Retirement Expectations in the Netherlands

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Abstract

This study discusses the effect of changes in retirement policy on expected retirement behavior of individual people. Using the panel dataset LISS from 2011 to 2019 in a fixed effect regression model, we see a highly statistically significant positive effect of a change in statutory retirement age on the expected retirement age. For people between 45 and 61 years old, their expected retirement age increases when the statutory retirement age is increased. Looking for heterogenous effect in different subgroups, the effect remains similar, indicating a robust result. Next to a change in the statutory retirement age, having a partner also influences the expected retirement age. Taking into account these factors, if the government wants to increase her financial sustainability, an increase in the statutory retirement age will lead to a decrease in the old-age dependency ratio, and thus achieving the expected result.

Key words: *Retirement; Old-Age dependency ratio; Pension systems; Statutory Retirement Age; Expected Retirement Age; Policy Reforms; The Netherlands; Financial Sustainability*

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1. Introduction

1.1 Research Question and Motivation

Aging, increased life expectancy and financial instability - all these trends have led to an increased pressure on pension systems worldwide (Leibfritz, Roseveare, Fore, & Wurzel, 1995). Increased public expenditure on pensions, increased risk of old-age inequality and lower financial sustainability are all consequences of this pressure (OECD, 2017).

The reason why these trends have such an oppressive effect is because of the foundation of the pension systems in the world; the old-age dependency ratio (OECD, 2017). The old-age dependency ratio projects the ratio between people 65 years and older (inactive people), and the population between 20 and 64 (active people). The OECD (2017) predicts that this ratio will be almost doubled in 2050 when compared to 2015 (see figure 1).

Figure 1: Inactive/active ratio in OECD countries
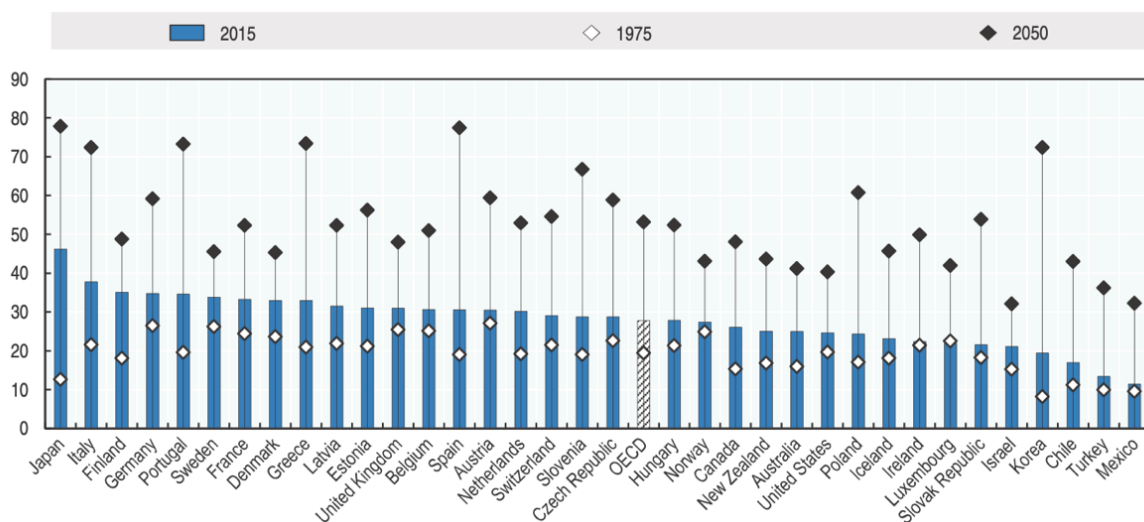
Source: OECD (2017), p.19

Two major factors are causing this rising trend in the old-age dependency ratio: (1) increased life expectancy and (2) the declining fertility rate (Schnabel, 1998). First, the increased life expectancy. Due to reduction in infant and child mortality and the reduction in infectious disease mortality the life expectancy at birth has increased (Mathers, Stevens, Boerma, White, & Tobias, 2015). Increased life expectancy leads to a larger group of inactive people and has its effects on the old-age dependency ratio. The second factor is the "below-replacement-rate levels of fertility" (OECD, 2020, p.1). To be able to replace (on average) the total population of a country, the replacement rate is around or above 2.1 children per woman. Currently, on average, the total fertility rate is between 1.4 and 1.9 children per woman, meaning that the replacement rate is not achieved (OECD, 2020, p.1). Without meeting or exceeding this replacement rate, the population will decrease, the active group will become smaller, and the old-age dependency ratio will increase.

This calls for action. According to the OECD, multiple countries are trying to reform their pension system in order to create financial stability and meet up with the trends explained previously (OECD, 2017). Measurements that countries have taken so far are increasing the statutory retirement age, changing of indexation rules and contribution rates, and lowering the income replacement rates. To see to what effect a change in policy has on financial sustainability, it is important to search for possible changes in an individual's behavior. For example, searching for a correlation between an increased statutory retirement age and a change in the expected retirement age of people: if people change their behavior, a positive effect can be seen in the old-age dependency ratio. However, it is not possible to see behavior changes for people that are not close to their retirement decision. Therefore, you ought to look at the expectations of this group, as expectations are good predictors of actual behavior.

In 2010, The Netherlands took its first steps in increasing the financial sustainability of the pension system. The Dutch cabinet, together with labor unions and the National Labour

Council (in Dutch: Stichting van de Arbeid), agreed on changes in the current pension agreement. This pension agreement was founded in 1957 by the former Minister of Social Affairs Ko Suurhoff, based on the emergency law made by former Minister of Social Affairs Willem Drees in 1947 (Historiek, 2019). In this new agreement, the involved parties agreed to a gradual increase of the statutory retirement age from 65 years to 67 years by 2025 (Stichting van de Arbeid, 2010).

Based on theoretical models such as the Life Cycle Model, we know that people closer to the statutory retirement age will delay their retirement due to changes in the statutory retirement age (Atav, Jongen, Rabaté, 2019). For example, if they retire before they reach the new retirement age, the (retirement)income could decrease more than expected. In order to maintain their normal consumer behavior, it is necessary for them to continue working. However, for younger generations, it is harder to tell how their life cycle model changes. Their expectations are based on the preferences ratio between consumption and leisure. They can for example decide to work longer in order to have the same life cycle model outcomes as before any reforms (just like the almost retired people), but another possibility is, for example, that younger generations change their behavior and save more which can lead to early retirement. In case of the latter possibility, financial sustainability will be a lot harder to achieve since people will no longer contribute in the 'active' group and become part of the 'inactive' group. Unfortunately, academic research about the effects on the younger generations is limited, especially in contrast with the (almost) retirement population.

The search for individual retirement expectations is central in this study, following the paper of De Grip, Fouarge and Montizaan (2013). In order to do an in-depth study, this study will only focus on the policy reforms and people in The Netherlands. Such a focus makes it possible to look at effects on individuals over time.

The Netherlands is ranked first in the Mercer CFA Institute Global Pension Index (Lenski, 2020). In order to be able to remain at this first place, the financial sustainability needs to improve, which is done by reforms. Due to the visible reforms, it is possible to analysis them. This eagerness to remain in first place can be seen from a quote of MHP's chairman (one of the Unions in The Netherlands) Mr. Steenbord. He stated: "It is important to maintain the internationally acclaimed Dutch pension system in the future" (Stam, 2010, p.1). Aside from this, the LISS data set provides a panel data set from Dutch households with constituency in people, and subjective answers. These details make it possible to control for reciprocity.

The research question that is central in this paper is:

What is the effect of increases in the statutory retirement age on retirement expectations?

1.2 Relevance

In March 2013, Andries de Grip, Didier Fouarge and Raymond Montizaan publicized an article about the individual retirement expectations based on the upcoming change in policy of an increase in statutory retirement age in that same year (De Grip, Fouarge & Montizaan, 2013). This study will follow in the footsteps of this article by using more recent data and including more and different background characteristics.

The research design will also be different than De Grip et al (2013) used. For their study, they used cross-sectional data and an OLS regression to see differences within groups; this current study will use panel data and a fixed effects regression model to see if individuals themselves change over time. An advantage of using panel data instead of cross-sectional data is that you can work with fixed effects. Individuals can have the same characteristics but still

be more optimistic or pessimistic about the future. Using this research design will give a more detailed analysis with more precise information about possible changes in expectations of individuals over time, as is the research question of this study.

In addition to the academic relevance, this study also has social relevance. The results of this study can be used in the public debate about pension systems. It informs the public about a possible connection between changes in policies and individual expectations. Will an increase in the statutory retirement age lead to more years on the labor market for younger generations, or do people change their behavior, such as increasing investments or savings, in order to retire at age 65? This question is not only interesting for the public but also for the policymakers. By showing if the expectations of people and the objective of the government are in line with one another, policymakers have the opportunity to pursue or change the policy if necessary.

1.3 Thesis outline

This thesis consists of seven chapters, including this introduction. Chapter two provides information about the composition of the pension system and what the Dutch pension system looks like, and outlines policy changes regarding the pension system in the last decade. In chapter three, an overview of the current literature about dependent and independent variables is presented. This chapter also introduces the hypothesis. Chapter four is dedicated to the research method and data collection of this paper. In order to answer the research question, this study will make use of the LISS dataset based on a panel study with people with different characteristics over multiple years. Chapter five will describe the operationalization of the analysis, the descriptive statistics and the empirical strategy. Based on a fixed effects regression model, the results will be discussed in chapter six. Finally, in chapter seven, the conclusion and the research findings, implications, limitations and future research suggestions are discussed.

2. Systems

2.1 Pension systems

Generally, there are two ways to fund a pension scheme: via a pay-as-you-go pension system (PAYG) and a fully funded system. In a PAYG system, contributions of people from the active group are directly transferred to people from the inactive group (Brunner, 1996). "A successful PAYG system requires a balance between the expenditure on pensions and the income from contributions made by the active workers over time, usually termed inter-generational solidarity" (Godínez-Olivares, del Carmen Boado-Penas, & Haberman, 2016, p.2). Because the growth rate of the economy is dependent on both the growth rate of the population and the labor productivity, this system is vulnerable for shocks such as low fertility rates (Brunner, 1996). To counter this, one can add an automatic balancing mechanism to create a sustainable system (Godínez-Olivares, et. al., 2016). Godínez-Olivares, et. al (2016) designed such a mechanism by improving for example contribution rates and conditions.

The main benefit from a PAYG system is intergenerational allocation of risk (Øystein Thøgersen, 1998). Due to the contribution of the younger generation, the older generation will be protected against macroeconomic risks (Bovenberg, & Uhlig, 2008). High risk-sharing can potentially lead to larger welfare gains and makes it possible for the government to adjust social security budgets to keep them in balance (Cui, De Jong, & Pons, 2011; Olovsson, 2010). Most OECD countries have integrated this system into their pension programs and will continue to use this in the next several decades (Øystein Thøgersen, 1998).

The second system is the fully funded system. In this system every person is responsible for their own old-age pension financing (Van den Bosch, 1988). This can be done via notional defined contribution (NDC) and funded defined contribution (FDC) (Chłoń-Domińczak, &

Strzelecki, 2013). Notional defined contribution (NDC) system was introduced and implemented in Sweden in 2001 by the government (Auerbach, & Lee, 2006). In this system, for every individual from a certain age, the government maintains a notional capital account (Auerbach, & Lee, 2006). "The appeal of the NDC account system is that it is a PAYG scheme that emulates the principles of a DC scheme but relies on demographic funding" (Orszag, & Stigliz, 2001, p.98). Notional payments are based on the rate of return. This is set in the pension plan for each individual, and amount to roughly the same level as during the pre-retirement phase. People are paying a contribution for the duration of their working career (Orszag, & Stigliz, 2001). Compared to a PAYG system, this system increases the financial stability as the annuity structure stops rising costs due to increased life expectancy (Auerbach, & Lee, 2006).

Within a funded defined contribution (FDC) system contributions are fixed, and the pension payments mirror the accumulated capital within a pension fund (Hemming, 1998). "The assets of the pension funds will by definition cover the pension liability" (Hemming, 1998, p.7). This system, in contrast to a PAYG system, is not reliable on future generations which makes shocks in the demographic less impactful (Hemming, 1998). However, economic shock can have large effects, as is demonstrated by the financial crisis in 2008, which led to a fall in rate of returns on assets (Holzmann, 2013).

Currently there is an ongoing debate about whether the PAYG system should be replaced by a funded system (Sinn, 2000). Some researchers have argued that a pareto-improving transition is possible (Brunner, 1996). Brunner (1996) argues that you can solve the deadweight-loss, that is caused by the distorted labor-leisure decision in the PAYG system, by some form of labor tax. Other researchers argue that this pareto-improving transition is not possible because current employees must pay twice during the transition period - making at least one generation worse off and no longer a pareto-improvement (Feldstein, 1997). Current employees have to pay the PAYG taxes to keep supporting the current retirees and have to save

for their own retirement. This debate extends beyond the limits of this paper, but it is an interesting topic since multiple countries are dealing with this dilemma of whether not to make the transition.

2.2 Dutch Pension System

On October 20th 2020, The Netherlands was ranked first in the Mercer CFA Institute Global Pension Index for the third year in a row (Lenski, 2020; Ubink, 2020). This makes the Netherlands an interesting case to explore.

The Dutch Pensions system is designed with three different pillars (De Kruijf, Johan, & De Vries, 2018). The first pillar is based on a mandatory pension plan organized by the government. This pillar is also called 'Old Age Pension' (AOW in Dutch) (Ministerie van Sociale Zaken en Werkgelegenheid, 2020a). You have to live at least 50 years in The Netherlands in order to receive full benefit from this pillar when reaching the statutory retirement age (De Kruijf, Johan, & De Vries, 2018). The payments are paid monthly, and start as soon as the statutory retirement age is reached. Like most countries, this first pillar is based on a pay-as-you-go system (Bovenberg, 2014). Chile is an exception to the 'standard' (Hemming, 1998). In 1981, Chile was the first country that replaced the PAYG system for a funded system to finance their public pension. After its success, some countries are implementing or considering this change. But the majority is still using the PAYG system to fund their public pension (Godínez-Olivares, del Carmen Boado-Penas, & Haberman, 2016). In the Netherlands, currently the age at which people can receive AOW is not flexible (Baars, Dillingh, Driessen, Knoef, Muns, Tielen, Van der Meer, Van Soest & Van Vuuren, 2019). This means that it is not possible to choose to retire early and still receive full AOW at that age; you can retire early, but you will only receive (full) AOW payment as soon as you reach the statutory retirement age.

The second pillar is based on a plan that is set up by employers and covers roughly 90 percent of all the employees in The Netherlands, as this pillar is mandatory (Ministerie van Sociale Zaken en Werkgelegenheid, 2020a). This plan is constructed through defined benefit or contributions, which is organized by private pension funds with regulatory and fiscal standards set by the Dutch government (De Kruijf, Johan, & De Vries, 2018). Compared to other countries, people in The Netherlands largely depend on the second pillar: in 2013, Statistics Netherlands (CBS) calculated that 40% of the total amount of pensions entitlements is within the second pillar, versus Germany (about 5%), France (about 7%) and the United Kingdom (about 22%) (Bruil, Schmitz, Gebraad, Bhageloe-Datadin, 2015; Bovenberg, 2014). An explanation for why this number is relatively high in The Netherlands can be that second pillar pension is part of fringe benefits when signing a contract. Because a lot of people are involved in such a pension scheme, higher risk sharing can take place which makes it easier to organize for employers (Bovenberg, 2014). Compared to the first pillar, the second pillar does have a (semi) flexible retirement age (Baars, Dillingh, Driessen, Knoef, Muns, Tielen, Van der Meer, Van Soest & Van Vuuren, 2019). Depending on the pension fund, it is possible to retire as early as age 55 or continue working till age 72. Therefore, within this pillar the statutory retirement age does not have to be reached in order to retire, instead it depends on your savings and consuming needs. As soon as an individual decides to retire, he or she will receive a monthly pay-out. A lump sum payment is currently not allowed in The Netherlands (Van der Cruijsen, & Jonker, 2019).

The third pillar is a voluntary pillar and therefore different from the first and the second (mandatory pillars). This pillar is based on an individual insurance (Ministerie van Sociale Zaken en Werkgelegenheid, 2020a). If an individual is not satisfied with a retirement income received from the first and second pillar, he or she can save through for example annuities in the third pillar (Ministerie van Sociale Zaken en Werkgelegenheid, 2020a). The reliance on this

pillar is quite low (about 6%) when compared to countries such as Italy (about 25%) and the United States of America (about 41%) (Bovenberg, 2014). A reason for this can be the large amount of the total pension entitlements in the first and second pillar that is satisfactory for people: the first and second pillars together provide an average gross replacement rate above 80 percent, which makes the third pillar less important (Bovenberg, 2014; Alessie, Van Rooij, & Lusardi, 2011).

Looking at an average household in the Netherlands, about 75% of the total amount of pension income depends on the first and second pillar (Knoef, Goudswaard, Been, & Caminada, 2015). Looking at a lower income group, the first pillar will be the main source of income. And, the higher the income before retirement, the more important the second pillar is in terms of pension income (Knoef, Goudswaard, Been, & Caminada, 2015).

2.3 Pension system reforms

In 1957, ten years after the temporary policy concerning state pension, an official policy was introduced where mandatory insurance effectuated state pension for all inhabitants: The General Old Age Act, or Algemene Ouderdom Wet in Dutch (Gradus, 2014). Since then, the government has changed small parts of the Dutch pension system multiple times. These reforms include final pay defined benefit schemes to average pay schemes and to end the opportunity for early retirement for people born after 1950 (Broeders, & Ponds, 2012; De Grip, Fouarge, & Monitzaan, 2013).

In 2010, a major reform took place in the first pillar. (Stichting van de Arbeid, 2010). Employer organizations, unions, government, and other social partners agreed upon necessary changes in order to keep the Dutch pension system more future proof (Stam, 2010). The most important changes the parties agreed on were (Stichting van de Arbeid, 2010):

1. **AN INCREASE OF THE RETIREMENT AGE FROM 65 TO 66 IN 2020 AND 67 IN 2025.**

2. **THE STATE PENSION WILL BE LINKED TO THE EARNED WAGES RATHER THAN THE NEGOTIATED WAGES**

3. **THE POSSIBILITY FOR EARLY RETIREMENT AT THE AGE OF 65 INSTEAD OF THE NEW RETIREMENT AGE WITH A REDUCTION IN STATE PENSION PAYMENT OF 6,5% PER YEAR.**

In June 2011, the Bureau for Economic Policy Analysis (CPB) examined the effects of this new pension agreement on state finances and the impact on younger generations (CPB, 2011). They concluded that this change was necessary for the ability to maintain the future expenses, but extending the increased retirement age in 2020 was too late. Table 2.1 shows the new statutory retirement age per birth cohort that was agreed upon in the new pension agreement.

Table 2.1: Statutory Retirement Age per Birth Cohort in 2011

Birth Cohort	Statutory Retirement Age
Born in 1954 or earlier	65 years old
Born between 1955 to 1959	66 years old
Born after 1959	67 years old

Source: CPB, 2011, p. 6

Although this agreement was signed by the social partners and the Dutch congress, when this agreement was sent to the Senate, the minister of social affairs decided to block the initiative (Eerste Kamer der Staten-Generaal, 2012).

In 2012, the new pension agreement again changed a little. After a year of continuous meetings and discussions between the Dutch Cabinet and the social partners, the Minister of Finance sent out a letter to parliament, stating that the new state pension retirement age was not to be increased for the first time in 2020, but pulled forward to 2013. (De Jager, 2012). In 2013, the statutory retirement age has started increasing by one month, which continued the following years with one or two months until 2020, when the new state pension retirement age of 66 was reached, as per the decision in 2010 (De Jager, 2012). The retirement age in the second pillar was increased to age 67 in 2014, and thereafter linked to increase with the average life expectancy (De Jager, 2012). The new measurements led to a saving of 144 million euros in the government's budget in 2013 alone (De Jager, 2012, p.12). Table 2.2 shows the statutory retirement age per birth cohort due to the changes made in the pension agreement.

Table 2.2: Statutory Retirement Age per Birth Cohort starting on January 1st, 2013

Birthyear	Statutory Retirement Age	Birthyear	SRA
Born before 1948	65 years old	Born from 1961 to 1963	67 years + 6 months*
Born in 1948	65 years + 1 months	Born in 1964 or 1965	67 years + 9 months*
Born in 1949	65 year + 2 months	Born in 1966	68 years old*
Born in 1950	65 years + 3 months	Born from 1967 to 1969	68 years + 3 months*
Born in 1951	65 years + 5 months	Born in 1970 or 1971	68 years + 6 months*
Born in 1952	65 years + 7 months	Born in 1972 or 1793	68 years + 9 months*
Born in 1953	65 years + 9 months	Born in 1974	69 years old*
Born in 1954	66 years old	Born from 1975 to 1977	69 years + 3 months*
Born in 1955	66 years + 3 months	Born in 1978 or 1979	69 years + 6 months*
Born in 1956	66 years + 6 months	Born from 1980 or 1981	69 years + 9 months*
Born in 1957	66 years + 9 months	Born in 1982	70 years old*
Born in 1958	67 years old	Born from 1983 to 1985	70 years + 3 months*
Born in 1959 or 1960	67 years + 3 months*	Born from 1986 to 1988	70 years + 6 months*

Source: De Jager (2012); own composition

* calculated based on the equation: V = (L – 18,26) – (P – 65) as described in article 7a of the law State Pension (Kamp & Weekers, 2012) and the prognosis of the life expectancy after reaching the age 65 of CBS (CBS, n.d.).
V = the period by which the statutory retirement increased
L = the estimated macro average remaining life expectancy at age 65 in the calendar year of the increase
P = the retirement age in the calendar year preceding the calendar year of the increase

In 2014, parliament decided to again accelerate the increase of the state pension retirement age from to 66 in 2018 (instead of 2020), and 67 in 2021 (instead of 2024), starting on January 1st, 2016 (Kleinsma & Wiebes, 2014). Reason to do this was to secure the affordability of the state pension in the future, which would secure the state finances in the future (Kleinsma & Wiebes, 2014). Table 2.3 shows the new statutory retirement age per birth cohort.

Table 2.3: Statutory Retirement Age per Birth Cohort starting January 1st, 2016

Birthyear	Statutory Retirement Age	Birthyear	SRA
Born before 1948	65 years old	Born from 1964 to 1966	67 years + 9 months*
Born in 1948	65 years + 1 months	Born in 1967	68 years old*
Born in 1949	65 year + 2 months	Born in 1968 or 1969	68 years + 3 months*
Born in 1950	65 years + 3 months	Born from 1970 to 1972	68 years + 6 months*
Born in 1951	65 years + 6 months	Born in 1973 or 1974	68 years + 9 months*
Born in 1952	65 years + 9 months	Born in 1975	69 years old*
Born in 1953	66 years old	Born from 1976 to 1978	69 years + 3 months*
Born in 1954	66 years + 4 months	Born in 1979 or 1980	69 years + 6 months*
Born in 1955	66 years + 8 months	Born from 1981 to 1983	69 years + 9 months*
Born from 1956 to 1958	67 years old	Born in 1984	70 years old*
Born in 1959 or 1960	67 years + 3 months*	Born from 1985 to 1987	70 years + 3 months*
Born from 1961 to 1963	67 years + 6 months*	Born in 1988	70 years + 6 months*

Source: Atav, Jongen, & Rabaté (2020), p.2; Kleinsma & Wiebes (2014), p. 1; own composition

Note: after 2021 (retirement age is set at 67 years old), the same equation as in 2013 (Kamp & Weekers, 2012) is applicable and used for the calculation of the retirement ages.

In 2019, the Social Economic Board (SER) published a report 'Towards a new pension system' (SER, 2019). This report stated that the Dutch government, employers' organizations and unions came to a new pension agreement as replacement for the current pension system. The most important changes with respect to the current system were (Koolmees & Snel, 2019; SER, 2019):

1. **A STOP OF INCREASING RETIREMENT AGE (OF 66 AND 4 MONTHS) IN 2020 AND 2021**

2. **STEP-BY-STEP INCREASE IN RETIREMENT AGE STARTING IN 2022 TO 67 YEARS OLD IN 2024.**

3. **POSSIBILITY TO RETIRE THREE YEARS BEFORE ACHIEVING THE RETIREMENT AGE AND GET A COMPENSATION FROM YOUR EMPLOYER WITHOUT PAYING A FEE.**

4. **THE SET-UP FOR A NEW CONTRACT WHERE RISK SHARING IS BASED ON AGE COMPOSITION OF A PENSION FUND AND AGE-DEPENDED PREMIUMS ARE PAID.**

Notably, this new agreement consisted only of an outline, with no mention of any details. In June 2020, however, these details were filled in. The government together with the social partners came to a final agreement including all the necessary details (Ministerie van Sociale Zaken en Werkgelegenheid, 2020b). Examples of such details were that all pension funds needed to have implemented the new contract by January 1st, 2026, and that from 2025 onwards, the state pension retirement age would increase by eight months when the life expectancy would increase by one year (Ministerie van Sociale Zaken en Werkgelegenheid, 2020b). "This new pension system will be more personal, more transparent and will offer an earlier indexation perspective. With this system we will have the best pension system in the world, not only for today, but also for the future", according to Minister Koolmees of Social Affairs (Ministerie van Sociale Zaken en Werkgelegenheid, 2020b). Table 2.4 shows the statutory retirement age per birth cohort with this agreement.

Table 2.4 Statutory Retirement Age per Birth Cohort starting January 1st, 2020

Birthyear	SRA	Birthyear	SRA
Born before 1948	65 years old	Born in 1963, 1964, 1965	67 years + 7 months*
Born in 1948	65 years + 1 months	Born in 1966 or 1967	67 years + 10 months*
Born in 1949	65 year + 2 months	Born in 1968	68 years old*
Born in 1950	65 years + 3 months	Born in 1969 or 1970	68 years + 3 months*
Born in 1951	65 years + 6 months	Born from 1971 to 1973	68 years + 6 months*
Born in 1952	65 years + 9 months	Born in 1974 or 1975	68 years + 9 months*
Born in 1953	66 years old	Born in 1976	69 years old*
Born in 1954 or 1955	66 years + 4 months	Born from 1977 to 1979	69 years + 3 months*
Born in 1956	66 years + 7 months	Born in 1980 or 1981	69 years + 6 months*
Born from 1957	66 years + 10 months	Born from 1982 to 1984	69 years + 9 months*
Born from 1958 to 1960	67 years old	Born in 1985	70 years old*
Born in 1961 or 1962	67 years + 4 months*	Born from 1986 to 1988	70 years + 3 months*

Source: Koolmees & Snel (2019), p. 1-2; Belastingdienst (2020); own composition

Note: after 2024 (retirement age is set at 67 years old), the same equation as in 2013 (Kamp & Weekers, 2012) is applicable and used for the calculation of the retirement ages.

In short, ten years after the first major reform within the pension system, multiple reforms have taken place, all in order to be able to maintain state pension and secure state finances in the future.

3. Theory

As has been discussed in the introduction, expectations are a part of the Life Cycle Model that can explain and predict economic decision making in an individual's life. In order to see how this plays out in real life, it is important to first discuss the Life Cycle Model. Next to that, it is important to see what role expectations play in this model, and to explain how (subjective) expectations can influence the behavior. Lastly, it is important to research in what way this can influence the retirement decision.

3.1 Life Cycle Model

The Life Cycle Model (LCM) is a theoretical framework that indicates the allocation of effort, time and money (Browning, & Crossley, 2001). It predicts an optimal plan of saving and consumption over lifetime (Thaler, & Benartzi, 2004). The optimal plan is a plan of consumption smoothing over time and depends on the saving rate, consumption needs and time preferences (Browning, & Crossley, 2001). Smoothing, according to Browning & Crossley, means: "The agents try to keep the marginal utility of money constant over time, which may involve quite variable expenditures" (2001, p. 4). This means that although consumption is not fixed over time, the marginal utility is.

The LCM is based on the assumption that households will take future circumstances into account when making consumption decisions (Danziger, Van der Gaag, Smolensky, & Taussig, 1982). People anticipate on income reductions once they retire, which leads to saving when younger, and dissaving after retirement. Individuals tend to maximize their utility based on their current and future earnings (Ando, & Modigliani, 1963). Without uncertainties this model is

straightforward; the maximized utility function leads to a desire to smooth out consumption over a lifetime, especially when keeping retirement in mind (Attanasio, 1999).

Because it is not possible to spend more than an individual can earn during their life, the equation for calculating the optimal consumption given a certain point in life is:

$$C = \frac{NY^d + RZ}{N + R} \tag{1}$$

Here, C represents the consumption per year, N the number of working years and R the number of years retired. Y^d equals the disposable income and Z indicates the annual pension income (Cooper, & John, 2018). The optimal consumption is, next to income, dependent on an individual time preference and the interest rate. Together with the first equation, this will give the equation for the optimal consumption rate:

$$C_{t+1} = \frac{1+r}{1+\rho} * C_t \tag{2}$$

In equation 2, r indicates the interest rate and ρ indicates the time preferences of an individual. t stands for the current year. Next the optimal consumption, this theoretical framework provides an equation for the optimal saving rate during work life:

$$S_{t+1} = (1+r)S_t + w - c_t \tag{3}$$

In this equation (3), S indicates the amount of savings in a certain year. r stands for the interest rate in a year. t indicates the current year, w equals the wage of an individual per year and c indicates the consumption per year (Knoef, 2020). The equation for optimal saving during retirement is slightly different than the equation for the optimal saving rate during work life, because w is replaced by b, which indicates the pension benefits (Knoef, 2020):

$$S_{t+1} = (1+r)S_t + b - c_t \tag{4}$$

3.2 Expectations and LCM

As has been specified in equation 1, the optimal lifetime consumption is, among other things, based on the number of years retired. When an individual is not close to retirement, this number is based on the expectations/prediction of this person's retirement duration. The mortality expectation of an individual is thereby of great influence on LCM (Salm, 2010). An individual that has a high expected mortality rate expects to benefit less from consumption in the future, and expects to spend fewer years in retirement, and so will consume more in the present than an individual with a lower expected mortality rate (Salm, 2010).

Because of the fact that LCM is a theoretical framework, in practice actual household behavior can differ from the optimal consumption rate calculated by the theory (Thaler, & Benartzi, 2004). A reason that is given by Thaler & Benartzi (2004) is that people may lack self-control. Because state pension and/or social security is (almost) certain, this only strengthens the lack of self-control to reduce current consumption (Thaler, & Benartzi, 2004). People are likely to overconsume compared with the optimal consumption due to expectations.

Another way expectations and LCM are connected is the financial attitude. People who are more optimistic tend to save less, because they do not fear loss of income during their work life. This leads to a suboptimal saving rate (Brown, & Taylor, 2006). People who are more pessimistic see their savings not only as a way of smoothing consumption but also as an insurance against future income loss due to unforeseen events (Brown, & Taylor, 2006).

3.3 (Retirement) Expectations and influences

"Most economic decisions involve uncertainty and are therefore shaped not only by preferences but also by expectations of future outcomes" (Delavande, Giné, & McKenzie, 2011, p. 1). How

individuals behave is partly explained by their expectations and are therefore very important to understand. In several studies, expectations have been linked to behavior.

An example of those studies is the research done by Huang (2014). In this study, Huang investigated the influences of expectations on the housing market in the United States. Due to over-optimism, where buyers expected that house prices would increase in the future, people bought houses that were too expensive for what they could afford. This led to extensive debts which ended up in a recession when house prices did not increase as predicted (Huang, 2014).

Media can also influence or even change expectations (Manski, 2004). This can be done in two different ways: due to 'volume' and 'tone' (Lamla, & Lein, 2014). Volume means how often the media report certain events. If the media report more on certain subjects, people will obtain new or more information about this subject. This can influence their expectations (Manski, 2004). The second way is the 'tone' of the media (Lamla, & Lein, 2014). If the media report more positive than negative news items about an event or subject, people tend to become more optimistic, and vice versa. It is a way of framing an event that can lead to change in expectations and with that a change in behavior (Barr, 2020). An example of how the media influenced expectations and behavior is visible in the results from a study done by Goda, Shoven & Slavov (2011). During the Great Recession, the media coverage was generally pessimistic about the economy. This, together with other factors, generally led to a delay in retirement since peoples' expectations changed their behavior (Goda, Shoven, & Slavov, 2011).

But not only the media can influence (retirement) expectations. Another factor is the stock market (Goda, Shoven, & Slavov, 2010). Goda, Shoven, & Slavov (2010) reported in their study that the probability of working full-time at age 62 decreases if the stock market goes up. The LCM explains this as follows: if the stock market grows, the income of an individual will go up, meaning that an individual can consume more or start earlier with dissaving (retirement). With a stock market going down, the reverse effect is visible (Goda, Shoven, & Slavov, 2010).

In short, not only expectations can influence the outcome (our behavior), but expectations can also be influenced by external sources such as the media or the stock market. These expectations can eventually influence the behavior of people.

3.4 Retirement decision

As has been stated so far in this literature chapter, the retirement decision in general can be explained by the LCM. In this model expectations are crucial, because, as mentioned before, they will eventually influence behavior. The decision to retire is also based on expectations. So, in order to see how expectations and behavior influence the retirement decision, it is important to look at factors that influence the expected retirement age.

3.4.1 Labor Market Choices

The decision to retire can be interpreted as a labor/leisure tradeoff (Börsch-Supan, 2000). Each individual has a labor/leisure decision to make (Altman, 2001). Based on individual preferences, an individual needs to decide how much time he or she wants to spend on labor, and how much time he or she wants to spend on leisure. Changes in wages and income can lead to changes in this labor/leisure tradeoff. The micro-economic theory about the substitution- and income effect predicts whether labor or leisure increases (Altman, 2001). People close to the statutory retirement age have to make a decision whether to continue working, leave the labor market and take early retirement or work after the retirement age is reached. Because this decision is dependent on the retirement age, changes in this statutory age can postpone or stimulate early retirement (Börsch-Supan, 2000).

3.4.1.1 Substitution effect

A substitution effect means that when wages go up, you work more (McDowell, Thom, Pastine, Frank & Beranke, 2012). Reason for this is that because of higher wages, not working will be

more expensive since you are receiving less income compared to the past. You now will substitute leisure for work. If wages decrease, leisure will become less expensive, which leads to a substitution of work for leisure.

Applied to the pension case, Petersen (1988) states that increasing the statutory retirement age can lead to an increase in expected retirement age. Due to this higher retirement age, income will continue to grow, meaning that leisure (early retirement) will become more expensive. The costs for early retirement is losing income, which can lead to the decision to continue working. Therefore, the substitution effect will delay retirement. A study done by Rabaté and Rochut (2020), shows that because of the reform in 2010 in France (where the statutory retirement age was increased from age 60 to age 61), the employment rate at age 60 increased by almost 23 percent compared to people aged 60 before the reform. This result indicates a delay in retirement, which again shows a substitution effect.

3.4.1.2 Incomes effect

An income effect works in the opposite way (McDowell, Thom, Pastine, Frank & Beranke, 2012). When wages increase, you will have a higher income, which allows you to 'buy' more leisure. If wages decrease, this purchasing power will decrease, meaning that you will purchase less leisure and will work more (McDowell, Thom, Pastine, Frank & Beranke, 2012).

Applied to the pension case, both directions of the income effect can be argued for. Conde-Ruiz, Galasso and Profeta (2013) argue that a decrease in pension benefits would lead to a delay in retirement. This result can be interpreted as follows: an increase in statutory retirement age will lead to lower pension benefits before reaching this new retirement age, which will postpone retirement. This shows the income effect: when income is lower, you will work more because of loss in purchasing power. Petersen (1988) similarly argues that higher statutory retirement age will lead to a higher income (since you have to work longer), which provides a desire for people to retire earlier than the new statutory retirement age.

Income is not only based on income from labor. Investments and social benefits are part of income as well (Gelderblom, Collewet, & De Koning, 2011). The older you are, the higher the total amount of savings (because you have saved more years), the higher the income, which can lead to early retirement (Gelderblom, Collewet, & De Koning, 2011). If the statutory retirement age increases, the income from investments and labor will increase, but income out of social benefits can decrease. Gelderblom, et al (2011) argue that generally, due to age, the investment in the second pillar will be higher, which leads to earlier retirement. But as this depends on individual characteristics, this does not apply to everybody.

Which of the two effects, the substitution effect or the income effect, dominates is hard to say. It is also a possibility that no effect is visible because both effects can perfectly compensate for each other (Conde-Ruiz, Galasso, & Profeta, 2013). Rather, it is an empirical question that can be different for different subjects (McDowell, Thom, Pastine, Frank & Beranke, 2012).

3.4.2 Financial Literacy

The theory about the labor/leisure trade-off does have a shortcoming. It lacks an explanation for differences in preferences between individuals with the same level of income/leisure as well as an explanation for how preferences can be influenced by internal and external factors (Altman, 2001). Financial literacy is a factor that influences the retirement expectations of individuals (Bucher-Koenen & Tusardi, 2011). The better the financial literacy, the better the retirement planning is. This retirement planning is necessary in order to fill the gap that is created by increasing the statutory retirement age (Bucher-Koenen & Tusardi, 2011).

This financial knowledge can manifest influence in two different ways: 1. expectations about the retirement age; and 2. long-term investments (Fouarge, De Grip, & Monitzaan, 2011).

For a policy to be successful, it is important that people have some financial knowledge. The research of Fouarge et al. (2011), concluded that people who are financially literate work four months longer compared to people who are not financially competent. People without this knowledge expect to keep the same retirement age as before the policy changes. However, how financial literacy influences retirement behavior is not crystal clear. Research done by Alessie, Van Rooij, and Lusardi (2011) argues that financial literacy is insignificant, as all people do have some indication of their expected retirement age. They argue that people who are born before 1955 expect to retire earlier than people born after 1975. This is in line with reform policy, therefore financial knowledge does not influence this decision. Contrastingly, Clark, Morrill, and Allen (2012) argue that financial literacy does have a significant effect on the retirement age. This is especially the case when people are misinformed about the statutory retirement age and the financial consequences of early retirement. These errors in knowledge are especially common among younger people and lesser educated people. People with a higher educational background tend to be better informed.

Financial literacy can also have an influence on investments. Due to policy changes, people have to invest more in order to compensate for lower pension income (if they still want to retire early or at the old statutory retirement age). Fouarge et al. (2011) state that younger people do not anticipate this lower pension income, and only about one-third is investing extra in their pension. If people invest in retirement products, people with more financial literacy tend to invest more in retirement products than people with less financial literacy (Fouarge, De Grip, & Monitzaan, 2011). But no connection is found between financial literacy and willingness to invest in second and third pillar pension (Fouarge, De Grip, & Monitzaan, 2011). Research done by Hung, Meijer and Yoong (2009) found a similar result. Although they found a positive effect on investment behavior for people with higher financial literacy, this relationship was not statistically significant. Hastings and Michell (2011) found a significant

result between financial literacy and investment decisions, although they say this correlation is weak. Additionally, De Grip (2015) found a significant result between financial knowledge and investments in life saving schemes. People with higher financial literacy are investing twice as much in life saving schemes compared to people with lower financial literacy (De Grip, 2015).

3.4.3 Health

Financial literacy is not the only factor that influences the expected retirement age; there are three other major factors: health, economic status, and behavioral and psychological features (Knoll, 2011). The majority of research has confirmed that people who indicate their own health as good, will retire later than people who indicate their health as poor (Knoll, 2011). McGarry (2002) even argues that health has a greater influence on the retirement expectations than changes in income or wealth. If people expect to live to age 85, they indicate better health and also indicate to expect to continue working longer (McGarry, 2002). In addition to people's own health, the health of their family also affects the retirement decision. If family members of individuals indicated poor/fair health, the individual expects to retire earlier than individuals with family indicated good health (McGarry, 2002).

Nevertheless, health is a difficult factor to be interpreted causally. Reason for this is that not only does health have an effect on the expected retirement age, but the expected retirement age also has an influence on health. Deciding on working longer or shorter can influence your expected health status. Therefore, because of this endogeneity, where a dependent variable can influence the dependent variable, the factor health will not be taking into account in the empirical analysis.

3.4.4 Economic Status

People with higher economic status tend to delay their retirement more so than people with a lower economic status (Knoll, 2011). The higher the earnings, the more retirement is

discouraged (Quinn, Burkhauser, & Myers, 1990). But working can also encourage people to retire, due to for example payroll taxes. The higher this wealth loss is, in contrast to the benefits from retirement, the higher the probability that individuals will retire (Quinn, Burkhauser, & Myers, 1990). But according to the research by Li, Hurd and Loughran (2008), wealth before retirement between early retired people and people who postpone their retirement does not substantially differ. The researcher did not find a reason why this is the case. Nevertheless, those working in physically demanding jobs and lower labor market earnings tend to retire earlier than people with management occupations (Li, Hurd, & Loughran, 2008).

Therefore, the economic status and or the financial situation of an individual tends to have a positive effect on the retirement decision. The higher the labor market earnings, the higher the expected retirement age tends to be. Wealth, on the other hand, does not seem to have a direct influence on this retirement decision.

3.4.5 Social interaction

The last big influence on the retirement decision is social interaction. With social interaction, multiple factors are accounted for. Spouse's influence is one of the factors. People tend to wish to retire simultaneously with their spouses, which would lead to early retirement for one of the two, the 'joint retirement desire' (Johnson, 2004). However, not only the wish to retire together influences the decision; research done by Smith and Moen (1998) showed that the decision to retire is influenced by their spouse, independent of the labor situation of their spouse. Another factor is the financial situation of children. If children are financial dependent on an individual, the incentive to retire early decreases (Henkens, van Solinge, & van Dalen, 2009). Lastly, emotional interaction is a factor that can influence the retirement decision. Work is being associated by intellectual discussion, which can disappear as soon as people decide to retire and leave the labor market (Knoll, 2011). This will lead to a delay in retirement.

So, social interaction can influence the retirement decision in both ways. Where emotional interaction and children who are financial dependent tend to delay the retirement decision, spouses tend to stimulate early retirement.

3.5 Hypothesis

Within the (economic) literature, research has shown that there are multiple factors that influence the decision on when to retire. Some of these factors have been discussed in this literature chapter. Because this paper builds on the research done by De Grip, Fouarge and Monitzaan (2013), the hypothesis is based on their results. As De Grip et al (2013) found a positive result of the announced policy change and the expected retirement age, the following hypotheses have been established:

H0: THERE IS NO EFFECT OF POLICY CHANGES IN STATUTORY RETIREMENT AGE ON THE EXPECTED RETIREMENT AGE OF PEOPLE.

H1: THERE IS A POSITIVE EFFECT OF POLICY CHANGES IN STATUTORY RETIREMENT AGE ON THE EXPECTED RETIREMENT AGE OF PEOPLE.

4. Research Design

This study focuses on finding causal effects between the dependent and the independent variable. To see if changes in statutory retirement age have an effect on the expected retirement age, it is important to see changes within the expected retirement age. This can be done with a standard regression, to see if there is a causal connection. Because the data set that is used in this study consists of panel data, it is possible to improve the regression by including fixed effects. Therefore, the research design of this paper is based on a Fixed Effects Regression Model.

4.1 Fixed Effects Regression Model

The Fixed Effects (FE) Model is a special variation of the standard regression model. It requires the same basic parts such as a dependent variable, treatment and/or independent variable, and control variables (Angrist, & Pischke, 2014). But the Fixed Effects regression makes it possible to control for variables that are not taken into account or cannot be measured (Allisson, 2009). The individuals within the dataset are used as their own control. This means that within this regression you do not make use of a control group and an experimental group, but you use the individual itself as the control group. This makes it is possible to control for some characteristics of individuals.

This model is applicable for variables that do not change over time, such as race or region of birth, but also for more complicated variables, such as "intelligence, child-rearing practices, and genetic makeup" (Allison, 2009, p.8). A fixed effects model cannot control for variables that change over time and should therefore be included into the regression itself.

According to Allisson (2009), there are two requirements for data when using the fixed effects methods (Allisson, 2009, p.9):

1. "THE DEPENDENT VARIABLE MUST BE MEASURED FOR EACH INDIVIDUAL ON AT LEAST TWO OCCASIONS. THEY MUST BE DIRECTLY COMPARABLE"

2. "THE PREDICTOR VARIABLES OF INTEREST MUST CHANGE IN VALUE ACROSS THOSE MULTIPLE OCCASIONS FOR SOME SUBSTANTIAL PORTION OF THE SAMPLE"

The first requirement means that, in order to search for an effect, it is important that you use a panel dataset. In this dataset, the variables are measured in the same way, which makes them comparable as well as having observations of one individual over time. This makes it possible to use the observations of an individual as their own control. The second requirement is stated because if estimated variables do not change over time, a fixed effect regression will not show any results. If variables do not change over time, the regression cannot estimate future or causal results (Allisson, 2009).

The reason why a fixed effect regression will be used in this study is because with this model it is possible to take pessimistic and optimistic personalities into the regression, without influencing the results. This way, the regression will show a result that indicates how many months or years people will delay or expedite their retirement when statutory retirement age changes.

4.2 Data Collection

To gain the information that is necessary for the analysis, the LISS (Longitudinal Internet studies for the Social Sciences) database is used. "The LISS panel is a representative sample of Dutch individuals who participate in monthly Internet surveys. The panel is based on a true

probability sample of households drawn from the population register. Households that could not otherwise participate are provided with a computer and Internet connection. A longitudinal survey is fielded in the panel every year, covering a large variety of domains including health, work, education, income, housing, time use, political views, values and personality" (Scherpenzeel & Das, 2010). The LISS panel includes approximately 7,500 individuals (CentERdata, n.d.). The monthly response is between the 50 and the 80 percent (CentERdata, n.d.). Because this dataset provides both differences in behavior for an individual over time, and opinions and expectations of individuals, this dataset is used in this research to see whether an effect is visible.

5. Analysis

5.1 Operationalization

5.1.1 Sample

The population of the study are people between 25 and 55 years old (with 2013 being the reference point). Age 25 is chosen as the minimum age because at that age, most people have entered the work force and will therefore likely have been introduced to pension agreements within the firm they are working or have at least some knowledge about pension. Age 55 is set as the maximum age because at this age, retirement is far enough away that changes in your behavior can still influence the outcome of your retirement decision. The closer you are to the statutory retirement age, the less an effect can be visible because changes in behavior (for example increased saving) will not have a big influence anymore. So, in order to see a potential change in behavior when reforms are taking place, it is better to be further away from the statutory retirement age. The analysis will therefore focus on the birth cohorts from January 1958 to December 1987.

The respondent group consists of 2,084 unique individuals. Over the years, these individuals formed a group of 8,561 observations. This means that not all unique individuals have responded to the monthly/annual questionnaire. Their ages are between 45 and 61. Younger people were part of the selection process but did not answer the question that was crucial for the dependent variable. That is why they were removed from the dataset.

5.1.2 Measures

For the analyses, the data that will be used are based on the existing questionnaires from the LISS database from the period January 2011 to December 2019. Within this time frame the first reform (announced in 2010) was introduced to the public, as well as the second and third major

reforms; the fourth reform of the statutory retirement age commenced after this timeframe. This way it is possible to see if and how policy changes that were introduced and executed have influenced people's behavior regarding their expected retirement age.

The dependent variable within this research is the expected retirement age. This will be measured by a direct question: "At what age do you expect to retire or take early retirement or to stop working?". This question could be answered with any number and the option "I don't know". This last option gets the value of 9999 in the dataset. Because this option will heavily influence the outcome, this option will be treated as a missing value and the respondent that gives this answer will be in its entirety excluded from the dataset.

The independent variable is the Statutory Retirement Age. The Statutory Retirement Age variable is calculated based on knowledge provided by the government (see chapter 2) and based on the year of the questionnaire. This also means that reforms in the statutory retirement age will be taken into account.

5.1.3 Additional variables

Education level

'Education level' can be measured in two different ways: with and without receiving a diploma from the highest education level. Respondents are asked the following question: 'please indicate the educational level of the members of your household. Select the highest level that a person ever attended or is attending now. After that select the highest level that this person has already completed (with a diploma or certificate)'. For both parts of the question, respondents are able to choose from the following categories: *Primary School* (1); *VMBO, LBO, MULO, ULO and MAVO* (2); *HAVO, VWO and HBS* (3); *MBO* (4); *HBO* (5); *University* (6); *Other* (7); *Has not yet completed any education* (8); and *Has not (yet) started any education* (9). Because both questions are relatively similar, only "*education with a received diploma or certificate*" will be

used in the regressions. There are two missing values in the dataset, meaning that this question was not answered twice.

Economic status

This variable is measured by the question: 'please enter the requested information about the monthly income of the member of your household'. The answer is numeric. If a respondent does not have any income, he will fill out 0. If a respondent does not know the income the answer -13 is filled in. If a respondent does not want to share this info the answer -15 will be filled in. Within the panel, members don't always follow these missing codes. Some respondents do not want to share their income or do not know what their gross and net income is and used the code 0 instead of -13 or -15. Therefore, all people that have used -13 or -15 will be set to 0, because it is impossible to determine which people do not have any income or did use the wrong code.

Because of the lack of response for both gross and net income, it has been decided to not include this variable in the regression. The mean and standard deviation (see table 5.1) show extraordinary results that cannot give a sufficient result.

Social interaction

Social interaction is defined as a respondent that lives with a partner (wedded and unwedded). This is measured semi-directly by the question: 'can you indicate the relationships between the members of your household'. If the respondent answers this question with 'spouse or partner', this will be indicated with one (1). If the respondent answers this question otherwise, this answer will be indicated with zero (0). Within the observations, two values are missing, meaning that the respondent did not answer this question.

The variable 'gender' is directly measured with the same question as the independent variable. If a respondent answers one (1), he identified himself as a male. If the respondent answers two (2), she identified herself as a female. If a respondent does not identify themselves as male or female, no answer is filled in. Within this dataset two values are missing. This can either be because of lack of response to the question or the respondent did not identify as male or female.

Migration background

This variable is not based on a directly asked question to the respondents. It is based on different variables from the study Religion and Ethnicity from the LISS database. There are five different categories a respondent could be placed in. If a respondent does have a Dutch background, he/she will be placed in category zero (0). If a respondent is a first-generation immigrant with a western background, he/she will be placed in category 101. Category 102 consists of people who are first-generation immigrants, with a non-western background. Category 201 consists of people who are second-generation immigrants, with a western background. If a respondent is placed in category 202 this means that he/she is a second-generation immigrant with a non-western background. 494 values are missing, meaning that the background of these individuals is unclear.

5.2 Descriptive Results

Table 5.1 presents the descriptive statistics. Looking at this table, in general the average expected retirement age lies at 65.96. Without excluding some interesting observations, the minimum expected retirement age was 6, which is an unlikely age to retire. An explanation for this low age can be a typing error or that the respondent meant that she (in this case) would retire 6 years earlier than the statutory retirement age. To make sure that this outlier does not

influence the results, it was excluded from the dataset. Within in the dataset, all observations that indicate a retirement age below their current age are dropped. The total of 6 observations were removed from the dataset. The results without the outliers are visible in table 5.1. As this table shows, the minimum expected retirement age is 50. The maximum expected retirement age is at age 100. Figure 5.1 shows the different average expected retirement ages per birthyear cohort.

Table 5.1: Descriptive Statistics

	N	Minimum	Maximum	Mean	Standard deviation
Expected retirement age	6,465	50	100	65.96	3.55
Statutory retirement age	8,561	65	68.9	67.33	1.15
Age	8,559	45	61	50.89	3.86
Partner	8,559	0	1	0.77	0.42
Gross income (in euro's)	8,559	0	35,000	1988.05	21157.9
Net income (in euro's)	8,555	0	25,000	1788.14	1134.68
Education level (with diploma)	8,559	1	9	3.99	1.38

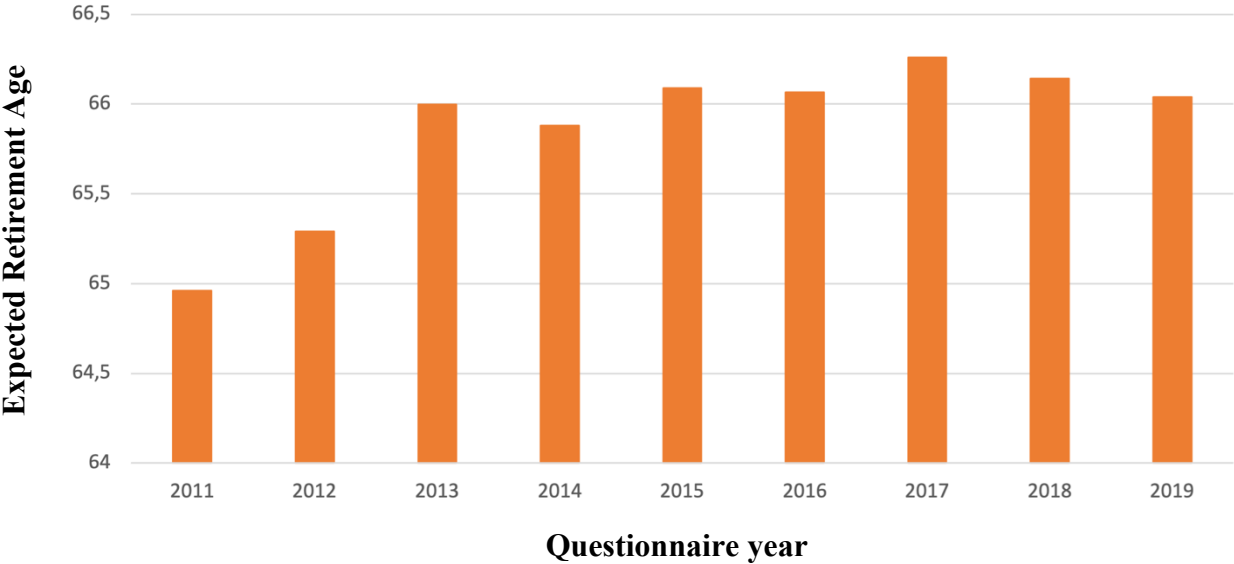**Figure 5.1: Average expected retirement age per birthyear**
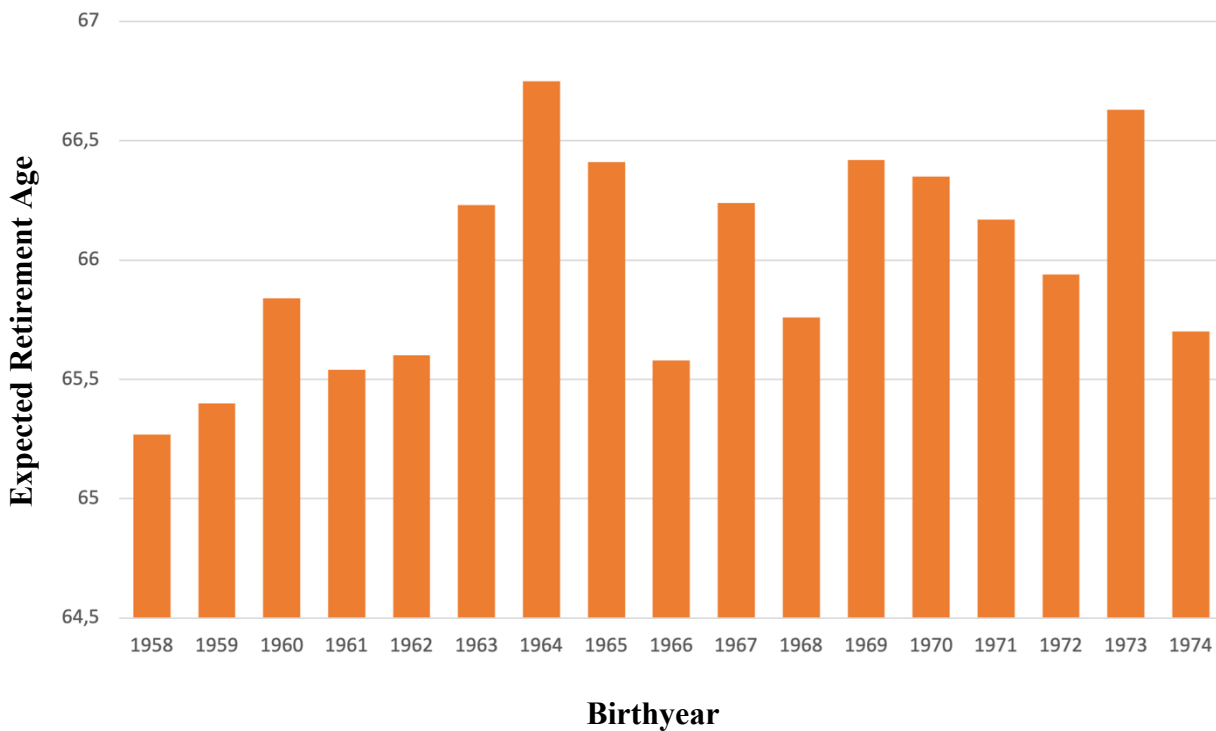
Generally, looking at figure 5.1 a rising trend is visible, although some fluctuations are happening over the years. This rising trend is as expected, since the statutory retirement age is higher for people who are born later. However, noticeable is how this average rising trend is interrupted in birthyear 1966. Finding an explanation for this interruption is not very straightforward. This birthyear is not heavily dependent on outliers, since both 1965 (713 observations) and 1967 (525 observations) have roughly the same number of observations as in 1966 (620 observations). Aside the number of observations, also economic trends do not heavily differ for this group (MacroTrends, n.d.). Further research will be necessary to see why people born in 1966, on average, expect to retire earlier compared to people born before and after them.

Besides the remarkable result in 1966, it is also interesting to look at the difference between 1973 and 1974. The average expected retirement age of people born in 1974 is about 0,75 years lower than for people born in 1973. Again, this result is hard to explain. The only

difference is that for people born in 1973 the statutory retirement age did not change in the reform starting in 2016, where the statutory retirement age for people born in 1974 dropped by 3 months (see table 2.2 and table 2.3).

The average expected retirement age can also be shown in the different questionnaire years (figure 5.2). This figure shows the average expected retirement age without taking the statutory retirement age in mind.

Figure 5.2: Average expected retirement age per questionnaire year

Within figure 5.2 an interesting effect is visible. Looking at the difference in 2012 and 2013, we see a big change. The average expected retirement age increases by a lot. Looking at the difference between 2015 and 2016, when the next reform took place, there is almost no change visible. Looking more closely, the figure even shows a decrease in 2016, but increases in 2017 (where no reforms were introduced). Also comparing 2013 and 2016 does not show a remarkable increase even though the reform came with an increase in the statutory retirement age. In conclusion, interesting is the difference between the reform in 2013 and 2016, in that in

2013 the average expected retirement age increased by a lot, however the reform in 2016 did not lead to a big change.

Looking at table 5.1, it shows that on average, more respondents have a partner (0.77). But because the standard deviation is more than half of the average, this average number is not really reliable. The last result that table 5.1 shows is the variable education level with diploma or certificate. Most respondents in this sample graduated from MBO. This means that on average this sample attended higher education after finishing high school.

5.3 Empirical Strategy

The goal of this study is to identify an effect on the expected retirement age of people between age 45 and age 61 based on the announced policy reform in the statutory retirement age. In the main analysis the following specification is used in the Fixed Effect Regression Model:

$$Y_{it} = \alpha + \beta Z_{it} + \gamma X_{it} + P_i + \varepsilon_{it} \tag{5}$$

In this specification, Y stands for the expected retirement age, given a person i and time t. α is a constant. Z_{it} represents the variable 'statutory retirement age' and β is the effect of changes in the statutory retirement age on the expected retirement age. P_i stands for the person-specific characteristics that are stable over time, such as personality and gender. X_{it} indicates the control variables and ε_{it} is the error term. The control variables consisted of a dummy variable for having a partner (indicated as 1) or not having a partner (indicated as 0), and the variables 'age' (that indicates the age of a respondent in the year of the questionnaire) and 'wave' (that indicates the year of the questionnaire).

6. Results

6.1 Main results

In order to test the hypothesis, different regressions are performed. Table 6.1 presents the regression results, using equation 5, for change in expected retirement age when the statutory retirement age changes. Model 1 shows this regression result for the dataset as a whole.

Table 6.1: Fixed effect regression on expectations

Variable	Model 1 _Fixed effect regression_
Statutory Retirement Age	0.253*** (0.048)
Partner (1 = yes)	-0.655*** (0.263)
Age	0.175 (0.252)
Wave	-0.145 (0.248)
Constant	331.79
R^2	0.0164
Note:	*P < 0.1 **P < 0.05 ***P < 0.01

Looking at model 1, a positive relationship is visible between the statutory retirement age and the expected retirement age. If the statutory retirement age increases by one year, the expected retirement age increases by three months (0.253). This result is statistically significant at the 0.01 percent level, meaning that the result is highly reliable. For policymakers this result is very interesting, since an increase by one year will not, on average, lead to an increase by one year of the expected retirement age. This means that, on average, people will retire later than before the reform but not for all of them this will be at the new statutory retirement age. There are still people who expect to retire earlier and therefore go into the inactive group earlier than desirable by the policymakers.

The variable '*Partner*' also shows a statistically significant result, at a 0.01 percent level. This variable is negatively correlated with the expected retirement age. This means that if you have a partner, your expected retirement age will decrease by almost eight months (-0.655). So having a partner can have a big influence on the retirement age. This reflects what was suggested in the theory section earlier as '*joint retirement desire*'.

Remarkable is the fact that the variable '*age*' is not statically significant. So, your age does not influence your expected retirement age. This is interesting because you can imagine that the older you get the lower your expected retirement age will be since you are closer to the eligible age of retirement. But this result suggests that no matter how far away you are from the eligible age, it will not influence your expected retirement age.

The last result in model 1 is the result of the variable 'wave' (The year of the questionnaire). This variable does not show a significant result meaning that the year of the questionnaire did not influence your expected retirement age. Looking at the difference in economic status of the Netherlands, this can be an unexpected result. The Great Recession that lasted from 2008 till 2013 also hit the Netherlands (CPB, 2014). The unemployment rose rapidly, which led to job insecurity. Theory suggested that people would have acted upon these

changes in expectations, and with insecurity the expected retirement age increased. The result in model 1 would suggest this because the higher the year, the lower the expected retirement age becomes, but since this result is not significant, it can be based on coincidence.

6.2 Additional results

To assess if the effects calculated by model 1 differ for subgroups, we estimate equation 5 separately. These subgroups are; *Men* (model 2), *Women* (model 3), *Low and High Education* (models 4 and 5), and for a *Dutch or a migration background* (models 6 and 7).

6.2.1. Gender

Table 6.2 shows the results for men (model 2) and women (model 3). Both for men and for women there is a positive relationship between the statutory retirement age and the expected retirement age. More interestingly, both subgroups also show almost the same result with the same statistical significance level at 0.01 percent. Men do have a slightly bigger coefficient than women. Where for men the expected retirement age increases by 94 days if the statutory retirement age is increased by one year, for women we see a result of an increase by 88 days. So, the difference between men and women is 6 days. Because of this small difference you can conclude that gender does not have an influence if we look at the effect of an increase in statutory retirement age on the expected retirement age. This increase for both men and women is comparable with the results of the general fixed effect regression (model 1).

Another interesting result is the difference between men and women and the role of the partner. Where changes in the statutory retirement age did not lead to changes between men and women in the expected retirement age, difference in having a partner does result in difference between men and women. Looking at model 2 we do see a positive but really small insignificant result. A positive result means that having a partner will lead to an increase in the

expected retirement age of men. But since it is not statistically significant the result means that it can be both ways. So, the conclusion based on this result is that for men having or not having a partner does not influence the expected retirement age, however for women this result is highly statistically significant at the 0.01 percent level. Moreover, this result is also negative. This means that, for women, having a partner will lead to a decrease of the expected retirement age of 16 months. Having a partner has a greater effect on the expected retirement age than changes in the statutory retirement age for women. A reason for the difference between men and women can be the joint retirement. In the study done by Smith & Moen (1998) it was found that women tend to start retirement more in line with their husbands than the other way around. If women are younger than their spouses, this could explain the negative relationship that is significant for women and the insignificant result for men.

The other variables included in this regression are both for men as well as for women statistically insignificant. This is comparable with the results from model 1, meaning that both the year of the questionnaire and the age of a respondent do not have a significant influence on the expected retirement age.

Table 6.2: Fixed effect regression on expectations for Men and Women

Variable	Model 2 Men	Model 3 Women
Statutory Retirement Age	0.257*** (0.070)	0.241*** (0.062)
Partner (1 = yes)	0.011 (0.405)	-1.341*** (0.032)
Age	0.303 (0.365)	-0.012 (0.332)
Wave	-0.275 (0.361)	0.047 (0.328)
Constant	587.89	-43.60
R^2	0.0123	0.0316
Note:	*P < 0.1 \quad **P < 0.05 \quad ***P < 0.01*	

6.2.2 Education level

As has been discussed in chapter 3, education can also play a role. Therefore, there will be two subgroups in education level. The first group (model 4) consists of people who responded to the question about their education level between 1 and 3, 8 or 9. This means that the highest achieved education for this group is HAVO, VWO and HBS (high school level). This group is called 'Lower Education'. The second group (model 5) consists of people that indicated they graduated from some sort of higher education (answered 4, 5 or 6 in the questionnaire). This means that a respondents' highest education he or she graduated from is MBO, HBO or University. This group is labeled 'Higher Education'. Table 6.3 shows the results.

Variable	Model 4 _Lower education_	Model 5 _Higher education_
Statutory Retirement Age	0.274*** (0.089)	0.244*** (0.057)
Partner (1 = yes)	-1.519*** (0.507)	-0.336 (0.313)
Age	-0.151 (0.472)	0.296 (0.298)
Wave	0.163 (0.467)	-0.261 (0.294)
Constant	-272.41	560.54
R^2	0.0223	0.0194

Note: *P < 0.1   **P < 0.05   ***P < 0.01

Like in model 1, 2 and 3, it appears that in model 4 and model 5 both age and wave are not significant. Even though models 4 and 5 show a contradictory direction, you cannot say something about this result because it can be based on coincidence. Looking at Lower education, we see a positive relationship between the statutory retirement age and the expected retirement age. By increasing the statutory retirement age by one year, the expected retirement age will increase with 100 days, or slightly more than three months (0.274). This result is highly statistically significant at the 0.01 percent level. The same goes for Higher Education. With a statistically significant level of 0.01 percent, the result is reliable. Higher education shows a positive relationship between the statutory retirement age and the expected retirement age. If the statutory retirement age increases by one year, the expected retirement age increases by three months (0.244), almost the same result as for lower education.

With this similar result, a conclusion can be that education level does not generally influence the decision when to retire, because both groups do not differ massively from one another. For the variable *partner* we do see a different result. Where for Higher education, this dummy is not significant, for Lower education this variable is. For people in the group of lower education, having a partner will lead to a decrease of 1,5 years in expected retirement age. With a confidence level of 0.01 percent this result is really reliable. A reason why this result differs can be that lower educated people can rely more on the income of their partner, which makes it possible to retire earlier than people who cannot rely on a partner. Higher educated people tend to rely more on their own income, which can explain why the partner dummy is not significant, and therefore generally not relevant for the retirement decision.

6.2.3 Dutch or Migration Background

The last subgroup that is calculated is the background of respondents. The first group (model 6) consists of respondents that indicate that they have a Dutch background. The second group (model 7) contains all the respondents who answered the question otherwise. People that did not answer the question about their background are not taken into account. Table 6.4 shows the results of the regression of these subgroups.

Looking at model 6, we see two statistically significant results for statutory retirement age and partner. 'Statutory retirement age' shows a positive relationship of 0.264 at a significant level of 0.01 percent. This result indicates that if the statutory retirement age increases by one year, the expected retirement age will increase by about 96 days (or about 3 months). Compared to the main results, this number is somewhat higher. Additionally, compared to the other subgroups calculated in this paper, this result is also slightly higher. When we look at the relationship between statutory retirement age and migration background (model 7), we do not indicate a statistically significant result. Although the direction is still positive, this number is not reliable. A reason why this result can be insignificant is because, as explained in chapter 2,

you have to meet certain demands in order to get a state pension (pillar 1). Especially for people from the first- generation immigrant group it can be possible that they did not meet these criteria and therefore are more dependent on pension received from the second and third pillar than on the first pillar. However, this does not give an explanation for second generation immigrants and is based on speculation. In order to look for an explanation further research is necessary.

Table 6.4: Fixed effect regression on expectations for Dutch and Migration Background

Variable	Model 6 *Dutch background*	Model 7 *Migration background*
Statutory Retirement Age	0.264*** (0.052)	0.169 (0.127)
Partner (1 = yes)	-0.692*** (0.281)	-0.174 (0.867)
Age	0.269 (0.281)	-0.219 (0.583)
Wave	-0.242 (0.277)	0.295 (0.575)
Constant	524.18	-528.85
R^2	0.0169	0.0168
Note:	*P < 0.1 **P < 0.05 ***P < 0.01*	

The variable 'partner' shows a negative relationship between having a partner and the expected retirement age for both model 6 and 7. Having a Dutch background and a partner leads to a decrease in the expected retirement age of more than 8 months, or about 253 days. Compared to the main regression (model 3), this is roughly the same. But having a Dutch

background and a partner does have less effect on the expected retirement age than for example women or people with a lower education level that have a partner, where the effect can be a decrease of more than a year. When a respondent has a non-Dutch background, the result becomes statistically insignificant.

6.3 Interpretation of the results

The results of the fixed effect regression show a positive effect of changes in the statutory retirement age on the expected retirement age for people between 45 and 61. In every model where the fixed effect regression is used roughly the same outcome is presented, this result can be interpreted as robust. Increasing the statutory retirement age will increase the expected retirement age for men, women, people with a Dutch background, lower education levels and higher education levels. Only for people with a different background than Dutch, we cannot say this with certainty. This result is in line with the research done by De Grip, Fouarge and Monitzaan (2013).

Looking at the variable 'partner' we see an overall negative effect on the retirement decision. Having a partner will decrease the expected retirement age. Noticeable is the influence on women (model 3) and lower educated people (model 4), where the decrease is more than a year. The overall result of having a partner on the expected retirement age is in line with the theory discussed in chapter 3 that suggested 'joint retirement'.

When comparing model 4 and 5 - the difference between lower and higher educated people - theory suggested that people with a lower education level do not really change their behavior when reforms are taking place, and that people with a higher educated level are better informed and therefore increase their expected retirement age. Looking at the results we, firstly, do see a significant effect for people with a lower education level, which is against theoretical expectations. Secondly, we see a similar result between lower educated people and higher

educated people. So, the results from model 4 and 5 do not confirm the expectations based on previous theories. A possibility for this outcome is that lower educated people can still have a high financial literacy, and people with a high education level have a low financial literacy. Therefore, only looking at the education level cannot completely suffice for the status of the financial literacy of people. To solve this problem, you can include a question in the monthly/yearly questionnaire to test for the financial literacy of people.

7. Conclusion & Discussion

7.1 Conclusion

Retirement is something we all have to deal with sooner or later. When to retire is dependent on a whole range of factors. This paper has examined the effect of policy changes on individual behavior, focusing in particular on the different reforms in The Netherlands in the last decade, through which the statutory retirement age increased. How do people react to such a policy? And is the policy change effective? In order to measure the impact, the following research question was central in this paper:

> *What is the effect of increases in the statutory retirement age on retirement expectations?*

As a follow-up to the research done by De Grip, Fouarge and Montizaan (2013), this paper used more recent data, a panel dataset and a different empirical approach to examine the effects. By using a fixed effect regression instead of an OLS regression, it was possible to control for personal characteristics that do not change over time. The expectation was to identify a positive effect of the statutory retirement age on the expected retirement age of individuals (Hypothesis H1).

The LISS dataset of Dutch Households between 2011 and 2019, at the start of the first reform, and just before a new reform was introduced, was used. This study found that the effect of changes in statutory retirement age on the expected retirement age is highly statistically significant. In every regression, the effect of the statutory retirement age on the expected retirement age was between 0.241 and 0.274. This means that if the statutory retirement age

increases by one year, the expected retirement age for people between 45 and 61 years old in The Netherlands will increase by around 3 months. Because all the regressions show about the same result, it can be concluded that this result is robust.

Besides the main results, this study also shows some additional results that are worth looking into. For example, the subcategories *lower* and *high education levels* showed a similar result. Based on theory, the expectation was that these categories would highlight some differences between the groups. Because lower educated people would be less informed of policy changes and about the consequences of these policy changes, the results were expected to show a lower or neutral coefficient compared to the regression for 'higher education'. But this study does not confirm that interaction. In fact, lower education showed an even higher coefficient than higher education.

Other interesting results are related to the control variable *partner*. For both subcategories' *women* and *lower education*, having a partner does have a big influence on the retirement decision. Both categories show a coefficient of about 1.5, meaning that having a partner can lead to a decrease of the expected retirement age by 1,5 years. This result is bigger than the effect of the reforms on the expected retirement age.

Overall, the general results of the statutory retirement age on the expected retirement age are in line with the results of the research done by De Grip et al (2013). This means that we can conclude that the effect of an increase in the statutory retirement age on the expected retirement age is an increase of three months in the expected retirement age, meaning that the effect is positive and therefore Hypothesis 1 (H1) can be accepted.

7.2 Limitations

As with many studies, this study does have some limitations regarding the analysis. First of all, the number of observations is quite limited. Although this study has far more observations than

in the study of De Grip et al (2013), 8.000 observations is still a limited number. Especially when looking at the representation of young people, the used database did not provide their answers to the question at which age people expect to retire. Therefore, it was not possible to see behavior changes for people below age 40, who can easily change their behavior in reaction to policy reforms. To improve this limitation, it is possible to make this question mandatory in the questionnaire in order to collect more answers from young people, or to include more observations from other databases or countries.

A second limitation of this study is regarding to the variable *migration background*. Due to the lack of specificity on differences in background, it was not possible to split the migration background into their own different categories. Since there can be big differences between first- and second-generation migration and between western and non-western migration, it would be interesting to analyze these potential differences. In the database, however, the number of people with a background other than Dutch were underrepresented. This can be an explanation as to why the coefficient of the effect of the statutory retirement age on the expected retirement age of people with a migration background was not significant. To improve this, more people with a migration background have to be included into the database.

A last limitation worth mentioning is the fact that current expectations will not always lead to the final behavior regarding to the retirement decision. Although expectations are a pretty good predictor, it can be that behavior eventually is different. Looking at the specific timeline of this study, however, it's difficult to accommodate this specific limitation.

7.3 Recommendations

7.3.1 Future research

Although this study did have some limitations, the analysis provides a good base for future research. Especially the results of the variable *partner* led to some questions that are outside the scope of this study. Therefore, a first recommendation for future research is to explore why the variable 'partner' has such a significantly large effect for women and people with a lower education level. Why does having a partner influence these groups so much, but not for men and people with a higher education level. Is it because people in these groups are more dependent on their spouses or is there a missing variable that could explain this relationship?

A second recommendation for future research is to explore if people do really change their behavior as their expectation would predict, or if in the end people tend to stop working at the new statutory retirement age even though their expectation was that they would go on early retirement. In order to research this, it is necessary to look back at these reforms in about ten to twenty years or to look at reforms done in the past and see if expectations and behavior are similar.

The last recommendation for future research is to include more data from different countries to see if these trends are country specific or a more general trend in for example Europe. Also, it would be possible to compare different countries and different pension systems. In this way, it might be possible to see if a different pension system has similar or different effects on the expectations of people regarding their expected retirement age.

7.3.2. Policy recommendations

Based on the results of this paper, policy makers can use this input to improve policy in a number of ways. Currently in the Netherlands, the social partners and the Dutch Cabinet are (yet) again discussing the latest policy reforms. The results of this study can show that

increasing the statutory retirement age does have some effect on the expected retirement age and therefore on the group of 'active' people. But as the results show, it is not the case that if you increase the statutory retirement age by one year, the expected retirement age will also increase by one year; instead of this it is only an increase of three months. Policy makers therefore have to weigh the advantages and disadvantages of this result.

Increasing the statutory retirement age leads to a lot of resistance in society. Since politicians do have to deal with elections each four years, it is up to the voters if they will understand that increasing the statutory retirement age is necessary to increase the financial sustainability of a country or not. This is not a scientific choice, but a political one.

A second and last policy recommendation is to see if other policy measurements can increase the willingness to work longer (even without increasing the statutory retirement age). This, or together with an increase of the statutory retirement age, could achieve a more effective result. In this study, having a partner is a more dominant factor for the expected retirement age than an increased statutory retirement age. If the reason for this becomes clearer, policy makers can focus on this aspect in order to increase the expected retirement age. This would mean that the 'active' group will become bigger, the old-age dependency ratio will become smaller, and therefore the financial sustainability will be increased.

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