

# The retrenchment of early retirement VUT

An aim to dispose an unaffordable policy as well as to prolong the labour participation



## Abstract:

Early retirement policies are on a return and are being replaced by measures encouraging older workers to remain in the work force for a longer period of time. A retrenchment of pension rights commenced in 2006, where people born before 1949 remained entitled to tax benefits, while their slightly younger counterparts were not. This paper analyses the effects of this policy measurement by means of a difference-in-difference analyses. A longitudinal panel data spanning 8 years was used to test for this. This is a unique study in this field and consequently provides new and interesting insights. It is however debatable if the aim from the government, namely prolonging the labour participation was eventually reached.

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## 1 Introduction

This paper analyses the effects of the cancellation of the financial benefits that came along with the early retirement arrangement VUT. A policy reform was implemented in the Netherlands, where a distinction was made between two types of workers. The policy change included a decrease in pension benefits for all employees who were born in 1950 or later, but not for their older counterparts. The first group will be indicated as the treatment group, while the not affected ones will be specified as the control group. However, the commencing date of the policy was unexpected and consequently, it will be viewed as an exogenous shock. This provides great opportunity to test the behaviour of both groups in the pre and post treatment situation.

This paper will indicate certain imperfections of the early retirement arrangement and the reasoning for its retrenchment. However, simply cancelling one procedure can lead to external effects such as an increase in other collective arrangements. Also, anticipated and actual effects can differ and as a result, this study is needed to test for this. Heterogeneous effects will be included as well to detect underlying effects.

Hardly any research has been performed, which makes it a very interesting but challenging study. This paper is comparable to the study done by Montizaan & Vendrik (2010), who investigate the impact of the same policy change on the individual well-being of male workers nearing retirement age, who are born in 1949 or 1950. Their main finding is a strongly negative ex-ante effect on individual well-being when workers have to adapt their expectations about retirement due to an exogenous shock in the pension system.

They use a similar approach as this paper, where a control group is compared to a treatment group. However, this study incorporates all kind of workers, including females. In addition, a longitudinal panel data spanning 8 years was used to test the different outcome variables. In 2005 the VUT policy was still intact and consequently, this is viewed as the pre-treatment situation. In 2006 the policy came into force and is therefore the first post-treatment situation. In order to observe time trends other post-treatments years will be tested as well, namely 2008, 2010 and 2012. This method is a difference-in-difference approach and tests for expected effects.

First, it is expected that the treatment group will be more likely to take up other collective measurements after the policy reform. This includes the disability (WAO) and unemployment (WW) arrangements. This study indicates that the treatment group is indeed more likely to take up these other arrangements after the policy reform. However, a distinction in behaviour is present for gender and education.

Second, one goal of the policy implication is to prolong the labour participation of elderly workers. If succeeded, the expected retirement age should increase for this group. The results suggest however that the opposite is true: the treatment group expects to retire at an earlier age after the new policy measurement. An explanation could be the flexibility of the new reform relative to the VUT policy, which enables more people to utilize and accustom it to their needs.

Third, how will this policy measurement affect the subjective well-being? Initially, happiness is not affected by the policy while a small negative effect can be observed for later years. Surprisingly, people who live alone are found to be happier after the policy reform, while individuals who live together with a spouse are less happy.

Some of these effects can be depicted as negative spill over effect, which is undesirable because an unaffordable policy such as the VUT is then simply averted upon others. This paper will for example find that the period of sickness will be much longer for women from the treatment group. An employer is then the one who has increased costs. It is therefore necessary to test if spill over effects arise, and if so, who are affected.

The remainder of this paper is structured as follows. Chapter 2 presents a brief discussion of the mechanism of the Dutch pension system and the early retirement arrangement VUT. Chapter 3 provides a framework for the expected treatment effects. Chapter 4 develops a simple model to interpret the results while Chapter 5 illustrates the descriptive statistics and the results of the logistic regression. Finally, Chapter 6 concludes on the findings and sets out recommendations for future research.

## 2 Dutch pension system

This chapter explains in what manner retirement in the Netherlands is regulated and how the early retirement arrangement VUT came about. Contributions to early retirement schemes were tax deductible, which boosted their financial attractiveness. However, it became unsustainable to retain these schemes and as a result, a legislative change was made in 2006. This exogenous decrease in pension benefits affected all employees born in 1950 or later, but not their older counterparts. This policy measurement will be the focus of this study.

### 2.1 Three pillar system

The Dutch state pension is based on a defined benefit –DB– system, founded on solidarity and collectiveness. The total pension system has three pillars: (1) a base pension named AOW<sup>1</sup>, (2) complementary pensions through employment and (3) supplementary pensions through insurances. Both the second and third pillar is privately-owned with a funded system. Table 1 in the Appendix provides an overview of this system.

The first pillar AOW is a basis income for all individuals who have reached the legal retirement age. This is constructed pay as you go –PAYGO–: the current pension payments are paid by the present premium revenues. Irrespective of one's nationality, each person that lives or works in the Netherlands is automatically insured for the AOW. For every year insured a 2 per cent AOW pension is build up (Sociale Verzekeringsbank). Consequently, everyone that lived between the ages of 15 and 65 years in the Netherlands will be given a full AOW pension when going with retirement.

The second pillar is a privately-owned labour restrained collective arrangement. Around 90 per cent of employers have a complementary pension composition and by doing so an additional payment can be given to the employee after retirement. Usually, the premiums are paid two third by the employer and the rest by the employee (Rijksoverheid 1). Graph 2 in the Appendix indicates that the size of the Dutch second pillar is fairly unique; in most of the surrounding nations is the importance of the first pillar, the state pension, much greater than the other pillars (European Insurance and Reinsurance Federation, 2007; Beltzer & Biezeveld, 2004). Apparently, this has been an advantage as the Dutch pension system was rated second best in the world by consultancy company Mercer in 2012.

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<sup>1</sup> Algemene Ouderdomswet / General Elderly Law (AOW)

The third pillar is a privately-owned individual arrangement based on a defined contribution –DC– system. All participants build up claims on basis of deposited pension and/or insurance premiums (De Nederlandse Bank, 2009), which means that one saves for themselves instead of paying for the people that are currently retired. A reason to participate is that people want to save extra for their pensions. Also, self-employed people usually do not have an arrangement through their employer and are now able to complement their pension through this pillar. The second and third pillar can be provided by more than just one financial institution.

## 2.2 Exiting the labour market

Workers can leave the labour market in different ways: at the official retirement age or by using collective arrangements. AOW is provided once the official retirement age is reached, while other arrangements such as early retirement –VUT<sup>2</sup>–, disability –WAO<sup>3</sup>– or unemployment –WW<sup>4</sup>– (Groot & Heyma, 2004) can be claimed earlier. Table 3 indicates that the take up rate for WAO is 3 to 4 times higher than for WW.

*Table 3 Social security payments at 31 December*

	2001	2005	2007
WW	189,000	192,000	171,000
WAO	772,000	599,000	561,000
Ratio	4.1	3.1	3.3

*Source:* Centraal Bureau voor de Statistiek (2009)

The labour force does not solely exist out of working and unemployed people. This can be observed in Table 4 as the percentages do not add up to 100 per cent. The unemployed are expected to use the WW arrangement, while the remaining group people are likely to use VUT or WAO. This is probably especially true for the cohort ‘55-65 years’ whose percentage ‘working’ is almost half of the younger cohort, while the unemployment rate only differs 1 percentage. Further, a difference for gender is present. Males work much more often than females, which is fairly stable over time. On the other hand, unemployment is much higher for women than for men, which suggests that they use the WW scheme more often than their

<sup>2</sup> Vervroegde Uittreding / Early retirement (VUT)

<sup>3</sup> Wet Arbeidsongeschiktheidsverzekering / Law Labour Disability Insurance (WAO)

<sup>4</sup> Werkloosheidsuitkering / Unemployment welfare (WW)

male counterparts. If the VUT option drops out, what will the effect be on these other measurements?

*Table 4 Labour force in percentage of population*

	2001		2005		2007		2008	
	Working	Unemployed	Working	Unemployed	Working	Unemployed	Working	Unemployed
Total	67.3	3.5	67.7	6.5	69.4	4.5	70.3	3.9
Male	78.8	2.5	77.6	5.6	77.9	3.6	78.5	3.3
Female	55.5	4.8	57.5	7.8	60.7	5.8	62.0	4.8
45-55 years	72.7	3.0	77.2	5.1	79.6	3.9	80.5	3.2
55-65 years	34.5	2.3	40.7	6.0	45.1	5.4	47.0	4.6

Source: Centraal Bureau voor de Statistiek (2009)

### 2.3 Early retirement (VUT)

The early retirement arrangement in the Netherlands is called VUT. The origin is described in Van Ewijk & Slokker (2008). The Netherlands was facing high unemployment in the 1970's as many young workers were entering the labour market while on the other hand companies were diminishing their labour staff. An initial plan was introduced with the slogan 'Young for Old' by NKV<sup>5</sup> board member Toon Riemen in 1975 to fight this unemployment. The thesis was that for every elderly employee who retired early a new young person could be hired. Initially, this policy was meant only for tiresome professions such as the construction segment.

In 1976 the first VUT policy was implemented in the construction and education segment. It was planned to last only one CAO<sup>6</sup> period and offered 63 and 64 year olds the opportunity to retire 1 to 2 years early. In 1977 this was expanded to others segments, which resulted in the VUT policy becoming more commonly accepted and more generous. The VUT is regulated within a CAO and as a result, many different conditions can exist. This study will assume for simplicity that using the VUT means retiring earlier than the official age of 65 years by using the tax benefits that came along with it.

Like the AOW is the VUT a pay as you go system; the working generation pays for the older generation to retire early. There exists no relation between the paid premiums and the future

<sup>5</sup> Nederlands Katholiek Vakverbond/ Dutch Catholic Union (NKV)

<sup>6</sup> Collectieve Arbeids Overeenkomst/ Collective Employment Agreement (CAO)



collection returns. If an employee decides to continue to work he or she will lose their rights to VUT profits over those years. The benefit of an additional year of working is only the difference between the salary and the VUT income. A VUT receiving is usually around 80 per cent of the last gross earned salary, which equals to roughly the same net income<sup>7</sup>. Working after one is allowed to go with the VUT would essentially mean that one works for free. It is therefore not surprising that Lindeboom (1996) found that about 81 per cent of employees will stop working as soon as they have the right to go with the VUT. However, retiring early through the VUT is only an option when the employee has worked as least 10 years in the same company or branch. The years during early retirement can be counted as fictive serving years on behalf of the basis pension AOW.

A benefit from this early retirement arrangement from the worker's perspective was that if they found themselves in a vulnerable position, retiring through the VUT was considered a less painful way to leave the workforce than to be laid off (Remery, Henkens, Schippers, & EHKamper, 2003). Also, multiple studies show that older workers are perceived as less competent and less motivated than their younger colleagues (Chiu, Chan, Snape, & Redman, 2001; Hummert, 1999) which could create an unpleasant work environment. As a result, the VUT could act as a simple solution to exit the labour market. From the employer's perspective the VUT was also considered a convenient measurement. Now, it was fairly easy to avert elderly employees on collective measures (Van Geuns, Mallee, & Wessel, 2004) instead of keeping them employed.

Retiring early through the VUT was thus beneficial for both worker and employer. However, why would the younger generation be willing to pay for this arrangement? As previously stated, it was expected that new jobs would become available after older workers would have left the labour market through early retirement. This job opportunity was supposed to benefit mostly the youngest, but also to some extent the middle age generation. Moreover, they now themselves could possibly retire earlier than the official retirement age. This phenomenon is known as a net profit curve of the VUT and is illustrated in Graph 5 in the Appendix.

#### 2.4 Cancellation VUT

Before introducing the VUT on a national level a commission was formed to evaluate the plan. A study done by Huizinga (1977) quoted in Van Ewijk & Slokker (2008) stated that the benefits did not outweigh the negatives and therefore implementing the VUT was not

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<sup>7</sup> Retired people do not have to pay employee premiums anymore

recommended. Apparently, this advice was disregarded and the VUT was implemented by many firms across all sectors.

A first flaw was presented itself rather quickly: the vacancies were barely filled by young employees. A study done in 1986 quoted in Beltzer & Biezeveld (2004) found that none of the 130 interrogated companies aimed at reoccupying the functions that became available due to early retirement exits. Further, as explained previously, pay as you go systems such as AOW and VUT are nowadays unaffordable and therefore policy adjustments had to be made.

Policymakers agree that an increase in overall labour participation will be an important remedy for obsolescence (Beltzer & Biezeveld, 2004). Therefore, people need to be stimulated to work more often and/or for longer periods of time to counteract this issue. It was assumed that withdrawing the financial benefits of the VUT would stimulate people to work for a longer period of time. According to Lindeboom (1996) this assumption is however not accurate: if the VUT was made less appealing, merely other possibilities would be explored more. Changes in one benefit program can cause people to exit the labour market through other schemes, which is known as spill-over effect (Gautier & van der Klaauw, 2012).

People agreed that adjustments had to be made and as a result, the VUT was phased out. The first step was to interchange the VUT with another policy measurement: prepension. Now the financing was no longer done pay as you go but with capital coverage and the effective date was far more flexible<sup>8</sup>. However, some firms still provided VUT while others switched totally to pre pensions. For convenience, this paper will assume VUT and pre pensions as being the same procedure for early retirement.

The second step was announced in 2000 by the Balkenende I administration. They announced that as of 2022 all fiscal opportunities of the VUT would disappear as well as eliminating all pay as you go elements of pre pensions. However, by the time of the next cabinet, Balkenende II, several proposals were made to speed up this cancellation (Beltzer & Biezeveld, 2004). This decision that accelerated the retrenchment of favourable tax treatment of the early retirement scheme VUT was unexpected (Montizaan & Vendrik, 2010) and infuriated many people. On October 2, 2004 the largest union demonstration in Dutch history took place where 300,000 people protested against this policy reform (Tweede Kamer). Some

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<sup>8</sup> It could also be used to take a sabbatical or other leave from work earlier in life.

adjustments were made and on November 25, 2004 the bill VPL<sup>9</sup> was accepted by the Second Chamber, which introduced the ‘Levensloop’ arrangement (Schouten, 2005). Here, employees as well as entrepreneurs could save partially one’s gross salary for unpaid leave (Rijksoverheid 2), which could later be used to retire early if needed. When the policy reform is mentioned, this indicates the Levensloop arrangement.

However, the bill included two infuriating aspects. The first was that per January 1, 2006 all financial advantages of the VUT policy were annulled. As a result, using the VUT was now no longer equivalent to one’s net income and therefore financially unattractive. Consequently, elderly workers were expected to participate in the workforce for a longer period of time (Van Geuns, Mallee, & Wessel, 2004). The difference between the commencement in 2006 instead of 2022 can be noted as significant. As a result, this policy measurement can be indicated as an exogenous shock.

Another surprise was the strong distinction between workers. If the VUT or prepension was used before January 1, 2006 that person would still be eligible to enjoy the old tax treatment. People, who were 55 years or older before January 1, 2005 (Rijksoverheid 3) or thus born before 1950, could also still make use of the old system. If these requirements were not met the new bill was applicable.

A result of the legislative decision was that 2 different groups were created. The first group was born before 1950 and could still enjoy the VUT tax benefits and is considered as the control group. The second group is born in 1950 or later and could no longer enjoy the favourable tax treatment for early retirement, which makes them the treatment group. Moreover, this last group had little to no time to adjust as the commencement was pulled forward 16 years. This study’s hypothesis is therefore that the treatment relative to the control group was worse off after the policy implication.

## 2.5 Related research

To the author’s knowledge only a few studies are present about the retrenchment of early retirement tax benefits in the Netherlands. The most closely related study is performed by Montizaan & Vendrik (2010) who use a panel survey from the largest public-sector pension fund ABP and match that to administrative data. The results provide strong evidence that

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<sup>9</sup> Wet voor aanpassing fiscal behandeling VUT & prepension / Law for adjusting fiscal policy VUT & prepension (VPL)

shocks in pension systems have substantial ex ante effects on individual well-being. Even though dissimilarities are present with respect to their dataset and this study, it provides a good framework to build upon.

The first difference is the type of respondents. Montizaan & Vendrik (2010) investigate male full-time public-sector workers who were born in 1949 or 1950. Also, the effect of the treatment on their partners is included to explore how this affects the well-being. To overcome this indirect approach I chose to include both male and female workers in the sample. The VUT was not accessible to all workers due to certain constraints, which harmed mostly women. Consequently, including women will provide a different perspective of the policy change. Further, the workers are from different types of industries and do not necessarily work full-time.

However, focusing on solely public-sector workers can provide a good perspective as well. The national government is both the initiator of the pension reform as well as the employer of these workers. It could be that they are perceived as directly responsible for deteriorating the pensions. As a result, public-sector employees' behaviour might differ from those working in the private-sector.

The second variance is the time period. Their survey data is available for three years but only the data of the second and third wave is used, which were held in March 2008 and 2009. My data is available for a longer time period 2005-2012, with includes observations of the pre-treatment condition as well. Consequently, a difference-in-difference approach can be taken, which eliminates time and group effects.

Further, it is assumed that the decrease in pension rights increases the expected retirement age. Montizaan & Vendrik (2010) gathered detailed information on retirement expectations in order to assess whether employees in the public sector are indeed aware of the shock in their pension rights and whether their retirement expectations in general are reliable. They find that on average employees are aware of the consequences of the new pension system. My study finds however that the treatment group expects to have a lower retirement age after the policy change, which could indicate that my sample is less aware of the consequences of the policy reform.

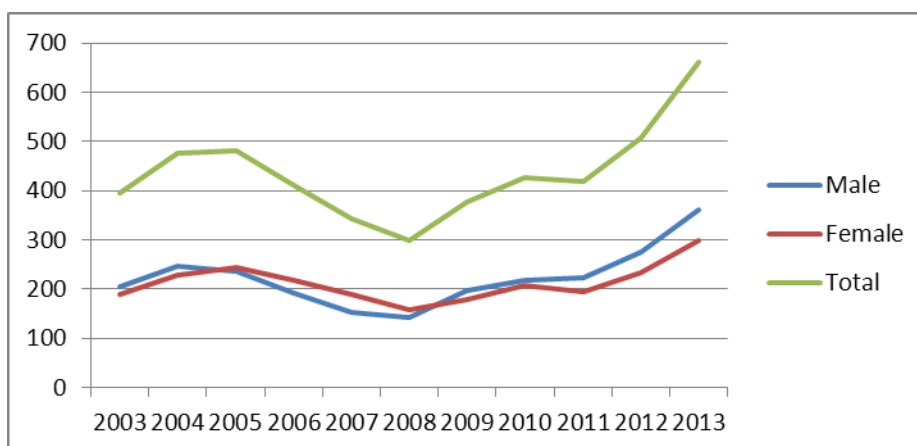
## 2.6 Other adjustments related to retirement

The average life span of Dutch people belongs in the top-20 in the world and this life expectancy is still increasing. Life expectancy at birth is described by the Worldbank as “the number of years a new born infant would live if prevailing patterns of mortality at the time of its birth were to stay the same throughout its life”. From Centraal Bureau voor de Statistiek 1 it can be inferred that the total life expectancy increased by 2.71 years in only a decade. Further, it indicates that women live longer than men, but this difference is becoming smaller.

On the other side, fewer people are born in the Netherlands (Eurostat). The Dutch birth rates are decreasing with 13 per cent while the European average is increasing with 2 per cent per decade. An increase in life expectancy combined with a decrease in births causes a grey pressure<sup>10</sup>, which is also known as obsolescence. As a result, there will be less working people to pay for the inactive retired people, causing a strain on pay as you go payments such as the AOW and VUT.

Recently, unemployment has become a problem as well. Graph 6 shows a rise in unemployment after 2008, which is mainly due to the current economic crisis. In numbers, this is equal to a yearly increase of 17.7 per cent over the period 2009-2013 (Centraal Bureau voor de Statistiek 2). In contrast, in the period 2003-2008 the unemployment rate decreased on average 4.5 per cent a year. Unemployment is undesirable since during that time period no premiums for retirement are paid, while the expenditures remain the same.

*Graph 6 Unemployment in the Netherlands (x1000)*



Source: Centraal Bureau voor de Statistiek 2

<sup>10</sup> Number of people older than 65 years divided by the number of people aged 20-64.

All these factors combined increase the pressure on the financial sustainability of retirement. Increasing the labour force as well as employment of older workers could alleviate this burden by increasing the output, while at the same time higher tax revenue is generated to finance it (Duval, 2003). A measure to do so is to increase the retirement age. In the Netherlands, the legal retirement age –AOW– was set at 65 years until 2012 but will gradually increase to 66 years in 2018 and 67 years by 2021 (Rijksoverheid 4). This will however not affect this paper’s research.

### 3 Potential effects of policy reform

This chapter discusses the expected effects of the retrenchment of VUT benefits on the treatment group. Possible spill over effects could arise to other collective arrangements. Further, heterogenous effects are considered as well, which includes gender, education and household composition.

#### 3.1 Expected effects

The main objective of social policy is to promote the well-being of the population as a whole. Policy makers should therefore also take the negative side effects of the revisions in their pension system into account (Montizaan & Vendrik, 2010). Below, it will be discussed which possible effects could arise due to the policy reform.

##### 3.1.1 Unemployment (WW) and disability (WAO) arrangements

As mentioned in the previous chapter, both employer and employee had incentives to use the early retirement scheme. However, when the tax benefits of the VUT were no longer available, it is possible that an older worker with a desire to exit the labour market will now consider exiting the labour force through another arrangement such as unemployment or disability benefits (Skugor, Muffels & Wilthagen, 2012). On the other hand, how likely is it that a person can influence this decision?

If unemployed, it is more difficult for older than for younger workers to find a new occupation. Younger people are perceived as having a higher adaptability, trainability and number of potential working years (Taylor & Walker, 1998). It is unlikely that an employer perceives a person born in 1949 much older than someone born in 1950 and therefore, both groups face difficulty with finding new employment.

It is plausible to assume that employers have the interest of the employees at heart. When discharging is in order, they will try to find the best solution possible. Before the policy reform both control and treatment workers could use the VUT arrangement to exit the labour market. However, after the alteration this is no longer possible for the treatment group and consequently they need to find an alternative such as the WW. Thus, the treatment group is more at risk to take up an unemployment benefit after the policy implication relative to the control group.

Another (early) retirement decision is dependent on health. Health variation exists at all ages but for middle aged workers it is likely to create a mismatch between an individual's capabilities and the requirements of a job (Bound, Schoenbaum, Stinebrickner, & Waidmann, 1999). As a result, prolonging the labour participation might be constraining to one's health and consequently deteriorating it. This is confirmed in Desmette & Gaillard (2008) who find that "retirement has consistently been shown to be more likely when the older worker is in poor health". This is especially true for labour intensive professions, for example craft and construction workers, where both the wish as well as the capability to continue to work in this present profession until the retirement age is below the national average (Ybema, Geuskens, & Oude Hengel, 2009). The new policy is aimed at prolonging the working period while this might not be optional for all workers. Now, individuals from the treatment group who face bad health will be pushed out the labour market into a disability arrangement such as WAO.

On the other hand, many people do not use any collective arrangements and have no intention to leave the labour market through one. How does this extended working period affect them? One could argue that the treatment's health deteriorates after the policy measurement as they have to work for a longer period.

Moreover, typically, one is not granted a disability arrangement instantly. First, one needs to be sick a certain period of time before being granted a WAO payment (Blekesaune & Solem, 2005). It might be the case that one is sick more often or for a longer period of time, but that the requirements to be granted a collective arrangement are not met. If true, the WW and WAO plans are not utilized but a spill over effect is still present. Therefore, the cancellation of the VUT benefits can be manifested in an increase in sick days or its duration for the treatment group. Not only does this hinder the labour participation, it also averts the costs onto the employer.

### 3.1.2 Retirement age

One goal of the policy implication was to prolong the labour participation of elderly workers. Ybema, Geuskens, & Oude Hengel (2009) find that in the ex-ante period 2005 only 21 per cent of Dutch servants wanted to continue to work, whereas in the ex-post period 2008 this increased to 36 per cent. Also, personnel that was actually able to work longer rose from 41 per cent to 50 per cent in that same time period. This suggests that the aim of prolonging the labour participation was indeed reached. Accordingly, an increase in labour participation would indicate a higher expected retirement age.



Are wealthier people affected less by the policy measurement? Lumsdaine & Mitchell (1999) conclude on basis of empirical literature that an increase of 10 per cent in the present value of total retirement income<sup>11</sup> induces earlier retirement by only about 1 to 2 months. Mooij, Bosch, Jongen, & Vuuren (2007) follow this analysis by stating that the reverse must then also be true: cancellation of the VUT will force elderly employees to work 1 to 2 months longer. Wealth is thus negatively related with retirement age, but only to a small extend.

Will life run its course or do people adjust their behaviour in order to correct for the reform? Both early and normal retirement had been stable over a long period. One can argue that prior to the policy change many individuals believed that they would not need to change their behaviour if pensions are sobered. However, when this radical measurement was introduced it becomes more likely that adjustment is needed after all. This would then indicate that the treatment group is expected to adjust their behaviour more after the policy reform compared to the control group.

### 3.1.3 Happiness

Again, the policy's aim is to extend the working period for older workforces. However, quantity is nothing without quality and therefore quality should be taken into account as well. Well-being is an important determinant of workplace performance and individual productivity (M. Jones, R. Jones, Latreille & Sloane, 2008) and consequently affects the quality of the labour supply. This paper uses well-being and happiness as interchangeable.

The retrenchment of the early retirement rights was viewed by many as unfair since it was considered a right instead of a privilege (Schouten, 2005). Does this then affect the treatment group's well-being? If so, is this a temporary or permanent shock? Montizaan & Vendrik (2010) found that the reform reduces life satisfaction by approximately -0.136. Another study confirms this finding by showing that the unexpected drop in pension rights increases the likelihood of becoming depressed (De Grip, Lindeboom & Montizaan, 2012). These findings corroborate the hypothesis that the policy reform negatively affects the treatment's well-being.

This study uses happiness as proxy for well-being and is therefore discussed a bit more extensively. Happiness is relative and has a genetically reference point. Very stable personality traits such as neuroticism, extraversion and openness to new experiences

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<sup>11</sup> At age 60

predispose people to experience moderately stable subjective well-being (Headey & Wearing, 1989). In Brickman, Coates, & Janoff-Bulman (1978) a major favourable event<sup>12</sup> is compared to a major adverse incident<sup>13</sup>. Little effect on subjective well-being was found, which suggests that adaptation is rapid and complete and thus extreme events have no detectable impact. Nevertheless, Oswald & Powdthavee (2008) argue that hedonic adaptation is forgotten here: people bounce back from utility shocks. By means of a longitudinal dataset it is found that the average life satisfaction drops after the onset of a moderate disability but fully recovers to the pre-disability level after 2 years. As a result, the before mentioned hypothesis needs to be adjusted to: it is expected that happiness will drop after the commencement of the policy for the treatment group, but will bounce back a few years later.

## 3.2 Heterogeneous effects

It is plausible to assume that an overall effect is affected by variability. Characteristics such as gender can provide a different response for men than for women. As mentioned earlier, labour participation differs for men and women, which could lead to different behaviour. Similar distinctions can be expected for education and people who live together with a spouse. These expected heterogeneous effects will be discussed below.

### 3.2.1 Gender

It is likely to find gender differences in retirement patterns as women often have a less secure place in the labour market than men. Individuals who did not work continuously were not eligible for the VUT arrangement but are entitled to the new pensions rules. This could result in an improvement for those workers. As men are more likely than women to work continuously, it can be expected that they will be affected negatively by the policy reform while women might benefit from it.

For instance, it follows from section 2.2 that the labour participation is much higher for male than for female, while the opposite is true for unemployment. In the ex-ante situation, women are more likely than men to use the WW arrangement, as they are more often unemployed. The new policy is more flexible and easier accessible which will provide a new opportunity for women to exit the labour force instead of using WW. On the other hand, men are now no longer able to exit the labour force through the VUT and could instead substitute this with

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<sup>12</sup> Winning a state lottery

<sup>13</sup> Becoming paralyzed through an accident

unemployment benefits. Hence it is expected that men are more likely to take up WW after the policy alteration, while women are less likely to take it up.

Women are likely to become older than men and consequently will face other health problems. Older men are likely to suffer from heart and lung conditions, whereas older women suffer more often from other conditions, both somatic and mental, as well as morbidity and disability (Deeg, Portrait, & Lindeboom, 2002). Or as Arber & Ginn (1993) put it “women have lower mortality but a higher prevalence of non-fatal illness than men”. As a result, women have a higher risk of becoming incapacitated from work (Steenbeek & van der Lecq, 2007) and are therefore expected to take up the WAO arrangement more than men. Again, the new policy enables women to use this arrangement instead of the WAO, while men are likely to interchange the VUT for the WAO. As a result, it is expected that men are more likely to take up WAO after the policy alteration, while women are less likely to take it up since they can use the Levensloop arrangement.

For people who do not use any collective arrangement it might be the case that their health diminishes after the policy alteration. Men suffer from heart and lung conditions, which can be argued as being independent of working conditions. Women however, suffer from many conditions such as stress, which could be amplified by an extended working period. This proposes that women’s health is more likely than male’s to deteriorate after the policy alteration. If this is true, then it is likely that women are also more often absent from work due to sickness relative to their male counterparts. Also, the period of absentness would be higher for women than for men.

A gender difference exists for financial literacy. This term is described by the OECD as “the knowledge and understanding of financial concepts, and the skills, motivation and confidence to apply such knowledge and understanding in order to make effective decisions across a range of financial contexts, to improve the financial well-being of individuals and society, and to enable participation in economic life”. Lusardi & Mitchell (2008) found that women are less financial literate than men and consequently are less likely to plan for retirement. Being financial literate will be helpful after the policy measurement as one understands the new situation better. It can therefore be assumed that men adjust their behaviour more after the policy compared to women, as they understand better what is needed.

If it is true that men are negatively affected by the retrenchment of early retirement tax benefits, while new opportunities are created for women, it could follow that their happiness is affected accordingly. Treated men are then less happy while their female counterparts are happier after the policy implication.

### 3.2.2 Education

The Dutch schooling system knows many different levels. This study focuses on 3 types of education: low<sup>14</sup>, middle<sup>15</sup> and high<sup>16</sup> education. In section 8.3 in the Appendix a clear overview of this educational system is provided. In Mooij, Bosch, Jongen, & Vuuren (2007) it is established that education is positively related to labour participation. People with higher education are thus more likely to be employed. Moreover, Saez (2002) finds relative high labour participation elasticity for the bottom of the labour force since those people have to choose between being employed and not working at all. This proposes that people with the lowest level of education are expected to take up the unemployment arrangement WW more often than higher educated people. If lower educated people are often in and out of jobs a consequence will then be that they will not be eligible for the VUT arrangement. As a result, the cancellation will not affect them negatively while the new regulation better suits their needs. This would decrease their need of an unemployment plan. Hence lower educated people are expected to take up the WW arrangement less often after the policy implication.

Education is negatively associated with early retirement. Higher educated workers retire at a later age than lower educated workers because they face a smaller risk of developing health problems (Blekesaune & Solem, 2005) which would force them to exit the labour market. When the labour period is extended it is likely that ‘low’ educated individuals take up a disability arrangement as their health will not allow continuing working. In contrast, ‘middle’ and ‘high’ encounter a smaller risk of health problems and can therefore cope with retiring at a later age. As a result, the WAO take up rate for ‘low’ education will for increase after the policy reform.

Moreover, Cutler & Lleras-Muney (2006) suggest that increasing levels of education lead to different thinking and decision-making patterns. Those who understand economic concepts well are more likely to have planned for retirement (Lusardi & Mitchell, 2007). Another paper by Lusardi (2008) establishes that financial literacy rises steeply with education and

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<sup>14</sup> Only basic education ≈ elementary school and lowest levels of secondary school

<sup>15</sup> Secondary school: HAVO, VWO, MBO

<sup>16</sup> Higher education: HBO and academics

thus can it be deduced that education is negatively related to retirement age. The generous tax benefits of early retirement need some financial literacy to be used optimally. It is assumed that persons with ‘high’ education were likely to have figured this out the best. Consequently, it can be assumed that the expected retirement age of ‘high’ educated individuals is lower than for ‘low’ education. If these benefits are no longer available, it follows that this affects the group that benefitted the most: ‘high’ education. The expected retirement age of treated ‘high’ education workers will thus increase after the policy measurement.

Understanding financial situations will be helpful in assessing the consequences of this policy measurement. As education is positively related to financial literacy, it follows that ‘low’ educated individuals will have a low understanding of the possible outcomes after 2005, while ‘high’ has a good understanding. Similar to gender, better understanding leads to adjusting one’s behaviour more. Accordingly, treated ‘high’ educated workers will adjust their behaviour more often after the policy measurement while their ‘low’ counterparts adjust less. For ‘middle’ education it is more challenging to say as it is difficult to establish how much financial knowledge is enough. It is therefore assumed that if ‘middle’ education workers from the treatment group act similar to their ‘high’ counterparts they have enough financial knowledge to assess the situation.

### **3.2.3 Living together with a spouse**

The first paper that economically evaluated marriage was written by Becker (1973) who for simplicity assumed that marriage meant sharing a household with a spouse. Nowadays, it is very common in the Netherlands to live together without legally being married. In 2005 nearly 750,000 couples lived together without being married, which was almost a 45 per cent increase in comparison with 1995 (Van der Meulen & De Graaf). As a result, it will be assumed in this paper that married and cohabiting couples act in an equal manner. This will be indicated as ‘together’.

Forming a household creates a bond what can act as a support system. Spouses can provide one another with a great deal of social (Pienta, Hayward, & Jenkins, 2000) as well as financial support. This is illustrated by Steenbeek & Van der Lecq (2007) as single people benefit less than ‘together’ people from the normal pension scheme. Changes in (early) retirement can be accommodated quicker, which will decrease the need for other

arrangements. Consequently, after the policy implication ‘together’ is expected to use a benefit such as WW less, while ‘alone’ is expected to have a higher take up rate.

On the other side, a support system also demands consulting one’s spouse if something occurs. People who live alone are much more flexible in their behaviour and can adjust it as they please. Do people who live together eventually take the same decisions as one that lives alone or do they behave differently? Here, it is argued that ‘alone’ adjusts its behaviour more often after the policy measurement than ‘together’.

In many studies, such as Myers (1999) it is found that married people are happier than singles. Marriage can provide a source of self-esteem, for instance by providing an escape from stress in other parts of one’s life, in particular one’s job (Argyle, 1999). In addition, Stutzer & Frey (2006) find that among the not married, individuals who cohabit with a partner are significantly happier than those who live alone. It is therefore assumed that a stressful situation such as cancellation of early retirement tax benefits will therefore decrease the happiness of ‘alone’ more than for ‘together’.

## 4 Methodology

This chapter will provide an overview of the methodology used in the present study. The first section elaborates on difference-in-difference procedure that is chosen for this study. Second, it is elaborated which dataset, sample and time span are used, followed by an overview of the variables of interest. The statistical programme that is used to compute all statistical tests is SPSS 19.

### 4.1 Procedure

The main aim of this research is to test the effects of the abolishment of the favourable tax treatment of the early retirement arrangement VUT. The new reform made an exception for one group, which creates a control and a treatment group. By means of a longitudinal study it will be tested if differences in behaviour can be observed over an 8 year time period. Section 4.2 discusses the characteristics of both groups for all the time waves.

Comparing the outcomes of the before and after treatment situation is not sufficient as it can be contaminated by either temporal time or group trends. Therefore, the combined difference needs to be included as well. This method is named difference-in-difference and is one of the most popular tools for applied research in economics to evaluate the effects of public interventions (Abadie, 2005).

In Puhani (2012) the difference-in-difference for a linear model is explained for a continuous and uncensored outcome. First, TIME and GROUP are both binary indicators, which are coded as either 0 or 1. As a result, the expected outcome will know 4 different situations as is represented in Table 7. Second, control variables will be included as well as an error term  $\epsilon$ . Then, the treatment effect is assumed to be constant and participation, thus TIME x GROUP, which will be denoted as TREATMENT. This approach will be equivalent to a multiple regression analysis, which can be denoted as:

$$E [X] = \alpha + \beta_1 * TIME + \beta_2 * GROUP + \beta_3 * TREATMENT + \text{control variables} + \epsilon \quad (1)$$

*Table 7 Difference-in-Difference linear model*

Group\ Time	<i>Before</i>	<i>After</i>	Difference
<i>Control</i>	$\alpha$	$\alpha + \beta_1$	$\beta_1$
<i>Treatment</i>	$\alpha + \beta_2$	$\alpha + \beta_1 + \beta_2 + \beta_3$	$\beta_1 + \beta_3$
Difference	$\beta_2$	$\beta_2 + \beta_3$	$\beta_3$

The before mentioned coefficients will be important in the verification of the hypotheses. The first coefficient  $\beta_1$  will indicate what the effect of time will have been while  $\beta_2$  will clarify the differences between the groups. However, both will not answer what the overall effect of the policy measurement has been. As a result, the coefficient  $\beta_3$  will establish this difference-in-difference effect, which will be referred to as the treatment effect.

## 4.2 Sample selection

In order to form a control and treatment group for several periods a matching dataset is needed. From here 2 groups are formed who will be the focus of this research. Then, several years are chosen to test what the instant and eventual effect is of this policy reform.

### 4.2.1 Selected database

This paper has made use of the data from the CentERdata data base. This is an eminent research institute specialized in online survey research and is located on the Tilburg University campus. The database comprises many surveys, which were devised by researchers of the CentERpanel. This panel is composed of over 2,000 households who complete questionnaires at home every week through the internet. The CentERpanel is an appropriate representation of the Dutch-speaking population. Further, the respondents remain panel members over de course of time, which makes it an excellent database for longitudinal research.

The benefit of a panel study is that it provides a complete image of changes in behaviour. However, due to instant shocks or adjustment over time it is useful to investigate more than one timeframe. This dataset allows tracking behaviour over several years, which will provide a more balanced view. Further, the quality of the sample is very high as it mirrors the distribution of characteristics from the Dutch population. To create such a dataset personally would cost a lot of time and effort and therefore, the author is very grateful to the CentERdata institute allowing her to make use of this data panel.



#### 4.2.2 Selected sample

This study's sample includes everyone who reported to being born between 1945 and 1954. After the benefits of the VUT were cancelled, people born in 1950 or later could no longer make use of this arrangement while those born before were still able to do so. The control group will consist of people born between 1945 and 1949 while the treatment group will contain people born between 1950 and 1954. As a result, this will be a cohort study.

#### 4.2.3 Selected timeframe

The year 2005 was the last year when the VUT benefits were available to everyone and is therefore taken as base year. As previously described, the enactment of VPL in 2006 caused the financial tax benefits of the VUT to be cancelled and is therefore taken as the first year of the new situation. These two years, before and after the policy implication, will be compared to test for differences in behaviour.

It is possible that some shocks occur in 2006 but will later drop back to the old level. In other cases, it takes time to adjust behaviour and the effect will not be noticed until a couple of years after the commencement of the policy. Consequently, a longitudinal approach will be taken where the behaviour over a long time period can be observed. The base year will remain 2005 while the after period will be extended with 2 year periods, namely 2008, 2010 and 2012.

### 4.3 Criterion variables

The validity of the following variables is explained in the literature review. They will be divided into 3 categories, namely independent, dependent and control variables. For an overview of these variables and their corresponding scorings one is referred to the Appendix, section 8.4.

#### 4.3.1 Independent variables

The first independent variable TIME is an interval variable and scores '0' for pre-treatment period, namely the base year 2005, and '1' for the post-treatment period. This includes 2006, 2008, 2010 and 2012.

The second independent variable is GROUP, which is a dummy variable and scores '1' if the individual belongs to the treatment group and '0' for the control group. The control group experiences no stimulus of the policy implication while this is the case for the treatment group. The variable is based on birth years, where people born between 1945 and 1949

belong to the control group and others born between 1950 and 1954 fit in the treatment group.

The third independent variable TREATMENT is the interaction effect of the previous variables. It is a dummy variable that scores '1' if both GROUP and TIME score '1' and scores '0' otherwise. This last independent variable is necessary because the simultaneous influence of GROUP and TIME on the dependent variables might not be additive.

#### 4.3.2 Dependent variables

The first dependent variable WW tests the take up rate of the unemployment plan. It scores '1' if someone received a payment through this arrangement and '0' if nothing was received. Originally, the amounts collected are reported but these are converted into a dummy variable. If a positive amount was received this is considered as receiving WW and thus scored as '1'. When it was reported that 0 Euros were received then this is proposed as not receiving WW and therefore recorded as '0'.

The second dependent variable WAO measures the take up rate of the disability arrangement. It scores '1' if someone received a payment through this arrangement and '0' if nothing was received. Again, in the original dataset the amounts collected are reported but these are converted into a dummy variable. If a positive amount was received this is considered as receiving WAO and thus scored as '1'. When it was reported that 0 Euros were received then this is proposed as not receiving WAO and therefore recorded as '0'.

The third dependent variable GEZ represents the general health. It was asked to evaluate one's general health condition on a Likert scale, with '1' if excellent, '2' if good, '3' if OK, '4' if not good and '5' if bad. It has to be noted that the higher GEZ will be, the worse the general health is.

The fourth dependent variable ZIEK measures the absence from work due to sickness. This is a dummy variable that scores '1' if that person had to miss a day's work due to sickness in that year and '0' if no days were missed. This scoring is a bit different than in the original dataset, where being absent was scored '1' as well while not being sick was scored as '2'. This is interchanged with '0' for convenience.

The fifth dependent variable HZIEK is related to the previous variable and asks if sick, how many workdays were missed that year. Consequently, this will always be a positive number, ranging from 1 to 365 days.

The sixth dependent variable LFTPENS exams the retirement age individuals expect to have. This interval variable will range from 52 until 75, with an incidental outlier much earlier or later. Unfortunately, the treatment group will not have retired at this moment and therefore the actual retirement ages cannot be known yet. Therefore, the expected instead of actual retirement ages are used.

The seventh dependent variable DNB116 checks how willing people are to adjust their behaviour if pensions are simplified. If willing to adjust their behaviour the score '1' is given while if unwilling '0' is the corresponding mark. In the original dataset this was not a binary but nominal variable and is therefore for convenience recoded. There, the score '1' indicated that one was willing to put more money aside for retirement, while the meaning of '2' was not to adjust behaviour since they will see it later. Also, the score '3' was a negative response where again they were unwilling to adjust their behaviour but now because they thought that their pension would be sufficient anyway. The recoding was done the following: '1' remained '1' while '2' and '3' were grouped into '0'.

The eighth dependent variable GELUKKIG tests the happiness level. This variable is scored on a Likert scale with '1' is as being very happy, '2' as happy, '3' neither happy nor unhappy, '4' unhappy and '5' very unhappy. Again, it has to be noted that the higher GELUKKIG will be, the less happy everybody is.

A first indication of the sample is provided in Table 8. The Appendix provides an overall table where a distinction for control and treatment group is made. The table shows the dependent outcome's mean with standard errors per year. It indicates that unemployment, disability, health and happiness have remained fairly stable over time. On the other hand, the percentage of people reporting to be absent from work due to sickness has decreased, while the number of days sick varies from year to year. Also, the expected retirement age increases after 2005 but less people report to adjust their behaviour to this new situation. The next chapter will test more extensively with the before mentioned difference-in-difference approach to see if these differences can be contributed to the policy implication.

*Table 8 characteristics dependent variables per year*

	2005			2006			2008			2010			2012		
	Mean	Std. Error	N	Mean	Std. Error	N	Mean	Std. Error	N	Mean	Std. Error	N	Mean	Std. Error	N
WW	0.05	0.011	431	0.04	0.010	425	0.04	0.010	428	0.03	0.008	523	0.05	0.010	512
WAO	0.13	0.016	428	0.13	0.016	422	0.11	0.015	425	0.13	0.015	519	0.10	0.013	512
Gez	2.24	0.036	433	2.25	0.036	428	2.19	0.034	430	2.21	0.032	525	2.22	0.032	514
Ziek	0.43	0.031	263	0.40	0.032	242	0.38	0.033	215	0.33	0.031	236	0.39	0.038	168
HZiek	24.13	4.750	112	25.07	6.243	96	23.35	5.666	81	17.56	3.943	78	29.06	8.184	66
Lftpens	62.36	0.170	294	62.70	0.208	255	63.77	0.206	247	63.98	0.142	236	64.52	0.126	186
DNB116	0.39	0.026	348	0.35	0.026	342	0.28	0.024	347	0.28	0.023	387	0.24	0.024	321
Gelukkig	2.01	0.031	443	2.14	0.031	432	2.01	0.031	449	2.02	0.028	559	1.96	0.027	574

### 4.3.3 Control variables

The first control variable is AGE, which is the age of that person in that specific year. In the original dataset only the birth year is provided and therefore age is computed by *year survey* – *birth year*. Given that the sample ranges from 2005 until 2012 and only people born between 1945 and 1949 are included, will this variable vary between 51 and 67 years.

The second control variable is GENDER, which is a dummy variable scoring ‘1’ for male and ‘0’ for female. As the databank is a good representation of the Dutch population, the male/female proportion is about equal.

The third control variable is EDUCATION, which indicates the highest obtained education. It is an ordinal variable scoring ‘0’ as low education, ‘1’ as middle education and ‘2’ as high education. Again, the original dataset contained many more answers but for ease these are regrouped. Here, low education is considered as having obtained elementary school and/or special elementary education. Middle education includes secondary education and MBO while high education contains higher education such as HBO or a university degree. The 2 categories ‘special education’ and ‘other education’ are excluded due to their vagueness. Moreover, ‘still a student’ is excluded as well since all the respondents are expected to have finished or abandoned their formal education during this point in their lives.

The fourth control variable is TOGETHER, which is a dummy variable where ‘1’ indicates that a partner or spouse is present in the same household and ‘0’ that he or she is living alone.

The original dataset contains an extensive range of marital status, but for simplicity it is recoded<sup>17</sup>.

The fifth control variable is INCOME, which is the total gross income for a given year. This amount reported can vary from no income to several tons of Euros each year. If an income was reported in both years, the average is taken. When only one observation was present then that income is used.

In Table 9 an overview is provided of the before mentioned control variables for 2005. The mean observation is provided for the total sample, as well as per group. An independent samples t-test is performed to assess if the variances of both groups are equal. For age and gender they are found to be equal, while education, together and income are found to be unequal. This suggests that in 2005, the treatment group has a little higher education than the control group, while the control group is more often together and earns a higher income.

*Table 9 Overview characteristics control variables*

		2005				
		Age	Gender	Education	Together	Income
Total	Mean	55.30	0.50	0.68***	0.80**	32561.67*
	Std. Deviation	(2.865)	(0.500)	(0.638)	(0.403)	(40057.19)
	N	697	697	695	452	373
Control	Mean	57.93	0.49	0.63	0.82	33588.05
	Std. Deviation	(1.397)	(0.501)	(0.660)	(0.384)	(51949.90)
	N	331	331	329	213	212
Treatment	Mean	52.92	0.51	0.73	0.77	31656.32
	Std. Deviation	(1.395)	(0.501)	(0.614)	(0.419)	(25413.60)
	N	366	366	366	239	212

<sup>17</sup> In the original dataset it was coded as follows: '1' means marriage with common properties while '2' indicate marriage with prenuptial agreement. Further, '3' declares as being divorced, '4' refers to live together but unmarried, '5' is designed for the widowed and '6' means always living alone. Variables '1', '2' and '4' are grouped together as 'living together' and thus '1', while the others '3', '5' and '6' are grouped as 'living alone' and thus '0'.

## 5 Descriptive statistics and results

This chapter shows the descriptive statistics and the results of the logistical regressions carried out to test the hypotheses. First, the treatment effect for the outcome variables is provided without control variables. Second, control variables are included to control for these effects. It will become clear which treatment effects exist due to the policy measurement, while for others no relation can be observed.

### 5.1 Treatment effect without control variables

To extend on Table 8 in section 4.3.2, a first difference-in-difference analysis will be performed. By using a linear regression<sup>18</sup> the corresponding treatment effect, standard error, number of observations and significance<sup>19</sup> value are calculated. This will provide for an initial treatment effect analysis without control variables. This result is displayed in Table 10.

*Table 10 Treatment effect dependent variables without control variables*

	Treatment effect											
	2005-2006			2005-2008			2005-2010			2005-2012		
	Treatment effect	Std. Error	N	Treatment effect	Std. Error	N	Treatment effect	Std. Error	N	Treatment effect	Std. Error	N
WW	-0.013	0.029	856	-0.029	0.029	859	-0.023	0.026	954	0.016	0.029	943
WAO	0.019	0.046	850	0.032	0.045	853	0.043	0.044	947	<b>0.068*</b>	0.041	940
GEZ	-0.110	0.101	861	-0.057	0.099	863	0.010	0.096	958	-0.063	0.096	947
Ziek	-0.064	0.090	505	0.041	0.093	478	0.001	0.091	499	<b>0.228**</b>	0.095	431
Hziek	-1.410	15.542	208	18.922	15.179	193	16.723	13.745	190	-0.433	17.173	178
Lftpens	0.106	0.539	549	0.006	0.541	541	-0.238	0.477	530	1.789	3.360	511
DNB116	0.042	0.074	690	-0.011	0.071	695	-0.027	0.069	735	0.004	0.072	669
Gelukkig	<b>-0.153*</b>	0.089	875	0.032	0.089	892	0.026	0.085	1002	0.015	0.083	1017

*No control variables*

First, it was assumed that the treatment effect for both WW and WAO increases after the policy implication but these results indicate that that is not the case. The take up rate for the unemployment arrangement WW is negative for all years except 2012, while the disability arrangement WAO is positive for all years and significant for 2012. This proposes that after the policy implication the proportion of people from the treatment group that used the WAO

<sup>18</sup> Independent variables are TIME, GROUP and TREATMENT.

<sup>19</sup> \*=significant at the 10 per cent level:  $P \leq 0.10$

\*\*= significant at the 5 per cent level:  $P \leq 0.05$

\*\*\*= significant at the 1 per cent level:  $P \leq 0.01$

arrangement increased, while WW decreased. A positive spill over effect could exist for WW, while a negative is likely to be present for WAO.

Second, it was assumed that the treatment's health would deteriorate after the reform, which could lead to a higher frequency of sickness and prolongation of its duration. The results indicate a negative coefficient for health which can be explained as an improvement for the treatment group's health. However, they are found to be significantly more often sick and usually for a longer period of time. Oddly, the treatment group takes up more often WAO, is sick more often and for longer periods of time after the policy reform but their health has not deteriorated. As it is self-reported health it could be that the effects are undervalued.

Third, the expected retirement age increases for most waves after the policy implication, just as expected. Further, it was assumed that the treatment group would adjust its behaviour more often after 2005. Initially, this is exactly what happens while later this changes to adjusting less than before the treatment. However, the last wave indicates that adjustment behaviour has come back to its original level. An exogenous shock such as this policy measurement causes a shock but eventually this will bounce back to its original level.

Last, it is assumed that the treatment group is worse off after the policy than the control group, which is perceived as unfair. Surprisingly, right after its commencement does the treatment group report to being happier than before. During later waves however, this decreases to being unhappier, but these effects are small and insignificant. Did people believe in 2006 that altering their behaviour would make them better off but later found out that this was not the case?

## **5.2 Treatment effect with control variables**

The same approach as in the previous section will be used, only now control variables will be included as well. Also, a closer look will be given to see if heterogenous effects are present. Each outcome variable will be discussed separately to clarify its meaning.

### **5.2.1 Unemployment arrangement (WW)**

First, it is assumed that the treatment group is more at risk to take up an unemployment benefit after the policy implication relative to the control group. In Table 11 evidence is found for this claim as a positive and significant treatment effect is present for 2005-2012. The retrenchment of VUT benefits and WW are for that wave related. Consequently, the proportion of people from the treatment group that used the WW arrangement after the policy

has increased, which indicates a negative spill over effect. Unfortunately, the overall goodness of fit is fairly low and therefore predicts the variation only to small extend. Further, heterogeneous effects are present which conflicting signs.

Second, it is expected that men are more likely to take up WW after the policy alteration, while women are less likely to take it up. This assumption corroborates with the results as the female outcome for 2005-2010 is negative, while the 'male' is positive for 2005-2012. Both are significant and hence women benefit while men are worse off after the new policy. This confirms that the VUT tax benefits were beneficial to men while the Levensloop arrangement is more valuable to women.

Third, lower educated people are expected to take up the WW arrangement less often after the policy implication. On the other hand, higher education individuals are expected to benefit the most from the VUT arrangement and could therefore be forced to take up WW more after its cancellation. The results indicate that this is correct, but are insignificant. However, the treatment effect in the third wave is negative and significant for 'middle' education. Apparently, the proportion of 'middle' educated workers from the treatment group that needed to take up WW decreased since the reform. An explanation could be that their needs were better filled by the new arrangement and as a result were less forced to take up an unemployment arrangement. This advocates a positive spill over effect for this specific subgroup.

Last, it is assumed that after the policy implication 'together' is expected to use a benefit such as WW less, while 'alone' is expected to have a higher take up rate. The former is both confirmed and rejected. At first, people from the treatment group who live together with a spouse are less likely to use an unemployment arrangement after the policy implication. However, eventually this effect is inverted and now they are more likely to do so. An explanation could be they could fall back on their spouse but this financial constraint could not last forever and ultimately unemployment benefits needed to be taken up. People without this support system are forced much earlier to take up WW. This proposes a household support system can be beneficial in the short but unfortunately not in the long term.



Table 11 Treatment effect Unemployment (WW)

Variable $Y_{WW}$		Take up rate WW payments											
		2005-2006 (N=369)			2005-2008 (N=741)			2005-2010 (N=793)			2005-2012 (N=803)		
		Treatment effect	Std. Error	R <sup>2</sup>	Treatment effect	Std. Error	R <sup>2</sup>	Treatment effect	Std. Error	R <sup>2</sup>	Treatment effect	Std. Error	R <sup>2</sup>
Total		-0.006	0.110	0.044	-0.037	0.032	0.031	-0.018	0.029	0.032	<b>0.031*</b>	0.018	0.031
Gender	Female	0.007	0.228	0.073	-0.050	0.047	0.045	<b>-0.067*</b>	0.040	0.054	-0.038	0.025	0.047
	Male	-0.058	0.145	0.069	-0.037	0.032	0.031	0.020	0.043	0.038	<b>0.082***</b>	0.026	0.051
Education	Low	-0.065	0.156	0.156	-0.050	0.052	0.073	0.004	0.047	0.088	0.031	0.028	0.112
	Middle	-0.050	0.271	0.029	-0.048	0.048	0.021	<b>-0.075*</b>	0.041	0.029	0.021	0.027	0.013
	High	0.080	0.168	0.251	0.067	0.051	0.103	0.107	0.102	0.088	0.075	0.054	0.042
Together	Alone	-0.089	0.293	0.070	0.032	0.105	0.035	0.032	0.094	0.049	-0.018	0.055	0.035
	Together	-0.023	0.119	0.029	<b>-0.050*</b>	0.030	0.012	-0.026	0.028	0.013	<b>0.048***</b>	0.018	0.025

Control variables: Age, Gender, Education, Together and Income

### 5.2.2 Disability arrangement (WAO)

An aim of the government is to prolong the labour period while this is might be undesirable for many workers. The VUT enabled workers to retire early, which is very convenient for labour intensive professions while this is more difficult under the new measurement. Individuals from the treatment group who face bad health will be pushed out the labour market into a disability arrangement such as WAO. Table 12 presents a positive treatment effect for all waves. This proposes that after the policy reform the proportion of people from the treatment group that needed to use the WAO arrangement increased. However, due to the insignificant findings it cannot be said that the VUT cancellation and take up rate of disability WAO are related.

Similar as anticipated and the WW findings do women take up the WAO less, while men take it up more after the policy alteration. Again, the findings are not significant but do provide a signal that the Levensloop arrangement fits the need of women better than the VUT. A positive spill over effect results that they are less likely to take up the disability arrangement after 2005. On the other hand, the VUT fitted the needs of men better and the perishing of it causes an increase in their WAO take up rate.

Low educated individuals have a higher risk of developing health problems and are thus likely to have a higher need to exit the labour force early. Before, it was possible to do so by using the VUT, while now it is expected that the WAO will be taken up. The results indicate that this is exactly what happens. Higher educated individuals such as 'middle' and 'high' are

expected to manage to work this extended period of time. The take up rate for WAO for treated ‘middle’ educated individuals decreases, whereas it increases for ‘high’. An explanation could be that people with the highest education are likely to have the most mentally demanding jobs. Along with responsibility comes for instance (mental) stress, which could stimulate the need for an early exit. Then, the take up rate for WAO would indeed increase for ‘high’ educated people from the treatment group as they can no longer exit the labour force through the VUT. As a result, the retrenchment of VUT benefits has a negative spill over effect for both treated ‘low’ and ‘high’ education, while a positive effects exists for their ‘middle’ counterpart.

*Table 12 Treatment effect Disability (WAO)*

Variable $Y_{WAO}$	Take up rate WAO payments											
	2005-2006 (N=366)			2005-2008 (N=741)			2005-2010 (N=793)			2005-2012 (N=803)		
	Treatment effect	Std. Error	R <sup>2</sup>	Treatment effect	Std. Error	R <sup>2</sup>	Treatment effect	Std. Error	R <sup>2</sup>	Treatment effect	Std. Error	R <sup>2</sup>
Total	0.165	0.181	0.019	0.030	0.049	0.023	0.028	0.048	0.019	0.033	0.027	0.165
Gender Female	-0.120	0.405	0.070	-0.030	0.076	0.044	-0.022	0.074	0.040	0.014	0.042	-0.120
Male	0.287	0.225	0.026	0.081	0.065	0.031	0.068	0.061	0.034	0.052	0.034	0.287
Education Low	0.220	0.243	0.105	0.075	0.079	0.067	0.064	0.076	0.043	<b>0.079*</b>	0.043	0.220
Middle	<b>-0.851*</b>	0.445	0.073	0.015	0.073	0.038	-0.008	0.073	0.042	0.012	0.040	-0.851
High	<b>0.624*</b>	0.337	0.172	0.003	0.115	0.047	0.113	0.094	0.054	-0.046	0.042	0.624

*Control variables: Age, Gender, Education, Together and Income*

### 5.2.3 Joint effect unemployment and disability arrangements

In order to leave the labour market early one can use the early retirement, disability or unemployment arrangement. If the VUT option drops out, what will the joint effect be on both WAO and WW? Table 13 suggests an insignificant positive overall treatment effect for most years. After the policy reform people from the treatment group were more likely to collect an unemployment or disability payment.

Again, it is proved that treated men and women respond differently to the policy reform. Treated women tend to be less likely to use either arrangement, while treated men are much more likely to do so. This is in line with the previous findings: women benefit from the new policy measurement while men profited from the VUT policy.

Further, education is found to be of significance in the take up rate of WW and WAO as well. The joint effect indicates a more significant picture: ‘middle’ educated people are expected to take up other arrangements less often after the policy measurement, while ‘low’ and ‘high’

educated individuals are more likely to substitute into these arrangements. Apparently, the VUT fulfilled the needs of both ‘low’ and ‘high’ educated people from the treatment group while the new policy is more beneficial to if one has ‘middle’ education.

*Table 13 Joint Treatment effect Disability (WW & WAO)*

Variable $Y_{WW\&WAO}$		Take up rate WW & WAO payments											
		2005-2006 (N=365)			2005-2008 (N=741)			2005-2010 (N=793)			2005-2012 (N=803)		
		Treatment effect	Std. Error	R <sup>2</sup>	Treatment effect	Std. Error	R <sup>2</sup>	Treatment effect	Std. Error	R <sup>2</sup>	Treatment effect	Std. Error	R <sup>2</sup>
Total		0.157	0.222	0.037	-0.007	0.060	0.043	0.010	0.057	0.038	0.093	0.057	0.051
Gender	Female	-0.114	0.455	0.105	-0.080	0.089	0.078	-0.089	0.083	0.075	-0.036	0.083	0.086
	Male	0.229	0.293	0.054	0.058	0.082	0.051	0.087	0.077	0.053	<b>0.198***</b>	0.076	0.081
Education	Low	0.155	0.311	0.173	0.025	0.097	0.107	0.068	0.090	0.095	<b>0.206**</b>	0.091	0.134
	Middle	<b>-0.908*</b>	0.533	0.063	-0.033	0.089	0.048	-0.082	0.084	0.055	0.002	0.083	0.062
	High	<b>0.705*</b>	0.377	0.143	0.070	0.124	0.069	<b>0.220*</b>	0.133	0.102	<b>0.246*</b>	0.128	0.073

*Control variables: Age, Gender, Education, Together and Income*

#### 5.2.4 General health

The previous section suggested a relation between WAO and the new policy reform. Has the health of this treatment actually deteriorated? The findings in Table 14 present the opposite: the treatment group’s health has slightly improved since the retrenchment of the early retirement tax benefits. This combined with the two previous findings proposes that the increase in collective arrangements such as WW and WAO is not caused by a worse health from the treatment group. However, it has to be noted that results are insignificant with large standard errors. An explanation cannot be found for gender. Women’s health was supposed to be more likely to deteriorate after the policy alteration than males’.

*Table 14 General health condition*

Variable $Y_{Gbz}$		General health condition											
		2005-2006 (N=366)			2005-2008 (N=741)			2005-2010 (N=793)			2005-2012 (N=803)		
		Treatment effect	Std. Error	R <sup>2</sup>	Treatment effect	Std. Error	R <sup>2</sup>	Treatment effect	Std. Error	R <sup>2</sup>	Treatment effect	Std. Error	R <sup>2</sup>
Total		-0.021	0.387	0.040	-0.103	0.103	0.046	0.001	0.104	0.039	-0.005	0.058	0.048
Gender	Female	-0.431	0.861	0.061	-0.123	0.152	0.054	0.014	0.154	0.056	0.000	0.091	0.072
	Male	0.087	0.489	0.047	-0.090	0.141	0.055	-0.010	0.141	0.048	-0.003	0.074	0.051

*Control variables: Age, Gender, Education, Together and Income*

#### 5.2.5 Absent from work due to sickness

The new bill could lead to a worse health for the treatment group. Above, this is not established through self-reported health levels but this does not mean that health has not

deteriorated. The effects due to the reform can be manifested through an increase in frequency absentness. Table 15 illustrates that the treatment group was more likely to absent from work due to illnesses after the policy alteration. Unfortunately, the results are again insignificant and large standard errors are present.

For 2005-2006 no finding is present for ‘female’ due to missing correlation. The male observation is however very interesting, as it finds that treated men have a higher absent rate from work due to sickness than their female counterparts. This is opposite of expectations and consequently very informative. This suggests another spill over effect, where the costs are averted unto the employer, who presumably not content with this consequence.

*Table 15 Absent from work due to sickness*

Variable $Y_{Ziek}$		Absent from work due to sickness											
		2005-2006 (N=222)			2005-2008 (N=409)			2005-2010 (N=407)			2005-2012 (N=227)		
		Treatment effect	Std. Error	R <sup>2</sup>	Treatment effect	Std. Error	R <sup>2</sup>	Treatment effect	Std. Error	R <sup>2</sup>	Treatment effect	Std. Error	R <sup>2</sup>
Total		0.188	0.422	0.102	0.096	0.098	0.048	0.084	0.102	0.049	0.128	0.086	0.024
Gender	Female	---	---	0.070	0.117	0.165	0.123	0.023	0.170	0.063	-0.041	0.124	0.009
	Male	0.392	0.425	0.154	0.133	0.120	0.081	0.138	0.127	0.081	<b>0.295**</b>	0.121	0.071

*Control variables: Age, Gender, Education, Together and Income*

### 5.2.6 Number of work days sick

One can be sick many times a year but its duration is of importance as well. Table 16 shows that the duration of sickness for the treatment group has increases after the policy implication. This can lead up to an increase of 20 per cent a year additional sick days. As anticipated, this is due to women from the treatment group, who are 49 days longer sick after the policy measurement. Combining this result with the previous finding puts forward the following: the policy implication increases the absent rate for men while increasing the absent duration for women.

*Table 16 Number of works days sick*

Variable $Y_{HZiek}$		Number of workdays sick											
		2005-2006 (N=100)			2005-2008 (N=161)			2005-2010 (N=155)			2005-2012 (N=96)		
		Treatment effect	Std. Error	R <sup>2</sup>	Treatment effect	Std. Error	R <sup>2</sup>	Treatment effect	Std. Error	R <sup>2</sup>	Treatment effect	Std. Error	R <sup>2</sup>
Total		57.581	48.489	0.106	11.878	16.949	0.071	23.801	16.237	0.080	4.360	16.457	0.039
Gender	Female	---	---	0.138	42.667	38.949	0.072	36.410	39.370	0.056	<b>48.979*</b>	24.887	0.139
	Male	44.204	34.430	0.140	-2.884	15.704	0.100	10.570	14.694	0.134	-19.670	22.954	0.040

*Control variables: Age, Gender, Education, Together and Income*

### 5.2.7 Expected retirement age

The policy reform was implemented to increase the labour participation. When people work for a longer period of time instead of retiring early, it follows that their expected retirement age should increase. Testing if this is true the outcomes in Table 17 are obtained. A negative treatment effect for most waves can be found but is again never significant. This suggests that after the new regulation the people from the treatment group reported a lower instead of higher expected retirement age. If these results were significant, it would test that the opposite of the policy aim was reached, which would be undesirable for the government.

The literature suggested that a difference for education should be present. Again, the results are insignificant and therefore an observation of the patterns will be discussed. First, ‘low’ education seems to expect a lower retirement age for most waves, where in 2012 it is expected to retire almost 3 years earlier than expected in 2005. This seems highly unlikely and should therefore be investigated more in future research. Second, ‘middle’ education too expects a lower retirement age under the new regulation, whereas ‘high’ education is indecisive. An explanation for this phenomenon could be the spill over effects into other arrangements such as WW.

Table 17 Expected retirement age

Variable $Y_{Liftspens}$	Expected retirement age											
	2005-2006 (N=267)			2005-2008 (N=455)			2005-2010 (N=439)			2005-2012 (N=420)		
	Treatment effect	Std. Error	R <sup>2</sup>	Treatment effect	Std. Error	R <sup>2</sup>	Treatment effect	Std. Error	R <sup>2</sup>	Treatment effect	Std. Error	R <sup>2</sup>
Total	-0.137	1.398	0.077	0.117	0.603	0.082	-0.257	0.493	0.134	-1.202	1.792	0.052
Education Low	-0.403	2.364	0.076	1.751	1.159	0.112	-0.373	0.748	0.177	-2.899	3.180	0.073
Middle	-1.157	2.268	0.114	-0.641	0.800	0.077	-0.133	0.717	0.129	-0.869	2.490	0.059
High	1.169	3.278	0.441	-1.606	1.285	0.418	-0.766	1.496	0.427	0.990	4.874	0.033

Control variables: Age, Gender, Education, Together and Income

### 5.2.8 Adjusting behaviour if pensions decrease

First, if the treatment group felt unfairly treated by the policy measurement it would be wise to adjust their behaviour in order to be effected as little as possible. Adjusting behaviour could occur in all sorts of ways, such as saving extra to supplement the gap that came into existence. Surprisingly, it is observed in Table 18 that the treatment group adjusts their behaviour less after the policy reform and is even significant for the last wave. This advocates that the treatment group will adjust its behaviour less after the policy implication.

Unfortunately, the overall goodness of fit is fairly low and therefore predicts the variation only to small extend.

Second, it is assumed that men adjust their behaviour more after the policy compared to women, as they understand better what is needed. The results do not corroborate with this expectation as a negative treatment effect is found for men in the last wave. Women are also likely to adjust their behaviour less often in the post-treatment situation.

Third, it is assumed that ‘low’ and ‘high’ education display opposite behaviour. High educated treatment workers are expected to adjust their behaviour more often after the policy measurement while their ‘low’ counterparts adjust less. For most waves this is true but unfortunately none of these observations is significant. On the other hand, for ‘middle’ education a negative treatment effect is found for 2 consecutive waves, which advocates that they are less inclined to adjust their behaviour after the policy measurement.

Last, a clear distinction between people who live ‘together’ or ‘alone’ cannot be observed. Both types are significantly less likely to adjust their behaviour after the policy measurement, whereas ‘alone’ is even less likely to do so than ‘together’.

*Table 18 Adjusting behaviour if pensions decrease*

Variable $Y_{DNB116}$		Adjust behaviour if pensions decrease											
		2005-2006 (N=314)			2005-2008 (N=594)			2005-2010 (N=614)			2005-2012 (N=558)		
		Treatment effect	Std. Error	R <sup>2</sup>	Treatment effect	Std. Error	R <sup>2</sup>	Treatment effect	Std. Error	R <sup>2</sup>	Treatment effect	Std. Error	R <sup>2</sup>
Total		-0.102	0.212	0.018	-0.057	0.078	0.020	-0.044	0.076	0.031	-0.101**	0.045	0.045
Gender	Female	0.476	0.538	0.068	-0.123	0.126	0.023	-0.035	0.124	0.046	-0.096	0.072	0.051
	Male	-0.077	0.287	0.019	-0.002	0.102	0.025	-0.042	0.097	0.039	-0.109*	0.057	0.064
Education	Low	-0.088	0.320	0.045	0.113	0.128	0.061	-0.001	0.125	0.048	-0.108	0.071	0.073
	Middle	-0.469	0.382	0.062	-0.222**	0.110	0.036	-0.194*	0.109	0.063	-0.100	0.065	0.047
	High	0.648	0.472	0.216	0.046	0.242	0.064	0.236	0.226	0.107	-0.050	0.130	0.139
Together	Alone	-0.983**	0.429	0.199	-0.212	0.183	0.076	-0.435**	0.184	0.067	0.024	0.098	0.102
	Together	0.164	0.251	0.027	-0.025	0.087	0.021	0.034	0.084	0.033	-0.133***	0.050	0.044

*Control variables: Age, Gender, Education, Together and Income*

### 5.2.9 Happiness level

An exogenous shock such as the retrenchment of early retirement tax benefits can lead to an initial drop in happiness but is expected to bounce back in later years. Table 19 indicates that there is no initial shock in happiness and it only decreases a little during the later waves. This suggests that happiness is fairly stable over time and is not affected easily. For policy makers

this is very interesting to know as it justifies certain tough decisions. However, it has to be noted that these results are insignificant and therefore this statement cannot be said with certainty.

Treated males are expected to have a lower level of happiness after the policy implication. The results suggest but not confirm that it is likely that men's happiness is lower than for females.

Further, traditional literature suggested that people with a spouse in the household are affected less by the policy than people who live alone as they have a spouse to find comfort with. However, this study finds the opposite results, which indicate that people who live alone in the treatment group are happier after the policy while people who live together are less happy. This is an important finding for household literature as it is contradictory.

*Table 19 Happiness level*

Variable $Y_{Gelukkig}$	Happiness level											
	2005-2006 (N=360)			2005-2008 (N=686)			2005-2010 (N=741)			2005-2012 (N=757)		
	Treatment effect	Std. Error	R <sup>2</sup>	Treatment effect	Std. Error	R <sup>2</sup>	Treatment effect	Std. Error	R <sup>2</sup>	Treatment effect	Std. Error	R <sup>2</sup>
Total	0.001	0.272	0.104	0.077	0.092	0.106	0.131	0.091	0.102	0.011	0.050	0.123
Gender												
Female	-0.275	0.460	0.122	0.019	0.140	0.100	0.100	0.134	0.148	-0.022	0.079	0.137
Male	0.165	0.427	0.110	0.130	0.122	0.123	0.155	0.124	0.088	0.044	0.065	0.127
Together												
Alone	0.050	0.534	0.038	-0.110	0.220	0.015	-0.199	0.203	0.028	<b>-0.242**</b>	0.112	0.043
Together	0.022	0.327	0.019	0.132	0.102	0.012	<b>0.227**</b>	0.102	0.018	0.076	0.056	0.014

*Control variables: Age, Gender, Education, Together and Income*

## 6 Summary and discussion

This chapter summarises the most important findings of this study. Some findings are in line with expectations while others indicate an opposite effect. At the end, recommendations for future research will be given.

### 6.1 Conclusion

This paper starts with an introduction to the Dutch retirement system. Here, the early retirement arrangement VUT is described and the motives for its cancellation. In 2006 a policy reform commenced which was considered as a drastic change. One group was not affected by this new policy and could still enjoy the tax benefits of the VUT, while another group was no longer entitled to do so. The former group is considered the control group, whereas the latter is taken as the treatment group. Chapter 3 provides a framework what effects this policy reform might have on the treatment group.

Chapter 4 illustrates the procedure that tests for these effects. A difference-in-difference analysis is taken with an 8 year time span. The data set was provided by the CentERdata panel and expands from 2005 to 2012. People who are born between 1945-1949 belong to the control group while others born 1950-1954 are considered as the treatment group.

A first glance at the data is illustrated in section 4.3.2. The take up rate for the WAO arrangement is roughly three times as large as for WW, which corresponds to the findings in the previous literature. People experience on average good health and are happy. Around 40 per cent reports to miss workdays due to sickness, which lasts between 17 and 29 days. Around a third of the participants reported to adjust their behaviour if their pensions were to be sobered. Finally, people expect that their retirement age will increase as time goes on. Will this be due to the cancellation of the VUT policy or will other factors been of influence as well?

Chapter 5 tests the true effect of the policy reform on the outcome variables. The control group is compared to the treatment group in a before (2005) and after (2006, 2008, 2010 and 2012) situation. This is done both with and without control variables, which includes age, gender, education, together and income.



The first discovery is that the treatment group is more likely to take up the unemployment arrangement WW after the policy measurement. This is especially true for men but not for women. This last group actually benefits from the new policy, which is very interesting for policy makers. Apparently, men and women react differently on early retirement schemes. Other subgroups that benefitted from the reform are ‘middle’ educated workers and people who live ‘together’.

The second finding was that the treatment group is more likely to take up the disability arrangement WAO after the policy measurement. Similar to the WW findings do women take up the WAO less, while men take it up more after the policy alteration. Also, difference for education can be observed where ‘middle’ is less likely but ‘high’ more likely to take up the arrangement.

Surprisingly, the increase in WW and WAO is not due to deteriorated health as it is likely to have improved after the policy alteration. However, the treatment group has become more absent from work due to illness since the new policy, which also lasts for a longer period of time. Treated men are found to be more often absent due to illness while treated women are sick for longer periods of time. This is a very interesting policy finding as the total costs are now averted onto the employer.

Another surprising finding is that the treatment group expects to retire at an earlier age after the policy measurement than before. The aim of the policy is to extend the labour force and this result suggests that it has not been successful in doing so. People from the treatment group were not eligible to retire at this point. It would be interesting to investigate the actual retirement ages instead of expected retirement age to see if this finding still holds.

Yet another exciting finding is that the treatment group is likely to adjust their behaviour less after the policy reform. Since they are faced with an exogenous shock it would be logical that people adapt to the new situation or least remain status quo. However, it is reported that their behaviour will be adjusted even less in the post-treatment situation, which is significant for most subgroups. To find an explanation more research is needed.

The last outcome is for policy makers always very useful. Even though the policy retrenchment is considered as unfairly and unexpectedly, treatment’s happiness is not affected. Also, contrary to beliefs it is found that people who live together are likely to have

diminished happiness level after the VUT cancellation, while people who live alone are happier in the post-treatment situation.

In conclusion, the VUT cancellation has had both positive and negative treatment effects. The most important ones are that its inaffordability has now been removed while people still manage to retire early. This contradicts the government's other aim to stimulate the labour participation but apparently, workers, and perhaps employers too, are unwilling to cooperate. Personally, in these times of extreme unemployment it is foolish to think this could be accomplished.

## **6.2 Recommendations for future research**

This study provides ample suggestions for future research. The first recommendation is to test the actual retirement ages of the control and treatment group. This will however only be possible in a few years but it might provide a better insight if prolonging of the labour force was a success or not. Second, this study finds a gender difference for sickness and the duration. Other scientific fields such as medicine could perhaps allocate the cause of this variance. Further, other nations and their cancellation of early retirement arrangement could be studied. Do similar trends occur there as well or do Dutch people react differently than for instance Swedish people? Will the generation be of influence of do people act alike?

## 7 Bibliography

- Abadie, A. (2005). Semiparametric difference-in-difference estimators. *The Review of Economic Studies*, 72 (1), 1-19.
- Allison, K. W. (1998). Stress and oppressed social category membership.
- Arber, S., & Ginn, J. (1993). Gender and inequalities in health in later life. *Social science & medicine*, 36 (1), 33-46.
- Arendt, J. N. (2008). In sickness and in health--till education do us part: Education effects on hospitalization. *Economics of Education review*, 27 (2), 161-172.
- Argyle, M. (1999). 18 Causes and Correlates of Happiness. In D. Kahneman, E. Diener, & N. Schwarz, *Well-being: the foundations of hedonic psychology* (pp. 333-373).
- Babbie, E. R. (2007). *The practice of social research*. Wadsworth Publishing Company
- Becker, G. S. (1973). A theory of marriage: Part I. *The Journal of Political Economy*, 813-846.
- Beltzer, R. M., & Biezeveld, R. L. (2004). De pensioenvoorziening als bindmiddel. Sociale cohesie en de organisatie van pensioen in Nederland. *Aksant*, 4.
- Blekesaune, M. & Solemn, P.E. (2005). Working Conditions and Early Retirement – A Prospective Study of Retirement Behaviour. *Research on Aging*, 27(1), 3-30.
- Bound, J., Schoenbaum, M., Stinebrickner, T. R., & Waidmann, T. (1999). The dynamic effects of health on the labour force transitions of older workers. *Labour Economics*, 6 (2), 179-202.
- Brickman, P., Coates, D., & Janoff-Bulman, R. (1978). Lottery winners and accident victims: is happiness relative? *Journal of personality and Social psychology*, 36 (8), 917-927.
- Centraal Bureau voor de Statistiek 1. (n.d.). Retrieved May 2013, from <http://statline.cbs.nl/StatWeb/publication/?DM=SLNL&PA=71950ned&D1=0&D2=a&D3=0&D4=0&D5=12-30&HDR=T&STB=G1,G2,G3,G4&VW=T>
- Centraal Bureau voor de Statistiek 2. (n.d.). Retrieved May 2013, from <http://statline.cbs.nl/StatWeb/publication/?DM=SLNL&PA=80479NED&D1=10&D2=0&D3=a&D4=12,25,38,51,64,77,90,103,116,129,I&HDR=T,G2,G1&STB=G3&VW=T>
- Centraal Bureau voor de Statistiek. (2009). *Statistisch Jaarboek*.
- Chiu, W. C., Chan, A. W., Snape, E., & Redman, T. (2001). Age stereotypes and discriminatory attitudes towards older workers: An East-West comparison. *Human relations*, 54 (5), 629-661.
- Cutler, D. M., & Lleras-Muney, A. (2006). Education and health: evaluating theories and evidence. *NBER working paper series, working paper 12352*, 1-39.
- De Nederlandse Bank. (2009). Pensioenvoorziening in internationaal perspectief. *Statistisch Bulletin*, 31-35.
- Deeg, D. J., & Bath, P. A. (2003). Self-rated health, gender, and mortality in older persons: introduction to a special section. *The Gerontologist*, 43 (3), 369-371.

- Deeg, D. J., Portrait, F., & Lindeboom, M. (2002). Health profiles and profile-specific health expectancies of older women and men: The Netherlands. *Journal of women & aging, 14* (1-2), 27-46.
- De Grip, A., Lindeboom, M. & Montizaan, R. (2012). Shattered dreams: The effects of changing the pension system late in the game. *The Economic Journal 122*, 1-25.
- Desmette, D., & Gaillard, M. (2008). When a "worker" becomes an "older worker": The effects of age-related social identity on attitudes towards retirement and work. *Career development International, 13* (2), 168-185.
- Di Tella, R., & MacCulloch, R. (2006). Some uses of happiness data in economics. *The Journal of Economic Perspectives, 20* (1), 25-46.
- Duval, R. (2003). The retirement effects of old-age pension and early retirement schemes in OECD countries. *OECD*.
- European Insurance and Reinsurance Federation. (2007). The role of insurance in the provision of pension revenue. *CEA Statistics, 28*.
- Eurostat. (n.d.). Retrieved May 2013, from <http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&language=en&pcode=tps00111&plugin=0>
- Field, A. (2009). *Discovering statistics using SPSS*. Sage Publications Limited.
- Francis, L. J. (1998). Happiness is a thing called stable extraversion: A further examination of the relationship between the Oxford Happiness Inventory and Eysencks dimensional model of personality and gender. *Personality and Individual Differences, 26* (1), 5-11.
- Gautier, P. & Van der Klaauw, B. (2012). Labour Market Policy and Participation over de the Life Cycle. Retrieved May 2013, from <http://arno.uvt.nl/show.cgi?fid=121839>
- Groot, C. M., & Heyma, A. O. (2004). Financiële prikkels voor werknemers bij uittreding. *Stichting voor Economisch Onderzoek*.
- Headey, B., & Wearing, A. (1989). Personality, life events, and subjective well-being: Toward a dynamic equilibrium model. *Journal of Personality and Social psychology, 57* (4), 731-739.
- Huizinga, W. P. (1977). Hoe zit het met de experimenten vervroegde uittreding. *Sociaal Maandblad Arbeid, 32*, 569-577.
- Hummert, M. L. (1999). A social cognitive perspective on age stereotypes. *Social Cognition and Aging, 175-196*.
- Jones, M. K., Jones, R. J., Latreille, P. L., & Sloane, P. J. (2008). Training, Job satisfaction and workplace performance in Britain: Evidence from WERS 2004. *IZA Discussion Paper 3677*.
- Kahneman, D., & Krueger, A. B. (2006). Developments in the measurement of subjective well-being. *The journal of economic perspectives, 20* (1), 3-24.
- Kiecolt-Glaser, J. K., & Newton, T. L. (2001). Marriage and health: his and hers. *Psychological bulletin, 127* (4), 472-503.
- Lindeboom, M. (1996). Vervroegde uittreding uit de arbeidsmarkt: een empirische analyse naar de determinanten van stoppen met werken. *Tijdschrift voor Politieke Economie, 19* (1), 67-86.

- Lumsdaine, R. L., & Mitchell, O. S. (1999). New developments in the economic analysis of retirement. *Handbook of labour economics*, 3, 3261-3307.
- Lusardi, A. (2008). Financial literacy: an essential tool for informed consumer choice? *Center for Financial Studies*, 2008/19, 1-33.
- Lusardi, A., & Mitchell, O. (2007). Financial literacy and retirement preparedness: Evidence and implications for financial education. *Business Economics*, 42 (1), 35-44.
- Lusardi, A., & Mitchell, O. S. (2008). Planning and financial literacy How do women fare? *Center for Financial Studies*, No. 2008/03, 1-10.
- Mercer. (n.d.). Retrieved May 2013, from <http://www.mercer.com/referencecontent.htm?idContent=1359390>
- Montizaan, R.M. & Vendrik, M.C. (2010). Shocks in retirement expectations and subjective well-being: evidence from a natural experiment.
- Montizaan, R. M., Corvers, F., De Grip, A., & Dohmen, T. (2012). Negative reciprocity and retrenched pension rights. *Discussion Paper Series, Forschungsinstitut zur Zukunft der Arbeit*, No. 6955.
- Mooij, R. D., Bosch, N. M., Jongen, E. L., & Vuuren, D. V. (2007). Fiscaal beleid en arbeidsparticipatie. In *Belasting met beleid* (pp. 61-73). Sdu Uitgevers.
- Myers, D. G. (1999). Close relationships and quality of life.
- OECD. (n.d.). Retrieved May 2013, from <http://www.oecd.org/finance/financial-education/oecd-pisa-financial-literacy-assessment.htm>
- Oreopoulos, P. (2007). Do dropouts drop out too soon? Wealth, health and happiness from compulsory schooling. *Journal of public Economics*, 91 (11), 2213-2229.
- Oswald, A. J., & Powdthavee, N. (2008). Does happiness adapt? A longitudinal study of disability with implications for economists and judges. *Journal of public economics*, 92 (5), 1061-1077.
- Pienta, A. M., Hayward, M. D., & Jenkins, K. R. (2000). Health consequences of marriage for the retirement years. *Journal of Family Issues*, 21 (5), 559-586.
- Puhani, P. A. (2012). The treatment effect, the cross difference, and the interaction term in nonlinear "difference-in-differences" models. *Economics Letters*, 115 (1), 85-87.
- Remery, C., Henkens, K., Schippers, J., & EHKamper, P. (2003). Managing an aging workforce and a tight labor market: views held by Dutch employers. *Population Research and Policy Review*, 22 (1), 21-40.
- Rijksoverheid 1. (n.d.). Retrieved May 2013, from <http://www.rijksoverheid.nl/onderwerpen/pensioen/opbouw-pensioenstelsel>
- Rijksoverheid 2. (n.d.). Retrieved May 2013, from <http://www.rijksoverheid.nl/onderwerpen/levensloopregeling>
- Rijksoverheid 3. (n.d.). Retrieved May 2013, from <http://www.rijksoverheid.nl/onderwerpen/pensioen/eerder-stoppen-met-werken>
- Rijksoverheid 4. (n.d.). Retrieved May 2013, from <http://www.rijksoverheid.nl/onderwerpen/algemene-ouderdomswet-aow>

- Saez, E. (2002). Optimal income transfer programs: intensive versus extensive labour supply responses. *The Quarterly Journal of Economics*, 117 (3), 21-40.
- Schouten, E. A. (2005). *Alles over VUT prepensioen en levensloopregeling*. Kluwer.
- Skugor, D., Muffels, R. & Wilthagen, T. (2012). Labour Law, Social Norms and the Early Retirement Decision – an Empirical Study. *Network for Studies on Pensions, Aging and Retirement Discussion Papers*, 11.
- Sociale Verzekeringsbank. (n.d.). Retrieved May 2013, from [http://www.svb.nl/int/nl/aow/hogte\\_aow/hoeveel\\_aow\\_later/](http://www.svb.nl/int/nl/aow/hogte_aow/hoeveel_aow_later/)
- Steenbeek, O. W. & Van der Lecq, S. G. (2007). Costs and Benefits of Collective Pension Systems. *Springer*
- Stutzer, A., & Frey, B. S. (2006). Does marriage make people happy, or do happy people get married? *The Journal of Socio-Economics*, 35 (2), 326-347.
- Talaga, J. A., & Beehr, T. A. (1995). Are there gender differences in predicting retirement decisions? *Journal of Applied Psychology*, 80 (1), 16-28.
- Taylor, P. & Walker, A. (1998). Employers and older workers: attitudes and employment practices. *Aging and Society*, 18, 641-658.
- Tweede Kamer. (n.d.). Retrieved May 2013, from [http://www.tweedekamer.nl/hoe\\_werkt\\_het/uw\\_mening\\_telt/demonstreren\\_en\\_actie voeren/index.jsp](http://www.tweedekamer.nl/hoe_werkt_het/uw_mening_telt/demonstreren_en_actie voeren/index.jsp)
- Umberson, D. (1987). Family status and health behaviours: Social control as a dimension of social integration. *Journal of health and social behaviour*, 306-319.
- Van der Meulen, A., & De Graaf, A. (n.d.). *Centraal Bureau voor de Statistiek*. Retrieved May 2013, from <http://www.cbs.nl/NR/rdonlyres/78850A0F-59FD-4F08-93E8-6B7148FA691C/0/2006k1b15p032art.pdf>
- Van Ewijk, C., & Slokker, M. (2008). Politieke economie van de VUT. *TPEdigitaal*, 2 (2), 61-79.
- Van Geuns, R., Mallee, L., & Wessel, M. (2004). Afschaffen prepensioen: Nut en noodzaak, samenvatting en conclusies. *Regioplan Beleidsonderzoek*.
- Wood, R. G., Avellar, S., & Goesling, B. (2009). The effects of marriage on health: a synthesis of recent research evidence. *Nova Science*, 1-68.
- Worldbank. (n.d.). Retrieved May 2013, from <http://data.worldbank.org/indicator/SP.DYN.LE00.IN/countries/NL--XS?page=2&display=default>
- Ybema, J. F., Geuskens, G., & Oude Hengel, K. (2009). *Oudere werknemers en langer doorwerken. Secundaire analyses van de NEA, het NEA-cohortonderzoek en de WEA*. Hoofddorp: TNO Kwaliteit van Leven.

## 8 Appendix

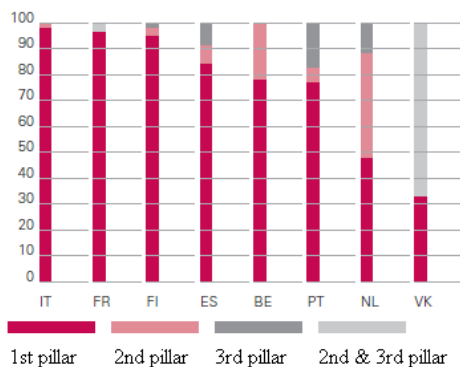
### 8.1 Graphs and tables

Table 1 Characteristics pension pillars

Pillar		Financing		Payments		Reserves	Provision
		PAYGO	Premiums	DC	DB		
1	Public	X			X	None	Basic pension
				X		X	Public funds
2	Private		X	X	X	Privately owned pension funds	Labour pension
			X	X		Insurers	Pension insurance
3	Private		X	X		Insurers	Pension insurance
						Banks	Other life products
						Investment funds	Savings at banks Pension investments

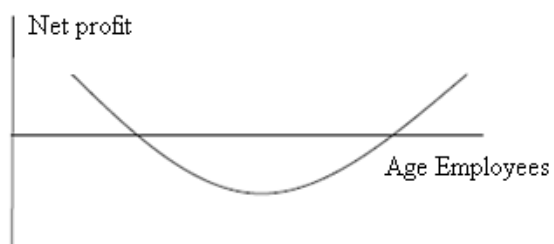
Source: De Nederlandse Bank (2009)

Graph 2 Division pillars for pensions payments (2006) in percentages



Source: European Insurance and Reinsurance Federation (2007)

Graph 5 U-curve Net profit VUT with respect to age



Source: Van Ewijk & Slokker (2008)

Table 8 Overview dependent variables per year

	2005			2006			2008			2010			2012		
	Mean	Std. Error	N	Mean	Std. Error	N	Mean	Std. Error	N	Mean	Std. Error	N	Mean	Std. Error	N
Total WW															
Control	0.05	0.011	431	0.04	0.010	425	0.04	0.010	428	0.03	0.008	523	0.05	0.010	512
Treatment	0.04	0.014	201	0.04	0.014	199	0.05	0.014	217	0.03	0.011	268	0.03	0.011	281
Total WAO	0.06	0.016	230	0.05	0.014	226	0.04	0.013	211	0.03	0.011	255	0.07	0.017	231
Control	0.13	0.016	428	0.13	0.016	422	0.11	0.015	425	0.13	0.015	519	0.10	0.013	512
Treatment	0.13	0.024	201	0.12	0.023	198	0.10	0.020	215	0.11	0.019	266	0.07	0.015	281
Total Gez	0.13	0.022	227	0.14	0.023	224	0.13	0.023	210	0.15	0.022	253	0.13	0.022	231
Control	2.24	0.036	433	2.25	0.036	428	2.19	0.034	430	2.21	0.032	525	2.22	0.032	514
Treatment	2.22	0.049	202	2.29	0.053	201	2.20	0.046	217	2.19	0.042	269	2.23	0.043	281
Total HZiek	2.26	0.051	231	2.22	0.048	227	2.19	0.050	213	2.24	0.049	256	2.21	0.047	233
Control	0.43	0.031	263	0.40	0.032	242	0.38	0.033	215	0.33	0.031	236	0.39	0.038	168
Treatment	0.44	0.048	110	0.45	0.052	94	0.36	0.054	80	0.34	0.056	73	0.50	0.082	38
Total Iftpens	0.42	0.040	153	0.36	0.040	148	0.39	0.042	135	0.33	0.037	163	0.36	0.042	130
Control	24.13	4.750	112	25.07	6.243	96	23.35	5.666	81	17.56	3.943	78	29.06	8.184	66
Treatment	31.94	9.538	48	33.55	13.057	42	19.97	6.879	29	15.48	5.887	25	31.00	18.893	19
Total DNB116	18.28	4.171	64	18.48	4.442	54	25.23	7.985	52	18.55	5.127	53	28.28	8.740	47
Control	62.36	0.170	294	62.70	0.208	255	63.77	0.206	247	63.98	0.142	236	64.52	0.126	186
Treatment	62.03	0.191	129	62.29	0.188	101	63.40	0.193	90	63.74	0.205	74	65.02	0.227	43
Total Gelukkig	62.61	0.262	165	62.97	0.321	154	63.99	0.303	157	64.09	0.184	162	64.36	0.148	143
Control	0.39	0.026	348	0.35	0.026	342	0.28	0.024	347	0.28	0.023	387	0.24	0.024	321
Treatment	0.38	0.037	176	0.31	0.037	159	0.27	0.034	171	0.29	0.032	200	0.23	0.036	133
Total Gelukkig	0.40	0.037	172	0.38	0.036	183	0.28	0.034	176	0.28	0.033	187	0.25	0.032	188
Control	2.01	0.031	443	2.14	0.031	432	2.01	0.031	449	2.02	0.028	559	1.96	0.027	574
Treatment	2.00	0.047	201	2.21	0.048	204	1.99	0.043	222	1.99	0.040	288	1.94	0.037	306
Total Gelukkig	2.02	0.042	242	2.08	0.041	228	2.04	0.046	227	2.04	0.041	271	1.98	0.040	268



## 8.2 Concepts

Abbreviation	Total Phrase
AOW	Algemene Ouderdoms Wet
CAO	Collectieve Arbeids Overeenkomst
DB	Defined Benefit
DC	Defined Contribution
HAVO	Hoger Algemeen Voortgezet Onderwijs
HBO	Hoger Beroeps Onderwijs
MBO	Middelbaar Beroeps Onderwijs
VMBO	Vorbereidend Middelbaar Beroeps Onderwijs
VPL	Wet aanpassing fiscale behandeling VUT/prepensioen en introductie levensloopregeling
VUT	Vervroegde Uittreding
VWO	Vorbereidend Wetenschappelijk Onderwijs
WAO	Wet Arbeids Ongeschiktheid
WO	Wetenschappelijk Onderwijs
WW	Werkloosheid Wet

### 8.3 Dutch School system

22	Master WO	Post HBO		Higher Education	<b>HIGH</b>	
21	Bachelor WO	Bachelor HBO	MBO			
20						
19				Secondary Education	<b>MIDDLE</b>	
18	VWO	HAVO	VMBO			
17						
16						
15				Primary Education	<b>LOW</b>	
14	Elementary School					
13						
12						
11						
10						
9						
8						
8						
7						
6						
5						
4						

## 8.4 All variables and their scoring

	Variable	Question	0	1	2	3	4	5
<b>Independent</b>	GROUP	Control or Treatment group	Control	Treatment	---	---	---	---
	TIME	Time Period questionnaire	2005	2006 2008 2010 2012	---	---	---	---
	TREATMENT	Group * Time	---	---	---	---	---	---
<b>Dependent</b>	WW	Unemployment payments	No	Yes	---	---	---	---
	WAO	Disability payments	No	Yes	---	---	---	---
	GEZ	General Health condition	---	Excellent	Good	Ok	Not Ok	Bad
	ZIEK	Absent from work due to sickness	No	Yes	---	---	---	---
	HZIEK	How many workdays sick	---	---	---	---	---	---
	LFTPENS	Expected retirement age [in years]	---	---	---	---	---	---
	DNB116	Will you adjust your behaviour if pensions are sobered?	No	Yes	---	---	---	---
GELUKKIG	To what extent do you consider yourself a happy person?	---	Very Happy	Happy	Neither happy nor unhappy	Unhappy	Very Unhappy	
<b>Control</b>	AGE	Age	---	---	---	---	---	---
	GENDER	Gender	Female	Male	---	---	---	---
	EDUCATION	Highest obtained education	Low	Middle	High	---	---	---
	TOGETHER	Living together	No	Yes	---	---	---	---
	INCOME	Total income [gross in Euro's]	---	---	---	---	---	---