010. In the original data set, the number of observations for each survey is 5498 and 1747, respectively. We combine the data from the two surveys and get our original sample with 7245 respondents. Since we are only interested in the retirement behavior of old workers who haven’t reached their pension age (65 years old), we first exclude the people who were out of the range of 50-64 years old. For this step, we drop 5180 respondents and get a sample consisting of 2065 respondents. For each individual, we will look into information on health characteristics (including self-assessed health condition, measures of limitations in physical functions, and whether the person is suffering from long-term diseases), labor market characteristics (including current employment status, expected retirement age, etc.), and socioeconomic and demographic characteristics (including net individual income, highest level of educational background, number of living-at-home children, marriage status, etc.). For the second step, we exclude respondents with missing data for any of the health, employment, or demographic measures used here (123

respondents are excluded). Therefore we get our clean sample for further study which contains 1942 respondents, with 932 males and 1010 females.

In addition to the full estimation sample, we will also employ three subsamples. The first subsample consists exclusively of ethnic Dutch, the second subsample consists of the 1st and 2nd generations of immigrants with non-western² backgrounds and the third subsample comprises the 1st and 2nd generations of immigrants with western backgrounds. In the Dutch sample, there are 1528 respondents, while for the immigrant samples there are 126 respondents in the non-western background immigrant group and 288 respondents in the western background immigrant group.

Variable definitions and summary statistics for different ethnic groups are presented in Table 1. This table shows that the employment rate for ethnic Dutch was the highest among the three groups while the non-western immigrant group had the lowest employment rate which was almost 10 percent lower than that of the ethnic Dutch group (51.59% vs. 60.54%). Without exception, for all the three ethnic groups there was always a larger fraction of males in the employed group than in the unemployed group, especially for the ethnic Dutch group. Meanwhile, the employed respondents always had more living-at-home children and higher education than the people who were not employed. The age differences between the employed and those who were not employed within each group vary a lot between different groups. For the ethnic Dutch group the difference was approximately 45 months. For the western background and the non-western background immigrant groups, the differences were 29 months and 18 months, respectively. In general, the employed groups always had a larger fraction of people who had the ownership of the houses they were living in and the difference was most noticeable in the non-western background immigrant group in which the ownership of a house for employed was almost twice as that of the unemployed. Furthermore, the employed individuals tended to be healthier and had a smaller fraction of people suffering from a chronic disease compared to those who were not employed. We also find that the ethnic Dutch were more likely to live in less urban areas than the immigrant groups. By comparing the personal net income per month between each ethnic group, we can also see the same sequence as we have found in vectors such as the labor participation rate and self-assessed health status, where the ethnic Dutch has the best “score” while the non-western immigrants have the worst “score”. Specifically, the net personal income per month for ethnic Dutch, western-immigrants, and non-western immigrants were EUR 1567.3, EUR 1504.4, and EUR 1297.3, respectively.

All in all, from the summary statistics, we can tell that the immigrants with western background seem to share more similarities with the ethnic Dutch, while the immigrants with non-western background show a more different pattern.

² Non-western immigrants are immigrants from Africa, Asia (excl. Japan, the Former Dutch East Indies and Indonesia), South America and Turkey. The largest groups of non-western immigrants in the Netherlands are Moroccans, Turks, and people originating from Suriname and the Netherlands Antilles and Aruba.

Table 1 Overview of variables and summary statistics for different groups in 2008

Variables	Dutch		Western immigrants		Non-western immigrants	
	Employed	Not employed	Employed	Not employed	Employed	Not employed
No. observation	925	603	160	128	65	61
Percentage (%)	60.54	39.46	55.56	44.44	51.59	48.41
Male	0.5438 (0.4983)	0.4046 (0.4912)	0.475 (0.5009)	0.3594 (0.4817)	0.5231 (0.5034)	0.4754 (0.5035)
Age	56.1730 (3.8079)	59.8275 (3.9254)	56.0813 (4.1904)	58.4531 (4.2126)	54.9077 (3.7738)	56.4426 (4.3302)
No.of children	0.6897 (1.0086)	0.2554 (0.6925)	0.6375 (0.8866)	0.2891 (0.6658)	0.7846 (0.9762)	0.7541 (1.2994)
Married	0.7438 (0.4368)	0.7231 (0.4479)	0.5813 (0.4949)	0.6094 (0.4898)	0.5538 (0.5010)	0.4098 (0.4959)
Own house	0.8184 (0.3857)	0.6915 (0.4622)	0.7375 (0.4414)	0.5859 (0.4945)	0.6 (0.4937)	0.3279 (0.4733)
Urban	3.0270 (1.2363)	3.0597 (1.2348)	2.5563 (1.2627)	2.7813 (1.2855)	2.0769 (1.1083)	2.1148 (1.1986)
Net income (in 1000 euro)	1.8828 (1.0826)	1.0828 (1.0543)	1.9036 (1.2609)	1.0050 (0.9288)	1.7015 (0.9078)	0.8658 (0.6342)
Mean Education	2.3146 (0.5787)	2.0978 (0.5839)	2.3250 (0.6199)	2.1953 (0.5894)	2.3077 (0.6829)	2.0984 (0.7462)
“Good” health	0.8627 (0.3443)	0.7131 (0.4527)	0.8750 (0.3318)	0.7109 (0.4551)	0.8000 (0.3772)	0.5574 (0.4498)
Chronic disease	0.2995 (0.4583)	0.5075 (0.5004)	0.3125 (0.4650)	0.5469 (0.4997)	0.3231 (0.3772)	0.5738 (0.4986)
Education (%)						
Primary school	5.95	12.6	8.13	9.38	12.31	22.95
Intermediate	56.65	65.01	51.25	61.72	44.62	44.26
High	37.41	22.39	40.63	28.91	43.08	32.79

NOTES:

In the table, we summarize the mean values and standard deviations of several socio-demographic variables and health-related variables for different ethnic groups. Within each ethnic group, we summarize the variables for employed participants and unemployed participants separately. We started with the fraction of employed participants within each group. Then we list the mean value and standard deviation for variables including: gender, age, number of living-at-home children, marriage status, whether owning a house, urban status of the living circumstance, personally net income per

month (in thousands), mean education, self-reported health status, and whether having a chronic disease.

3.2 Modeling individuals' health stock

In the Health Survey, we can get information of individuals' self-assessed health status, which is a good health indicator. However, self-assessed health status is likely to be endogenous to the retirement decisions (Disney, Emmerson and Wakefield, 2006). In order to eliminate any person-specific association between characteristics and labor market outcome, we will construct a latent 'health stock' for each individual as a function of personal characteristics and health indicator variables. To construct individual's underlying 'health stock', we will follow Bound et al. (1999) in assuming that individual i 's health at time t is determined by a linear combination of exogenous personal characteristics (such as age, gender, education, etc.) x_{it} , a vector of detailed personal health indicators of functional limitations and specific health problems z_{it} , and unobserved variables v_{it} which are uncorrelated with x_{it} and z_{it} . We allow the impact of these characteristics to vary over time. The 'health state' η_{it} in the model is:

$$\eta_{it} = x'_{it}\beta_t + z'_{it}\lambda_t + v_{it}$$

In our study, however, due to the limitation of our data base, instead of employing the panel data model described above, we can only carry out cross-sectional analysis with one wave drawn in November, 2010. So the model we will use in our study is:

$$\eta_i = x'_i\beta + z'_i\lambda + v_i \quad (1)$$

This 'health stock' is not observed, however, we can observe the self-assessed health status in our data. In the LISS Survey, the following question was asked: "How would you describe your health, generally speaking?" The answers can be drawn from "poor", "moderate", "good", "very good", and "excellent". We can denote these categorical variables as h_i . The latent counterpart of h_i is denoted as h_i^* , modeled as a simple function of η_i and an error term ε_i :

$$h_i^* = \eta_i + \varepsilon_i \quad (2)$$

For the two equations above, we assume that the error terms are not correlated. Thus we write:

$$h_i^* = x'_i\beta + z'_i\lambda + v_i + \varepsilon_i$$

$$h_i = j, \text{ if } Y_{j-1} < h_i^* \leq Y_j \quad (3)$$

Where $Y_0 = -\infty$ and $Y_M = \infty$. Assuming that the error term $(v_i + \varepsilon_i)$ is normally distributed, equation (3) can be estimated as an ordered probit model.

In Table 2, we show the values of the “self-assessed health” variable between ethnic Dutch, western background immigrants, and non-western background immigrants.

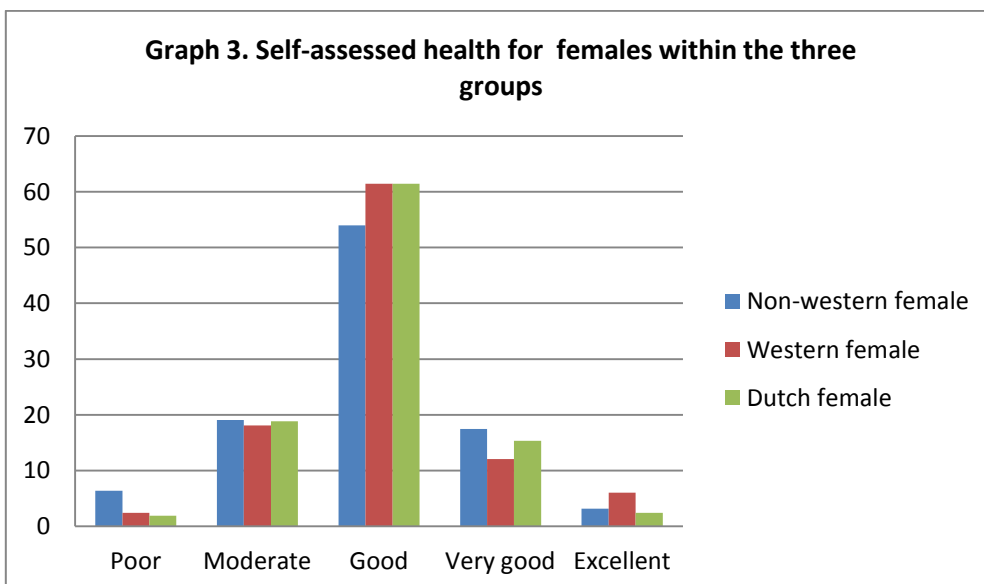
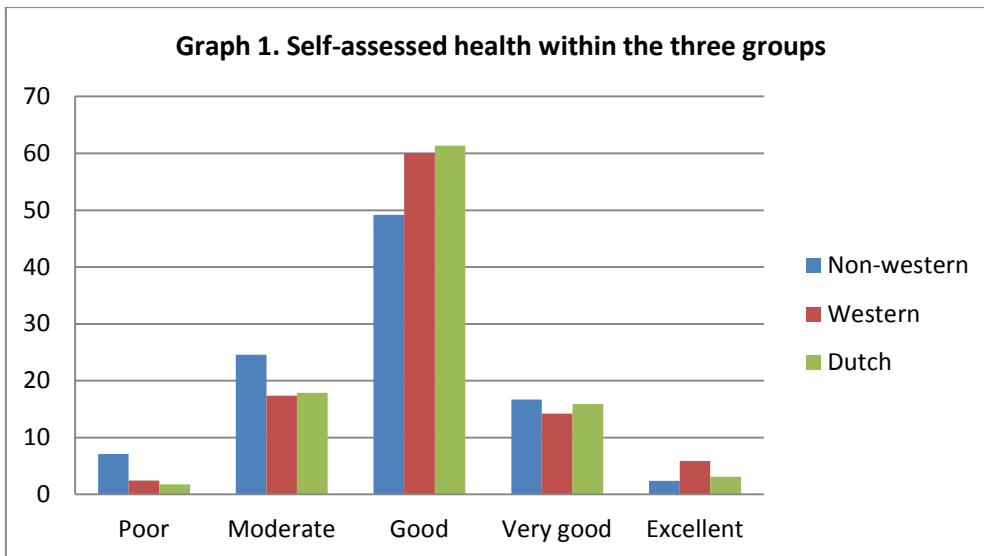
Table 2 Self-assessed health among three ethnic groups

	Ethnic Dutch			Western immigrants			Non-western		
	Male	Female	All	Male	Female	All	Male	Female	All
Poor	1.61	1.92	1.77	2.46	2.41	2.43	7.94	6.35	7.14
Moderate	16.87	18.82	17.87	16.39	18.07	17.36	30.16	19.05	24.60
Good	61.18	61.46	61.32	58.20	61.45	60.07	44.44	53.97	49.21
Very good	16.47	15.36	15.90	17.21	12.05	14.24	15.87	17.46	16.67
Excellent	3.88	2.43	3.14	5.74	6.02	5.9	1.59	3.17	2.38
“Good” health	0.8153 (0.388)	0.7926 (0.406)	0.8037 (0.397)	0.8115 (0.393)	0.7952 (0.405)	0.8021 (0.399)	0.6190 (0.490)	0.7460 (0.439)	0.6825 (0.467)
No. ob.	747	781	1528	122	166	288	63	63	126

NOTES:

In the “Health” questionnaire of LISS panel, respondents were asked to report their own health status. The answers can be chosen from “poor”, “moderate”, “good”, “very good”, and “excellent”. In the table we summarize the percentage of each answer given by respondents from each group. Specifically, we count the percentage of all the answers in males, females, and overall within each group. We define “Good” health for those who reported one from “Good”, “Very Good”, and “Excellent”.

To get a clearer picture, the percentage of reporters who claimed their health to be “good”, “very good” or “excellent” within different ethnic groups is shown separately in Graphs 1 through 3. We can see that, in general, the majority in all the three ethnic groups chose “Good” over the other four options. The distribution of self-assessed health status for western background immigrants is quite similar to that of the ethnic Dutch. The mean values of the self-assessed health of these two ethnic groups are similar as well. However, it is very noticeable that the mean value of self-assessed health status for non-western background immigrants was significantly different from the ethnic Dutch. By running a t-test, we find out that the difference is significant at the 1% level and so is the significance of difference between western background immigrants and non-western background immigrants. To obtain a better insight into different genders’ self-reported health states, we have drawn the percentage columns of the percentage of different self-assessed health status for males and females, separately. We notice that males always had a slightly higher self-assessed health states than females for ethnic Dutch and western background immigrants, while surprisingly the situation was reversed for the non-western background immigrants.



3.3 Empirical Results

In this part we will estimate the model for the latent variable ‘health stock’ as we described in session 3.2. As in equation (3), the dependent variable is the unobserved ‘health stock’, which is the latent counterpart to the observed variable ‘self-assessed health status’. The explanatory variables include health indicator characteristics (including health ‘difficulties’, which are measures as limitation in physical functions, health ‘problems’, which are diagnosed diseases, and whether the reporter was suffering from long-term diseases), labor market characteristics (including current employment status), and socioeconomic and demographic characteristics (including net individual income, highest level of education, number of children living with the family, marriage status, etc.). Table 3 depicts the results of our ordered probit model underlying equation (3) for the whole sample.

Examining the parameter estimates, two personal characteristics variables are significant in explaining self-assessed health status. From the two significant variables, we can conclude that holding other characteristics stable, individuals who are living in less urban areas are more likely to report a higher categorical health status. Moreover, holding other variables fixed, we expect that for somebody who has a higher educational background, the probability to report a better self-assessed health status is also higher. We also find out that ethnic background difference doesn’t seem to be a relevant variable in explaining the differences in individuals’ self-reported health. In fact, because of this result, for later research we will pool the three ethnic groups and calculate a single ‘health stock’ measure which applies to all of them.

In contrast to personal characteristics, many of the health measures are significant at 5% or even 1% levels, and tests of joint significance have also proved that the measures of functional limitations (referred to as ‘health difficulty’ in table 3) and diagnosed diseases (referred to as ‘health problems’ in table 3) are very significant when considered together. Moreover, the variable implying whether a reporter has a long-term disease is also significantly related to one’s self-assessed health status.

The model we are using here is an ordered discrete choice model. A positive coefficient unambiguously means that the corresponding variable decreases the probability with which an individual is predicted to be in the lowest health category and increase the probability with which they are predicted to be in excellent health, and vice versa.

Table 3 Results of ordered probit estimating self-assessed health status as a function of individual characteristics and health indicators.

Variables	Coefficient	S.E	P> z
Origin	.0658	.0383	0.084
Gender	-.0753	.0566	0.184
Age1	.0036	.0070	0.613

Living at home children1	-.0107	.0326	0.742
Married1	.0098	.0651	0.880
Owning a house1	.1002	.0698	0.151
Urban	-.0487*	.0225	0.030
Income1	.0198*	.0096	0.038
Education1	.1111*	.0479	0.020
Long-standing disease	-.5174**	.0719	0.000
Hinder to daily life	-.2314**	.0388	0.000
Hinder to social life	-.3099**	.0454	0.000
Hinder work	-.1052*	.0416	0.011
Chest pain	-.4307**	.1567	0.006
Heart attach	-.1211	.2093	0.563
High blood pressure	-.1387	.0800	0.083
High cholesterol	-.1280	.0902	0.156
Stroke	.0147	.2640	0.956
Diabetes	-.3710**	.1164	0.001
Chronic lung disease	-.4269**	.1630	0.009
Asthma	-.1628	.1562	0.297
Arthritis	-.3071**	.0930	0.001
Cancer	-.8920**	.2120	0.000
Gastric ulcer	-.7315**	.2237	0.001
Parkinson's disease	-.0962	.5669	0.865
Cataract	-.0431	.1830	0.814
Broken hip	-1.6020	.9042	0.076
Another fracture	.0186	.1995	0.926
Memory problem	-.3910	.6339	0.537
Benign tumor	.0656	.1971	0.739
Other afflictions	-.1180	.0847	0.163
No disease	.2218*	.0873	0.011

F-test	Chi-squared	p-Value
Health 'difficulties'	291.78**	0.0000
Health 'problems'	132.4**	0.0000

NOTES:

We use an ordered discrete choice model to regress "self-reported health status" on several detailed health-related variables and demographic variables. The health-related variables include whether the respondent has a long-term disease; to what extent the reported physical or emotional disease hinders one's daily life, social life and work; if the respondents was told by his or her physician last

year that he or she suffers from some specific diseases. For the F-test, the number of observation is 1942; the log likelihood equals -1606.86; LR chi2 (33) =1087.91; and Prob.>Chi2=0.0000.

* Significant at 5% level.

** Significant at 1% level.

3.4 Modeling the Impact of Health on Retirement Decisions

To construct the role of health stock in individuals' retirement decisions, we will estimate the underlying model as described in equation (4). The dependent variable is based on self-reported economic activity and inactivity. Since only the outcome is observed, we will employ a discrete choice model, the logit model, to exploit the retirement decision problem.

$$w_i^* = \beta x_i + c\lambda_i + \varepsilon_i$$

$$\begin{cases} w_i = 1 & \text{if } w_i^* > 0 \\ w_i = 0 & \text{otherwise} \end{cases} \quad (4)$$

where w_i^* is the latent variable that indexes the probability of participation in the labor market of individual i , defined as whether the individual reports that he/she is currently having a paid job (including self-employment). λ_i is the re-assessed predicted value of the 'health stock', obtained from estimating equation (3) as described previously. From equation (3), we can acquire the predicted value of the underlying 'health stock' η_i for each individual. We normalize these predicted values to give the 'health stock' as the deviation of individual's health index from the cohort mean. In summary, the unobserved health stock λ_i we use in equation (4) is the re-assessed predicted value in the light of information on self-assessed health status and the other health indicators in the data. In addition to λ_i , x_i is the vector of other socioeconomic and demographic characteristics, and ε_i is an error term with a logit distribution. The logit model is written in general as below, which means the probability that an individual has a paid job for a given x_i and λ_i is:

$$\Pr(w_i = 1 | (x_i, \lambda_i)) = \frac{e^{\beta x_i + c\lambda_i}}{1 + e^{\beta x_i + c\lambda_i}}$$

The variable definitions are as follows:

Employment state: 1 if self-reported employed or self-employed, 0 otherwise.

Age/10: self-reported age divided by ten.

Gender: dummy variable, 1 if the respondent is a male.

No. of children: the number of living-at-home children in the household.

Married: dummy variable, 1 if the respondent is married (0 if separated, widowed, divorced, or never married).

Own house: dummy variable, 1 if the respondent has the ownership of the house his/her is living in.

Urban: urban character of place of residence (1 as extremely urban and 5 as not urban).

Education: 3 as highly educated, 2 as medium educated, and 1 as low educated.

Health stock: deviations of individual health stock measure from mean cohorts defined in section 4.2 and section 4.3.

Equation (4) is estimated separately for ethnic Dutch, western-origin immigrants, and non-western immigrants. The coefficient estimates are reported in table 4. By running the estimations, we find that the equations for the three ethnic groups are significantly different. As shown in table 4, the estimated employment functions are generally well-behaved since most coefficients display the expected signs. Having an older age, being a female, obtaining a lower education, and reporting a worse self-assessed health status are significantly associated to higher probabilities of not being employed for both the ethnic Dutch and western immigrant groups. However, for the non-western immigrants, the number of significant variables is much smaller. ‘Health stock’ is the only significant variable in explaining the employment decisions among the rest of the factors in our model.

Table 4 Results of logit estimating employment status as a function of individual characteristics and health stock

Variable	Ethnic Dutch	Western Immigrants	Non-western Immigrants
Intercept	14.0277** (-10.930)	6.6256** (-20.122)	6.6888* (-30.462)
Age/10	-2.4468** (.1773)	-1.3882** (.3394)	-0.9833 (.5252)
Gender	0.7222** (.1267)	0.6332* (.2757)	0.3553 (.4208)
No. of children	0.0976 (.0828)	0.3448 (.1885)	-0.0953 (.1957)
Married	-0.0702 (.1484)	-0.5592 (.3095)	0.5726 (.4463)
Own house	0.2265 (.1566)	0.8030** (.3118)	0.2358 (.5029)
Urban	0.0019 (.0505)	-0.1660 (.1084)	-0.1689 (.1798)

Education	0.3021** (.1100)	0.1782** (.2236)	0.2273 (.3085)
Health stock	0.5208** (.0631)	1.214** (.3411)	0.4290** (.1239)
R²	0.2197	0.1500	0.1694
No. observation	1528	288	126

NOTES:

We use a logit model to construct the role of individuals' health stock on their retirement decisions. The regression is estimated separately for ethnic Dutch, western-origin immigrants, and non-western immigrants. The variable "health stock" is measured in the way mentioned in last section.

* Significant at 5% level.

** Significant at 1% level.

Looking further into the employment decision functions between the ethnic Dutch and western immigrants, although they share most of the significant variables, the ownership of dwelling is only significant for the western immigrants. With its positive sign, the result denotes that owning a house is likely to correlate to a higher probability of participation in the labor force. For those variables which are significant for both of the two ethnic groups, we have run a t-test and found that all the coefficients are significantly different between the two estimated results. For the ethnic Dutch, being a male has a greater influence on the probability of employment status than for western background immigrants. Also, a higher education background seems to be more efficient in encouraging individuals to participate in the labor market for the ethnic Dutch than for the western background immigrants. Moreover, we have found that the 'health stock' has a much more significant role in determining western background immigrants' participation status in the labor market than its influence for ethnic Dutch's employment status.

As for the non-western background immigrants, their employment status function is highly different from that of the ethnic Dutch group and the western-origin immigrants group. For the two groups, as mentioned above, although the specific coefficients are significantly different, the explanatory variables still follow a similar pattern. However, for non-western background immigrants, among all the vectors we consider in our model, only the "health stock" has a significant result. On the one hand, it shows the magnitude of self-assessed health status on non-western origin immigrants' work participation decisions; on the other hand, their decision patterns differ from what we have found for ethnic Dutch and immigrants with a western background. When lowering the significance level to 10%, the variable age becomes significant.

When we look at the number of significant variables between each ethnic group, we should also take the number of observations into consideration. We can see that the

ethnic Dutch group has 1528 observations, while the immigrants with western background and non-western background only have 288 and 126 observations, respectively. Combining the number of observations and the number of significant variables between each group, we can explain that the reason why non-western and western immigrants group have a smaller number of significant variables might be due to the insufficient number of observations compared to the ethnic Dutch group.

4. Empirical Retirement Expectations Analysis

4.1 Work and Schooling Survey

For the second research question “retirement expectations among different ethnic groups”, we will also use the data drawn from CentERData. In this part, we will employ a cleaned sample drawn from two waves of the LISS Survey “Work and Schooling” which were held in April, 2009 and April, 2011. Unlike the first research question “working participation differences” for which we can get data from both LISS Survey and Immigrant Survey, the second research question’s relevant data is not available for the Immigrant Survey at CentER Data yet. Considering that we do not have a sufficient immigrant sample for this research question, for the study below, we will only separate the whole sample into two subgroups, namely the ethnic Dutch group and the immigrants group, without further classification of the immigrants.

In the original data set, the number of observations for the two waves is 5701 and 5358, respectively. First, we restrict our respondents to those who were still active in the labor market. In the questionnaire, a question was asked regarding the “primary occupation” of the respondent. The options are:

1. paid employment;
2. works or assists in family business;
3. autonomous professional;
4. freelancer, or self-employed;
5. job seeker following job loss;
6. first-time job seeker;
7. exempted from job seeking following job loss;
8. attends school or is studying;
9. takes care of the housekeeping;
10. is pensioner ([voluntary] early retirement, old age pension scheme);
11. has (partial) work disability;
12. performs unpaid work while retaining unemployment benefit;
13. performs voluntary work;
14. does something else;
15. is too young to have an occupation.

We define those who were “active” in the working market as the first six types, which are:

1. paid employment;
2. works or assists in family business;
3. autonomous professional;
4. freelancer, or self-employed;
5. job seeker following job loss;
6. first-time job seeker;

For this step, we get a sample consisting of 3332 respondents for wave 1. For wave 2, we follow the same occupation restriction procedure and get a sample of 2922 out of 5358 respondents from the original sample. We merge the two waves and keep those who participated in the survey in both of the waves and get a sample of 2255 respondents.

To study the retirement expectations of individuals, we will get the most crucial information from one survey question: “At what age do you expect [if age<65] to stop working?” The answer can be any number between 0 and 100 (inclusive) or “I don’t know”. Based on the merged sample which has 2255 respondents, we include those who answer to this question in at least one of the two waves. In the end, we get our final sample with 1170 participants. Among them, 1072 (91.62%) are ethnic Dutch and 98 (8.38%) are immigrants. For those who reported to be immigrants, 70 people have western background and 28 people have non-western background.

For each individual, we will look into information on retirement expectations (including expected retirement age, expected possibility of receiving early pension benefit, and reasons for considering early retirement), labor market characteristics (including current employment status, net personal income, net household income, etc.), and socioeconomic and demographic characteristics (highest level of education, number of living-at-home children, marriage status, ethnical origins, self-reported health condition, etc.).

4.2 Modeling individuals’ retirement patterns

Information regarding individuals’ retirement age was collected for all respondents in wave 1 and wave 2. Individuals could respond to the question by either reporting an expected retirement age between 0 and 100 or reporting “I don’t know”. We use this variation in responses across waves to classify individuals into five different groups.

We define the first groups as “Group1: Uncertain Plans”. The individuals who are classified in this group are those who reported “I don’t know” in both of the waves,

showing that they didn't have certain plans in a comparatively long-term. The second group is "Group2: Insufficient Plans". Those who only reported an expected retirement age in one wave are classified in this group. The third group is called "Group3: Delayed Plans". This group includes respondents who had uncertain plan in wave1 (reported "I don't know" in wave 1), but a specific expected retirement age in wave2. The fourth group is called "Group4: Changing Plans" consisting people who reported an expected retirement age in wave 1 but reported "I don't know" in wave 2. The last group "Group 5: Standard Plans" is the most crucial group which contains individuals with standard retirement age plans. Thus, for individuals who are in Group 5, they reported an expected retirement age in both of the 2 waves. The distribution of the five subsamples is given in table 5:

Table 5 Distribution of the subsamples

Group	Total		Ethnic Dutch		Immigrant	
	Number	Percentage	Number	Percentage	Number	Percentage
1. Uncertain Plans	55	4.70	50	4.66	5	5.10
2. Insufficient Plans	257	21.97	224	20.90	33	33.67
3. Delayed Plans	37	3.16	33	3.08	4	4.08
4. Changing Plans	170	14.53	157	14.65	13	13.27
5. Standard Plans	651	55.64	608	56.72	43	43.88

NOTES:

All the respondents who have reported for at least once to the expected retirement age question in the two waves are classified into one of the five groups. In the table, we establish the number and the percentage of that specific group within ethnic Dutch, immigrants and total respondents.

As it is shown in table 6, more than half of the total respondents (55.64%) fit what we define as the "standard plan" group. To look closer into different ethnic groups, 56.72% ethnic Dutch and 43.88% immigrants gave specific expected retirement age in both of the two waves. 14.65% percent ethnic Dutch and 13.27% percent immigrants have "changing plans", where they gave a reasonable retirement age in wave 1 but became uncertain of their retirement age in wave 3, which took place in April, 2011. We will not rush to conclude the reason for a considerable amount of people in this group, but it is likely that the unstable European economy has contributed to the uncertainty of individuals' retirement plans and has worsened their faith in the quality of their retirement life. The other two groups, "Delayed Plans" and "Uncertain Plans" are much less common. However, it is interesting to see that immigrants are more likely than their ethnic Dutch contemporaries to fit in these two groups (5.1% vs. 4.7% and 4.08% vs. 3.16%), which shows a higher uncertainty regarding one's retirement plans. Finally, 21.97% of the respondents did not reply to the retirement age question in one of the

two waves. Considering that our data is limited, we will still keep the information for this group for the use of further study.

In order to understand the underlying characteristics of these groups, we will follow the strategy introduced by Cobb-Clark and Stillman (2006) to estimate a multinomial logit model of subgroup membership. Specifically,

$$\Pr(Y_i = j | x_i) = \frac{e^{\beta_j' x_i}}{1 + \sum_{k=1}^J e^{\beta_k' x_i}} \text{ for } j = 1, 2, 3, 4, 5 \quad (5)$$

Given a set of explanatory variables, $\Pr(Y_i = j | x_i)$ is the predicted probability that individual i belongs to subgroup j and the five subgroups are defined as above. In this model x_i is a vector of factors assumed to be related to an individual's retirement plans including socioeconomic and demographic characteristics (highest level of education, number of living-at-home children, marriage status, and ethnic origins), status of participation in the labor market, self-reported health status, urban/rural status, ownership of the house, personal net income per month, and household net income per month. β_j are vectors of parameters to be estimated, it shows the contributing value of one specific explanatory to the probability that individual i would belong to subgroup j . These factors are all measured in wave 1 of the "working and school" survey. The marginal effects along with the associated standard errors for these variables are reported in table 6.

Table 6 Marginal effects in the multinomial logit model

	Uncertain Plans	Insufficient Plans	Delayed Plans	Changing Plans	Standard Plans
Early pension benefits	0.0081 (0.0174)	-.0289 (.0208)	-.0100 (.0144)	.0526 (.0280)	-.0217 (.0349)
Age	-0.0011 (0.0020)	.0062** (.0023)	-.0030 (0.0020)	-.0029 (.0032)	.0007 (.0041)
Female	0.0457* (0.0193)	-.0050 (.0200)	.0279 (.0164)	.0613* (.0288)	-.1299** (.0354)
Children	-0.0041 (0.0178)	-.0034 (.0128)	.0281* (.0110)	.0322 (.0171)	-.0528* (.0218)
Domestic status	0.0064 (0.0128)	.0022 (.0132)	-.0631* (.0288)	-.0373 (.0250)	.0917** (.0325)
Ownership of house	-0.0277 (0.024)	.0054 (.0251)	.0009 (.0195)	-.0551 (.0357)	.0765 (.0449)
Urban status	0.0103 (0.0068)	-.0012 (.0077)	-.0014 (.0057)	.0119 (.0110)	-.0196 (.0136)
Working	0.0459**	.0257	.0002	.0459*	-.1023**

status	(0.0232)	(.0142)	(.0140)	(.0231)	(.0297)
Immigrant	0.0001 (0.0002)	.0002 (.0002)	.0001 (.0001)	.0001 (.0002)	-.0005 (.0004)
Personal income/1000	-0.02 (0.01)	1.80e-04 (0.01)	-0.00379 (0.0088)	-0.02 (0.01)	0.05* (0.02)
Household income/1000	-0.00543 (0.0077)	-0.0028 (0.0092)	4.62e-4 (0.0060)	0.01 (0.0100)	-0.0029 (0.0155)
High education	0.0084 (0.0067)	-.0043 (.0109)	.0064 (.0104)	-.0272 (.0185)	.0294 (.0206)

NOTES:

We use a multinomial logit model to examine the marginal effects of different characteristics to individuals' group classification. The coefficient values illustrate the marginal effect of that variable to individuals' likelihood to fall into the specific group.

* Significant at 5% level.

** Significant at 1% level.

Variables including "female", "age", "work", and "domestic status" are found to be statistically significant in the multinomial logit regression for some subgroups, specifically. In our "standard plan" group, 5 out of 12 variables are significant.

We find that women are 12.99% less likely than otherwise similar men to be certain about the age at which they expect to retire. Meanwhile, they are 6.13% more likely to have an expected age in 2009 but loses track of that in 2011. Together, these results point to a great deal of uncertainty in women's retirement plans. Moreover, having living-at-home children also seems to contribute to the uncertainty of individuals' retirement decisions. We find that individuals with children at home are 5.28% less likely than otherwise similar men to give certain expected retirement ages in both waves and 2.8% more likely to have a delayed plan for retirement. Those who did not get paid employment are 10.23% less likely to have certain retirement plans than those with paid employment and they are 4.6% more likely to have not yet begun to plan for retirement.

Other demographic and human capital characteristics are less loosely related to whether or not individuals have begun to plan for retirement. Specifically, neither education nor ethnic origins is closely related to an individual's subgroup membership. A fuller understanding of the effect of specific factors on retirement plans will require more waves and respondents.

We will have a closer look at the respondents' characteristics for the five groups. We have summarized the average of variables including: age, number of children, domestic situation, urban status, personal net income, household net income, expectations towards receiving of early pension benefits, education level, primary occupation, and self-assessed health situation for respondents in each group. The results are shown in table 7.

Table 7 Mean value for respondents' characteristics in each group

	Uncertain Plans	Insufficient Plans	Delayed Plans	Changing Plans	Standard Plans
Age	53.564 (5.881)	48.296 (6.972)	51.541 (5.541)	52.459 (4.707)	52.934 (4.872)
Children	0.764 (0.999)	1.280 (1.186)	1.081 (1.211)	1.035 (1.240)	0.920 (1.070)
Partner	81.818% (0.389)	77.043% (0.421)	81.081% (0.397)	82.941% (0.377)	82.796% (0.378)
Household location	3.382 (1.421)	3.027 (1.333)	2.956 (1.153)	3.153 (0.425)	3.003 (1.234)
Pincome	858.2 (916.578)	1394.082 (1017.422)	1171.351 (1019.321)	1080.31 (1074.695)	1628.55 (1213.771)
Hincome	2861.71 (1112.717)	3023.186 (1319.012)	3248.271 (1585.123)	3162.734 (1523.579)	3301.02 (1410.653)
Early pension	25%	31.9%	26.92%	35.76%	45.05%
Education	32.73%	34.24	29.73%	27.06%	40.86%
work	64.45%	79.38%	89.19%	80.59%	91.24%
Health	84.72%	88.16%	94.12%	88.10%	91.04%
Health Change	-3.09%	-5.30%	-16.34%	-1.55%	-2.61%

NOTES:

The mean values of different demographic and health-related variables of each group are summarized in the table. The variables include: gender, age, number of living-at-home children, marriage status, whether owning a house, personally net income per month (in thousands), household net income per month (in thousands), expectation of receiving early pension benefits if retire before 65, mean education, whether have a paid employment or not, and self-assessed health status.

The most significant difference between each group is found in the answers of personal net income. For respondents who reported “I don’t know” in both waves (“Uncertain Plans Group”), the average of their personal net income per month is only EUR 858.2 while for those who had standard plans (those who reported a reasonable retirement age in both waves), the average is EUR 1628.55, which is almost twice as large as the people from the “Uncertain Plans Group”. We have also found that the personal monthly net income for people with standard plans is significantly different from all the other groups. The significant difference makes the “Standard Plans Group” a special

group among all the other respondents. This is likely because of the fact that people who had a higher and more stable personally income may also have a better guarantee for their retirement lives. Thus, those people may be more positive and certain with a standard and clear retirement plan than those who had less financial fortune. The answers regarding personal net income from the other three groups also vary largely, but between the answers given by the “Uncertain Plans Group” and “Standard Plans Group”. Similarly, the household net monthly income also follows the same pattern among the five groups. However, the difference among groups is smaller compared to the difference among groups over the variable “personal net monthly income”. One of the reasons could be that within one household there might be family members who have different retirement plan types, and as it is shown in our study, people with different retirement plan types exhibit different personal net income averages. Consequently, each household as a whole might reveal a smaller gap compared to other households. Another noticeable big difference lies in the educational levels in different groups. To measure the education level of individuals, respondents were asked for their highest level of education with a diploma. We classify those who have HBO (higher vocational education) or WO (university) diploma as highly educated people. We calculated the percentage of people who had either of the two diplomas in each group and found out that in the “Standard Plans Group”, 40.86% respondents belong to the highly educated class. For the percentages of other groups, the number ranges from 27.06% to 34.34%. Furthermore, we find that the “Changing Plans Group” has the lowest percentage of highly educated people.

In our research sample, as we mentioned before, we only include those who are active in the labor market. Among all the five occupational types, “paid employment” is seen as the most stable primary occupation and we use the percentage of “paid employment” to estimate the labor participation in each group. Unsurprisingly, the “Standard Plans Group” enjoys the highest percentage of paid employees in its group. This finding is consistent with the conclusions we drew from the two variables: personal net monthly income and household net monthly income. With a comparatively stable employment status, individuals are more able to hold a reasonable retirement plan and foresee the future financial situation and thus are more likely to have standard retirement plans.

There is another interesting variable, the number of living-at-home children in the household. The reason for this is that the average value in the “Uncertain Plans Group” is only 0.764, which is much smaller than the other groups who have values around 1. This can be explained that when people had fewer living-at-home children, they are attached to less financial responsibility or burdens. In this case, they are less obligated to make clear and consistent retirement plans compared to those who have children to take care of.

When individuals form expectations towards future retirement plans, they would also base their decisions on their expectations of receiving early pension benefits. The

intuition is straightforward: when someone expects that he or she will be able to receive early pension benefits after taking early retirement, the person would have a financial guarantee for choosing to retire before 65. The guarantee will make individuals become more certain about their retirement plans. Moreover, it might motivate people to retire earlier and work shorter if only they know that their pension benefits will still be granted even if they retire early. However, for further discussion regarding this aspect, we will study it in the later sections. Another thing which is worth discussing is the ‘Health Change’ variable. It’s calculated by taking the difference between the two waves regarding the percentage of people who reported “good”, “very good”, or “excellent” for their self-assessed health. We’ve found that for “Delayed Plans Group”, the change in self-assessed health is extreme. 16.34% of the respondents changed their self-assessed health from a “good” level to a “moderate” level. For this specific group, when respondents were asked about their retirement plans, they reported “I don’t know” in wave 1 and a standard answer in wave 2. We might explain the relation between their health situation and retirement patterns as, when people realized their health situation is decreasing they started to realize the significance and urgency to seriously consider their retirement plans to prepare for the health-related issues.

For other variables, we fail to find interesting or noticeable differences between the five groups. According to our data, it seems that the domestic status, age and household location don’t show special patterns between different groups. Indeed, these variables are less relevant to people’s decisions to make a plan for retirement.

4.3 Modeling expected retirement ages for ethnic Dutch and Immigrants

For this part, we will focus on the “Standard Plans Group”. Based on our sample, the majority of individuals formulate standard retirement plans. Specifically, 56.72% ethnic Dutch and 43.88% immigrants reported an expected retirement age in both wave 1 and wave 2. It’s of great importance to examine how individuals change their retirement plans over time in response to changes in circumstances. To choose a static linear model, we will start with two options: the random effects model and the fixed effects model. After reporting the estimation results from the two models and examining the regressions with Hausman test, we will make a choice between the two models.

First, we will formulate a random effects model with random effects and independent variables uncorrelated to estimate the expected retirement age of individual i in wave t :

$$y_{it} = \mu + x_{it}\beta + \alpha_i + \varepsilon_{it}$$

$$\varepsilon_{it} \sim \text{IID}(0, \sigma_\varepsilon^2); \alpha_i \sim \text{IID}(0, \sigma_\alpha^2) \tag{6}$$

where x_{it} is a vector of time-varying characteristics affecting expectations regarding retirement, β is a parameter to be estimated. Here we use a random effects model in which α_i are random factors, independently and identically distributed over individuals.

$\alpha_i + \varepsilon_{it}$ is treated as an error term consisting of two components: an individual specific component, which does not vary over time, and an idiosyncratic component, which is assumed to be uncorrelated over time. This is, all correlation of the error terms over time is attributed to the individual effects α_i .

The equation is estimated by using the subsample of individuals from the “Standard Plans”, those who reported expected retirement ages in both of the two waves.

In addition to the random effect model, we will also use a fixed effects model to estimate the same research question. The fixed effects model is simply a linear regression model in which the intercept terms vary over the individuals units i:

$$y_{it} = \alpha_i + x_{it}\beta + \varepsilon_{it}$$

$$\varepsilon_{it} \sim \text{IID}(0, \sigma_\varepsilon^2); \tag{7}$$

By using the fixed effects model, we assume that all x_{it} are independent of all ε_{it} . The fixed effects approach is conditional upon the values for α_i . The individuals in the sample cannot be viewed as a random draw from some underlying population.

Estimation results for both of the models are presented in Table 8. We may find that time-invariant values with time-invariant effects are omitted in the regression of the fixed effects model.

Table 8 Results of random effects model and fixed effects model on expected retirement age regression

Variables	Random Effects Model		Fixed Effects Model	
	Coefficient	S.E	Coefficient	S.E
Gender	-0.5953*	(0.2621)	Omitted	
Age	0.0673**	(0.0233)	0.1930**	(0.0510)
Children	0.2019	(0.1158)	0.2907	(0.2574)
Partner	-1.2844**	(0.3048)	-2.3984**	(0.8296)
Household location	-0.1194	(0.1010)	-0.1756	(0.4062)
Occupation	-1.0757**	(0.3565)	-0.8958	(0.7401)
Pincome	0.00492	(0.0203)	0.0959	(0.2471)
Education	0.1897*	(0.0833)	-0.1965	(0.2605)
Health	0.0077	(0.1262)	-0.0584	(0.1662)
Ethnic origin	-0.0009	(0.0030)	omitted	
Constant	62.751**	(1.5829)	57.5948**	(3.3636)

NOTES:

We use both random effects model and fixed effects model to examine how individuals change their retirement plans over time in response to changes in circumstances. Specifically, how individuals’

retirement age differ based on gender, age, number of living-at-home children, partner, household location, main occupation, personal net income, education level, self-assessed health situation and, ethnic origins.

* Significant at 5% level.

** Significant at 1% level.

Next, we will discuss whether we should the random effects model or the fixed effects model by introducing the Hausman test. As we discussed below, if x_{it} and α_i are correlated, the only model we can use here is the fixed effects model. However, if x_{it} and α_i are uncorrelated, the estimators from both of the tests are consistent. Hausman (1978) has suggested a test for the null hypothesis that x_{it} and α_i are uncorrelated. The general idea of a Hausman test is that two estimators are compared: one which is consistent under both the null and alternative hypothesis and one which is consistent (and typically efficient) under the null hypothesis only. A significant difference between the two estimators indicates that the null hypothesis is unlikely to hold, which means under this situation we can only use the fixed effects model instead of the random effects model. By running the Hausman test, we find that it's not possible to reject the null hypothesis, showing that both of the two models are applicable in our case. After having a closer look into our results of standard deviations for all the variables, we may find that the standard deviations for all the variables from the random effects model are smaller than those from the fixed effects model. This result exhibits that in our case, the regression results from the random effects model are more efficient than the results from the fixed effects model. In addition, in a fixed effects model, time-invariant variables are omitted, such as "Gender" and "Ethnic Origin". Considering that we are also interested in the time-invariant variables, we will use the estimation results from the random effects model.

The variable "Ethnic Origin" is not significant in our model. It means that respondents with different ethnic origins are not significantly different in their expected retirement ages, given that other characteristics are fixed. This leaves us little room to examine the different expected retirement ages between the ethnic Dutch group and immigrant group. However, we have still found some other worthy factors in deciding individuals' retirement ages in the whole sub-sample.

First, we find that females tend to have an earlier retirement age than males. Specifically, keeping all the other characteristics the same, females expect to retire more than half a year earlier than males. This result seems to be consistent with reality, where females are less enterprising than males and feel the obligation to attach more importance to their families over their careers. Thus, they would consider to retire earlier to take care of the family while males might prefer to work longer to pursue a career compliment. Another interesting significant factor we have found in determining respondents' retirement age is "whether or not living with a partner". We can see from our results that those who were living with a partner reported an earlier retirement age compared to those who were not. We may explain the reason by considering that, when living with a partner, people may modify their employment plans in anticipation of the need to

provide care for their partners or the need to spend more retirement time with their partners. Instead of making a retirement age decision by only considering his or her own needs, living with a partner may urge individuals to take another person's needs into consideration for the sake of family.

In our panel sample, the ages of our respondents range from 16 years old to 89 years old. Among people with different ages, we've found a significant delay in individuals' expected retirement age with an increase of their reported age. Although with one year older age, the delay of expected retirement is only 0.0673 year from our result. However, in general it shows, with a gap of 10 years in ones' ages, that the older one might expect a delay of retirement for more than half a year compared to the younger one. Moreover, the primary occupation of an individual also significantly influences his or her retirement plans. In our sample, we only include those who are still active in the labor market. We divide them into two groups in our estimation: those who have a stable paid employment and those who have less stable work or still are looking for a job. From our estimation result, we have found that for those with a stable paid employment, their expected retirement age is later than the others. This finding is very persuasive and self-explaining because when people have a more secure and steady job, they feel more discipline and obligation to stay with the job until a legal retirement age. The same reasoning may also be suitable for another significant character: education. In our results, with a higher educational level, people generally expect a higher retirement age. Compared to the same contemporary, people with higher educational levels are more likely to get a steady employment contract for which they are inclined to fulfill their responsibilities and delay their retirement age.

5. Discussion and Conclusions

The objective of this paper was to estimate how health conditions, pension incentives, and varying background affect the labor participation patterns and retirement expectations for ethnic Dutch and immigrants, respectively. We used cross-sectional data to investigate the first research question, regarding labor market participation and for the second research topic we used two-wave panel data to examine the specific expected retirement age patterns for ethnic Dutch and immigrants, respectively.

First, we have found that for older workers, ethnic Dutch have the highest labor market participation rate, while immigrants with non-western background have the lowest participation rate, with a difference of almost 10 percent. Looking further into the differences of employed respondents and unemployed respondents within each group, we found that those who have a job normally report a better self-assessed health status, higher education background, and ownership of the house he or she is living in, which is consistent with contemporary studies. From the specific statistics, we can tell that the immigrants with western backgrounds share more similarities with the ethnic Dutch, while the immigrants with non-western background illustrate a more distinctive pattern.

For the explanatory factors of individuals' working decisions, we focused on the variable "health". By mapping out the distribution of self-assessed health condition for the three ethnic groups, we've found that the distribution of immigrants with western background is very similar to that of the ethnic Dutch. However, the distribution of immigrants with non-western background is significantly different from either of the two groups. Moreover, we noted that males always have a slightly higher self-reported health states compared to females for ethnic Dutch and western background immigrants, while, surprisingly, the situation is reversed for the non-western background immigrants.

By modeling the impact of health on retirement decisions, we may draw the conclusion that having an older age, being a female, obtaining a lower education, and reporting a worse self-assessed health status are significant contributors to higher probabilities of not being employed for both the ethnic Dutch and immigrants with western backgrounds. However, for immigrants with non-western backgrounds, the only significant variable in explaining one's employment status is the "health stock". Looking further into the employment decision functions between ethnic Dutch and western immigrants, although they share most of the significant variables, the extent of each factor's influence is different. For ethnic Dutch, being a male has a greater influence to the probability of employment status than for western background immigrants. Also, a higher educational background seems to be more efficient in encouraging individuals to participate in the labor market for ethnic Dutch than for western background immigrants. Moreover, we have found that the "health stock" has a much more significant role in determining western background immigrants' participation status in the labor market than it has for ethnic Dutch's employment status.

For the second research topic, regarding expected retirement age, due to the insufficient data problem, we only divide our study objects into two subgroups, ethnic Dutch and immigrants. Around half of the total respondents have standard expected retirement plans in both of our research waves. It's obvious that ethnic Dutch in general have more consistent and clear expected retirement age than immigrants. While the majority of ethnic Dutch have reported expected retirement age in both of our research periods, most of the immigrants have uncertain retirement plans, delayed retirement plans, changing retirement plans, or insufficient plans. To look into the characteristics of individuals who have different expected retirement age patterns, first we found that women tend to be more uncertain about their retirement plans. Also, having living-at home children seems to contribute to the uncertainty of individuals' retirement decisions.

From the results of our empirical model of expected retirement age, we found that females tend to have an earlier expected retirement age than males. Among people with different ages, we've found a significant delay in individuals' expected retirement age with an increase of their reported age. Specifically, with a gap of 10 years in individuals' ages, the older ones might expect a delay of retirement for more than half a year

compared to the younger ones. Moreover, we have found that for those with a stable paid employment, their expected retirement age is later than for the others.

There is currently a tense atmosphere between the “right-wing” and “left-wing” political parties regarding the “special” Dutch citizens— the immigrants. The “right-wing” claims that immigrants should be selected on the basis of their level of education. They have also demanded that the government conduct a cost-benefit analysis of the effects of migration to the Netherlands. The PVV, for example, sent questions to all twelve Dutch ministries asking them to list the costs of (non-western) immigrants and their offspring to society. However, parties who are against the cost-benefit analysis of non-western background immigrants responded: "Immigrants are members of our society. Their presence cannot be reduced to simple figures of addition and subtraction, with the euro as the standard" (Van der Laan, 2009). A recent research by Aslan Zorlu (2011) shows that migrants from non-western countries, both first and second generation, have a higher probability to participate in social assistance and disability benefit programs and to a lesser extent in unemployment benefit programs.

Apparently, how much taxes immigrants contribute to the country and how much they benefit from the social benefits remain the foci of this discussion between different political parties. It also strengthens the significant importance of our paper’s research topic: labor market participation of immigrants. In our paper, instead of arguing how to deal with the low working participation/ high unemployment benefit of the immigrants, we shed light on how to prevent the inactivity of immigrants in the labor market and how to improve the weak social position and independence of the immigrants. From our research results, we have illustrated that by improving the health status and educational background, immigrants are more likely to join the labor market. Therefore, if the policy makers encourage the immigrants to pursue better educational achievement and ensure access to more completed health institutions, the participation rate of immigrants in the labor market is likely to increase. In present times, such policies have already been carried out for some part in the Netherlands. Recently, immigration policies have changed to restrict family and asylum migration. Newly arriving immigrants should now learn the Dutch language and relevant institutions during a citizenship course upon arrival. Their participation in welfare system is conditional on the certificate of citizenship course. Obligatory language training and some training to obtain knowledge about relevant Dutch institutions, called citizenship courses, have the potential to prevent immigrant welfare dependency, in particular in the long run. Other recent policy changes have set more restrictions on immigration flows as well as the welfare received by immigrants. However, it is now too early to evaluate the influence of these new policies.

At the moment, with the spreading economic crisis in Europe, non-western immigrants tend to be more vulnerable compared to western immigrants and ethnic Dutch. Our study has shown that non-western immigrants are less likely to have paid employment and a weaker educational background which might weaken their competitive power

during job hunting. It is high time that both policy makers and individuals realized the urgency to improve the disadvantage of immigrants in the labor market.

For future study, researchers could attach more importance to the differences in personal incomes between immigrants and ethnic Dutch. One result from *Press release Statistics Netherlands (2001)* shows that non-western immigrants are more likely to receive benefits, and among all the benefits, the most substantial differences lies in income support claimants. More than 15% of non-western immigrants received income support, compared to 2.5% of the ethnic Dutch population. The likelihood of a non-western immigrant receiving income support was therefore six times higher. In our paper, we only compare the participation rates in the labor market between immigrants and ethnic Dutch while we comparatively ignore further discussion regarding their income differences. Given the distinct income support claimants from empirical results, research in personal incomes between the two ethnic groups might be of magnitude as well.

Moreover, there is another perspective that future research could improve. When I study the labor market participation and expected retirement age, I fail to consider the interaction of couples in a household. It is reasonable to realize that, within a household, a wife's labor participation patterns would be closely related to her husband's decisions, vice versa. For example, they would like to start their retirement life together. Considering that the average age of a wife is roughly three years younger than the husband in the household, and from our research women tend to have a younger expected retirement age, the two factors would further shorten women's career length.

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