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Shocks to future income and (lack of) consumption-smoothing

Evidence from the abolition of the state pension partner supplement in the Netherlands

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Shocks to future income and (lack of) consumption-smoothing: Evidence from the abolition of the state pension partner supplement in the Netherlands*

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ABSTRACT

Under the property of fungibility, all components of wealth are equal. Thus (assuming no transaction cost, liquidity constraints, and so on) a change in current income, liquid wealth and future income should lead to similar a response. However, there is ample empirical evidence indicates that the marginal propensity to consume current income is close to one and the marginal propensity to consume wealth is somewhere between zero and unity. Less is known of people's response to changes in future income. This paper utilizes the abolishment of the state pension partner supplement in the Netherlands to investigate the effect of a change in future income on savings, labour supply, and consumption. We employ a differences-in-differences-in-differences setup and find no effect in people's labour supply and savings decisions attributable to the supplement abolishment. Our investigated policy change provides a unique dataset to investigate the hypothesis of a zero marginal propensity to consume future income for a variety of reasons. First, we use administrative microdata allowing us to calculate effects with high accuracy. Second, the policy change allows a treatment and control group to be identified. Third, the wealth shock is quantitatively large (around €70,000 for an average household with a young partner with very low or no income). Fourth, the discontinuation of the supplement, enacted on April 2015, followed a 20 year announcement period, including an active campaign in order to inform the public of the policy change.

JEL Classifications: D11, D14, D91, H55

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1 Introduction

Understanding how individuals respond to shocks in their *future* income is crucial, both for economic theory as well as policy. This study takes advantage of a unique setup, in order to probe the response of households to a large shock in their future income, with a substantial announcement period that allows them to reconfigure their consumption and labour supply paths. We find that household do not respond in anticipation of this large future income shock despite the long announcement period.

Standard life-cycle models (see, e.g. Ando and Modigliani, 1963) predict that upon announcement of a future shock in the present value of their life-time wealth households respond by smoothing their consumption and labour supply for the remainder of their life cycle. Given that we investigate the response prior to the shock, standard theory predicts only a wealth effect on the households' behaviour. On the other hand, within the framework of behavioural economics Thaler (1990) shows that mental accounting violations of the principle of fungibility predict a lack of response to a future income shock. This would lead to a small or zero wealth effect on the retirement planing of the households.

This paper investigates the effect that the abolishment of the partner pension supplement in the Netherlands had on consumption and labour decisions. Originally, the supplement was given to couples where the older partner, who was the main bread-earner (henceforth "the individual"), reached the state pension age, while the younger partner (henceforth "the partner") had low income. The size of the supplement depended on the partner's income and was given to the couple until the partner also reached the state pension age. On average, households affected by the policy change received around €70,000 less over a period of 7 years compared to the birth cohorts that received the supplement. The abolishment was announced two decades prior to implementation. Therefore, the policy change led to a change in *future* income for those who are no longer eligible for the supplement. We consider three possible response channels. The first is a labour supply response of the individual. Given their status as the main bread-earner of the household we expect them to mostly work full-time. We, therefore, probe their labour supply response through means of delaying retirement. The second channel is a labour supply response of the younger partner and the third channel is an increase in the savings rate of the household in anticipation to the income shock.

We use a differences-in-differences-in-differences setup in order to investigate the response of the affected households to the policy change. As a control group we use couples from older birth cohorts who did receive the supplement. This allows us to investigate the effect per month of age difference of the partners, hence per euro of the total future income loss. We find no response attributable to the policy

change in any of the three channels in *anticipation* to the shock.

The policy change provides us with a unique setup to investigate the response of households' retirement planning to a future income shock. First of all, we use administrative microdata. This provides us with a large set of data on all people residing in the Netherlands, allowing us to compute effects with large accuracy. Second, the total wealth shock is sizeable, with a drop in lifetime wealth of around €70,000 for an average household with a younger partner with very low or no income. Moreover, the shock is dependent on the age difference of the partners and is targeted on a specific sample of the population - namely households with a young partner with low income. Third, the sample considered is rather diverse, as the supplement was not conditional on anything else other than the income of the younger partner. Therefore, the sample includes households with low income and/or wealth that could be liquidity constrained as well as high income/wealth households with small disutility from lowering consumption in order to smoothen it. Fourth, there was an active campaign in order to inform the public. That included newspaper articles, advertisements and a letter sent to those affected by the policy change in 2010. The announcement period of the reform was rather large (almost 20 years). That gave plenty of time to the households to readjust their expectations and act accordingly. Using the dataset we are able to investigate multiple channels of response, in order to get a complete picture of the reaction of the households. Our analysis constitutes a test on the hypothesis of a zero marginal propensity to consume future income.

Ando and Modigliani (1963) show that in a standard life-cycle setup individuals consume an amount proportional to their discounted total lifetime income in every period, assuming the ability of household to freely save and borrow. Unexpected shocks in the lifetime budget force individuals (in our case households) to alter their consumption. This is done in order to achieve smoothening within the new budget. In our case, the announcement of the abolishment of the partner pension supplement would force individuals to alter the path of their consumption and labour supply. Hence, forward looking households are expected to react on the day of the announcement of the shock. In the case of the abolishment of the partner supplement, that would amount to smoothening a shock of €70,000 over some 35 years. It has been shown that wealth shocks can alter significantly the labour supply of individuals. French (2017) uses data for lottery winners and finds a modest immediate and persistent drop in earnings. The wealth effect from pensions, though, on labour supply and retirement is, in general, found to be small or even zero (De Mooij et al., 2009).

The rest of the paper is structured in the following way. Section 2 describes the policy change within

the framework of the Dutch pension system and our empirical strategy. Section 3 presents the dataset used and Section 4 the methodology. Section 5 presents the results and Section 6 concludes.

2 Policy Change & Empirical Strategy

Institutional Framework

The Dutch pension system is a three pillar system. The first pillar consists of the state provided pension, the AOW, which is financed by the AOW premium (17.9% in the first two tax brackets) and from general tax revenues. Every registered citizen in the Netherlands accruals (regardless of employment status) 2% of the state pension per year, during the 50 years prior to reaching the state pension age. The full benefit, after 50 years of residency, amounts to 100% of the minimum wage[1] for couples (50% each) and 70% for single individuals. Until 2012 the state pension age (henceforth SPA) was 65 years old. This has been gradually increasing, with SPA reaching 67 years by 2024 and being linked to life-expectancy thereafter.[2]

Pillar one also includes a means-tested supplement (the AIO) to ensure subsistence level. This safety net is provided to those receiving the state pension and has strict income and wealth requirements.[3] Up to 2015, pillar one also included a supplement for individuals with a younger low-income partner (the AOW supplement). This supplement and its discontinuation (presented later in more detail) is the focus of this paper.

The second pillar consists of occupational pensions. These pensions are funded by the contributions of employees and employers in the pension funds. The pillar consists of industry-wide pension funds (e.g. for civil servants), corporate pension funds and pension funds for independent professionals. If social partners agree on a pension scheme for their employees,[4] the government can make a pension scheme mandatory for the entire sector or profession. As a result, over 90% of the wage workers and professionals have a pillar two pension scheme. Pillar two does not cover employees without a collective labour agreement or self-employed. Non-standard workers and self-employed can save on individual basis in the third pillar of the pension system, but the savings tend to be low. Participation in this pillar is not mandatory, leading to low participation rates.

The Policy Change

[1] €1,501.80 per month in April 2015.

[2] Dutch tax office: `https://www.belastingdienst.nl/wps/wcm/connect/bldcontentnl/belastingdienst/prive/werk_en_inkomen/pensioen_en_andere_uitkeringen/wanneer_bereikt_u_de_aow_leeftijd/wanneer_bereikt_u_de_aow_leeftijd`, accessed 12/05/2018

[3] For the AIO payment an application must be lodged. Van Eekelen and Kridene-Lageman (2017) find that less than half of those that were eligible for the AIO supplement actually applied for it.

[4] A majority of 50-60% of employers and employees is required for that.

As previously mentioned, for each partner in a couple the AOW pension amounts to 50% of the minimum wage. Until April 1st 2015, if at the time the older partner (referred to as "the individual") reached SPA the younger one (referred to as "the partner") had an income below a certain amount (€1,411.13 per month for 2015), then the first would receive an AOW supplement on top of his/her AOW pension. This was done automatically, without having to apply for the supplement. This supplement reached 50% of the minimum wage (i.e. around €750 per month) if the younger partner earned less than €236.70/month. I.e. if the younger partner had very low or no income they would receive their full AOW pension as soon as the older partner reached SPA. For each euro of labour income above the threshold of €236.70/month the supplement would be reduced by two thirds of a euro. Hence, effectively the income of the younger partner between €236.70 and €1,411.13/month was taxed at an additional 66.7% rate, as soon as their older partner reached SPA. If this income from the younger partner was drawn from an early pension the effective tax was 100%.

On April 1st 2015 the supplement was discontinued for new pensioners. This means that if the older partner in a couple reached SPA after the 1st of April 2015 and their younger partner had a low income, they would not receive the supplement. This amounts to a maximum income loss of €782.70/month (if the income of the younger partner was below €236.70/month), a sizeable drop in income of more than €9,000/year until the younger partner reached SPA as well. Given that the average age difference of the partners that receive the supplement is over 7 years, the abolishment resulted to a total shock of around €70,000 for a couple with the average age difference and a younger partner having very low or no income.[5] Given that retirement plans have a rather long horizon, the Dutch government provided a 19 year announcement period before the law was enacted. The law that was enacted in 2015 was legislated in 1996.

Pillar Two reform

Until 2015, employees were able to draw income from their pillar two pension up to 8 years prior to SPA (depending on their scheme), without any essential reduction in their pension income. As of 2006 new rules have made early retirement in pillar two actuarially fair, followed by a transition period. On April 2015 the transition period ended, making it less financially attractive to retire early, leading to fewer early retirees. Therefore, couples affected by the policy change to the partner supplement were also affected by the pillar two change that strongly incentivised them not to retire early.

[5]The supplement was also discontinued for individuals that had reached SPA before April 1st 2015 but the younger partner had an income above the €1,411.13/month threshold. I.e. if the partner had an income above this threshold and it dropped bellow only after April 1st 2015 the household would not start receiving the supplement. The response to this change is not investigated in this work.

Empirical Strategy

In a classical life-cycle model - under certainty - individuals maximise their expected lifetime utility, V, subject to constraints:

$$\begin{aligned} \max_{\{C_t,L_t\}_{t=0}^{\infty}} V(\{C_t,L_t\}_{t=0}^{\infty}) = & \max_{\{C_t,L_t\}_{t=0}^{\infty}} \sum_{t=1}^{\infty} p_t \beta^t U(C_t,L_t), \\ \text{s.t.} \quad W_{t+1} = & (W_t + G_t + I_t - C_t)(1+r_t) \\ I_t = & f(1-L_t), \quad \text{given} \quad W_0. \end{aligned} \tag{1}$$

p_t is the probability that the individual is alive in period t and β the time discount factor. $U(C_t, L_t)$ is the time separable utility in period t, given the level of consumption C_t and the fraction of time spent on leisure L_t in period t. This is subject to the budget constraint in which W_t is the liquid wealth in period t, G_t the government transfers (including the state pension) and I_t the labour income (a function of the hours worked $1 - L_t$), and r_t is the return in period t.

The abolishment of the AOW supplement constitutes a (negative) shock in G_t from the time the individual reaches SPA until their younger parter reaches SPA. After the announcement of the abolishment, in order to smoothen their consumption within the new budget, couples need to alter the path of their consumption and labour supply, by reducing C_t and/or increasing L_t, in order to satisfy the budget constraint. Hence, forward looking households are expected to react on the day of the announcement of the shock. In the case of the abolishment of the partner supplement, that would amount to smoothening a shock of €70,000 (for a household with a younger partner with low or not income and the average age difference of 7 years) over 35 years (20 years of announcement plus 15 years of expected pension life).

The couple can respond in (a combination of) three ways. First, to reduce consumption after the shock arrives. Second, to increase labour supply after the shock arrives. Third, to increase their savings before the shock arrives, either by reducing consumption or increasing their labour supply. The younger partner can increase their labour supply both before and after the shock arrives. Given that the older individuals are the main bread-earners (as the partner has low or no income) we expect them to be time-constrained. Hence, we investigate their labour supply response through means of delaying retirement.

3 Data

For the analysis we use administrative microdata from Statistics Netherlands (CBS) available from 2006 until 2017. This administrative dataset consists of the whole population of interest. Appendix A presents

in more detail the datasets used, how they were merged, and how some variables where constructed.

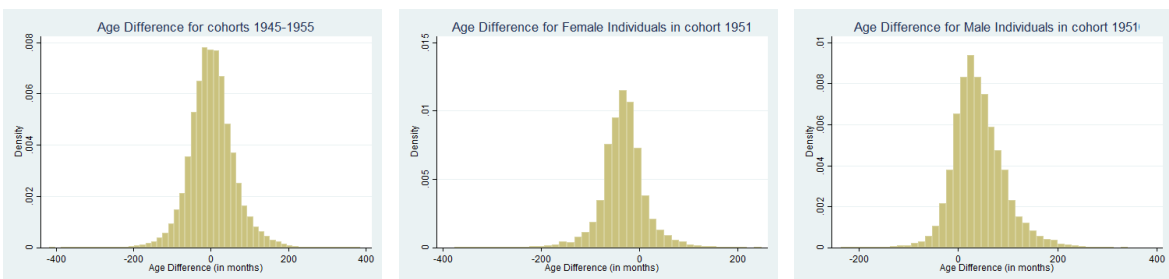
3.1 Summary Statistics

Our analysis is based on data for the cohorts born between 1948 and 1952, reaching SPA between 2013 and 2017. Table 1 summarises some relevant statistics. In Figure 1 we present a histogram describing

Table 1: Number of individuals per cohort

birth year	1948	1949	1950	1951	1952
N	32,940	30,412	30,838	30,013	30,781
Chararcteristics	Male	Migrant (1st gen)	Migrant (2nd gen)	Homeownership 4 years before SPA	
in %	50.7%	7.2%	5.1%	around 75%	

the age difference distribution of the couples in our sample. Age difference is defined, in months, as the distance between the date the individual reaches SPA minus the date the partner does (i.e. including changes in the SPA). Hence, a positive age difference denotes an individual with a younger partner. In slightly above 80% of the households the older partner is male.



(a) Birth Cohorts 1945-1955 (b) Female individuals (c) Male individuals

Figure 1: The distribution of the Age Difference (in months) for birth cohorts 1945-1955 (panel a) and for the birth cohort 1951 for Female (panel b) and Male (panel c)

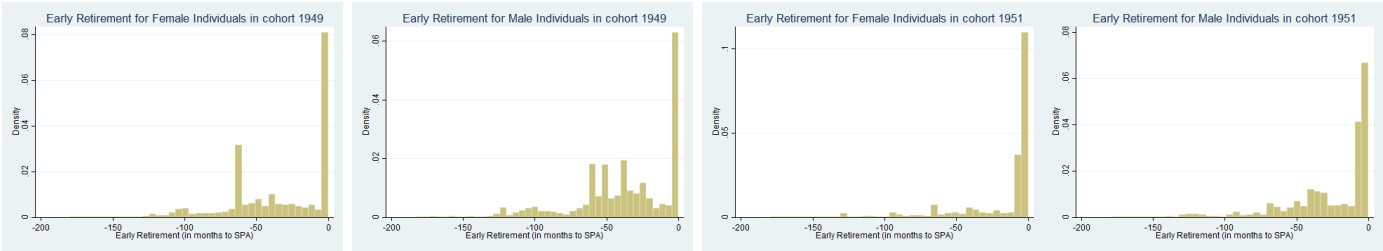
Table 2 displays information on the households' finances. Liquid wealth (excluding home-ownership) quartiles of households is displayed at 5 years prior to the individual's SPA and at the individual's SPA. Due to the changes in pillar two early retirement, individuals born after 1950 retire, on average, later and, hence, have higher incomes the last years prior to reaching SPA (see lower panel of Table 2). As a result, they were able to accumulate additional wealth, part of which was saved as liquid wealth.

Figure 2 shows the distribution of early retirement for male and female individuals in the 1949 and 1951 birth cohorts. On the whole, female individuals seem to respond more to the policy change. This can be seen in the 1951 birth cohort figures, where early retirement essentially disappears in the female distribution, but is only reduced in the male case. For the 1949 birth cohort the first sizeable wave of early

Table 2: Wealth and income quartiles

Birth cohort	1949			1951		
Percentile	25th	50th	75th	25th	50th	75th
Household liquid wealth (€) 5 years prior to individual's SPA	6,494	25,614	69,113	5,014	24,564	63,119
Household liquid wealth (€) at individual's SPA	4,378	23,471	66,105	6,546	27,580	67,372
Wage income (€/year) of individual 5 years prior to SPA	0	6,283	31,041	0	13,801	35,453

Notes: This table presents the household liquid wealth quartiles 5 years prior (upper panel) and at the individual's SPA (middle panel) and the individual's wage income quartiles 5 years before SPA (lower panel).



(a) Female individuals 1949 (b) Male individuals 1949 (c) Female individuals 1951 (d) Male individuals 1951

Figure 2: The distribution of early retirement, in months to SPA, for male and female individuals in the 1949 (panel A & B) and 1951 (panel C & D) birth cohorts.

retirement is 60 months prior to SPA (mostly for female, but also to a lesser extend for male individuals), i.e. at 60 years of age. This is due to the fact that pillar two schemes had a default early retirement, often at age 60. This spike disappears in the 1951 birth cohort distribution. As noted, for the 1949 birth cohort the probability mass at 60 months before SPA is much stronger for females, with males retiring early in a more uniform fashion. An explanation for this is that couples try to retire simultaneously (Gustman and Steinmeier, 2010). As such, given that males are usually the older partners, they postpone retirement until their female partner reaches the age of 60 (the earlier possible retirement age), at which point they both retire. This explains both the female individuals retiring 60 months prior to SPA and males delaying early retirement.[6]

[6]This might have been facilitated through, for example, the pension fund of the health care sector (PfZW) that allowed for a flex-pension starting at age 60. See https://www.pfzw.nl/Documents/brochures-werkgevers/pensioenreglement-en-statuten-2006.pdf.

4 Methodology

Our analysis focuses on the effects of a policy change that is enforced at a specific time. As such, we deploy a Differences-in-Differences (DiD) strategy (see, e.g. Card and Krueger (2000)), using birth cohorts that were not affected by the change as control groups. More specifically, given that the size of the effect of the policy change depends on the age difference of parters we deploy a DiD on slopes, i.e. a differences-in-differences-in-differences (DiDiD). In the remainder of this section we describe our methodology for each of the three investigated channels and at the end of this section we further discuss how we disentangle the response from the abolishment of the pension supplement from the second pillar reform.

4.1 Retirement Response of the Older Individual

First, we probe the retirement response of the individual (the older, breadwinner partner) to the discontinuation of the supplement. As noted in the previous section, we have data available on retirement up to and including 2016, hence we investigate the response in terms of cutting short early retirement. That would correspond in Equation (1) to postponing the period in which leisure, L_t, of the individual becomes equal to 1. Given that younger partners reach SPA much later than 2016, we are unable to look at their response. We define early retirement, R, as the number of months prior to reaching SPA that the individual retired, defined as a negative number reaching 0 when the individual retires at SPA.

A DiDiD approach is used, where the birth cohorts 1948 and 1949 which were not affected by the change are used as control. Early retirement, R, is taken as the dependent variable. The age difference, A_i, between the two partners (in months) will be the variable indicating whether the treatment is "turned on" or not. When the age difference is negative the partner is older and, therefore, the individual is not affected by the change in the law. For individuals with a younger partner we will observe the effect of the policy change per month of age difference (i.e. per around €750 of future income lost, if their partner's income is very low/zero). Birth cohort (indicated by t, which is fixed given the individual i) fixed effects are included along with interaction terms. This results to the following regression:

$$\begin{aligned} R_{it} = \sum_{\tau=t_1}^{t_2} \lambda_\tau \delta_{\tau t} + \gamma_A A_i + \gamma_\theta \theta(A_i) + \gamma_{A\theta} A_i \theta(A_i) + \sum_{\tau=t_1+1}^{t_2} \gamma_{\delta_{\tau t}\theta} \delta_{\tau t} \theta(A_i) \\ + \sum_{\tau=t_1+1}^{t_2} \gamma_{\delta_{\tau t} A} \delta_{\tau t} A_i + \sum_{\tau=t_1+1}^{t_2} \alpha_\tau \delta_{\tau t} A_i \theta(A_i) + \beta X_{it} + \epsilon_{it}, \end{aligned} \tag{2}$$

where t_1 is the base control cohort. Cohorts until $t_1 + j$ (for some j) are used as placebo treatment

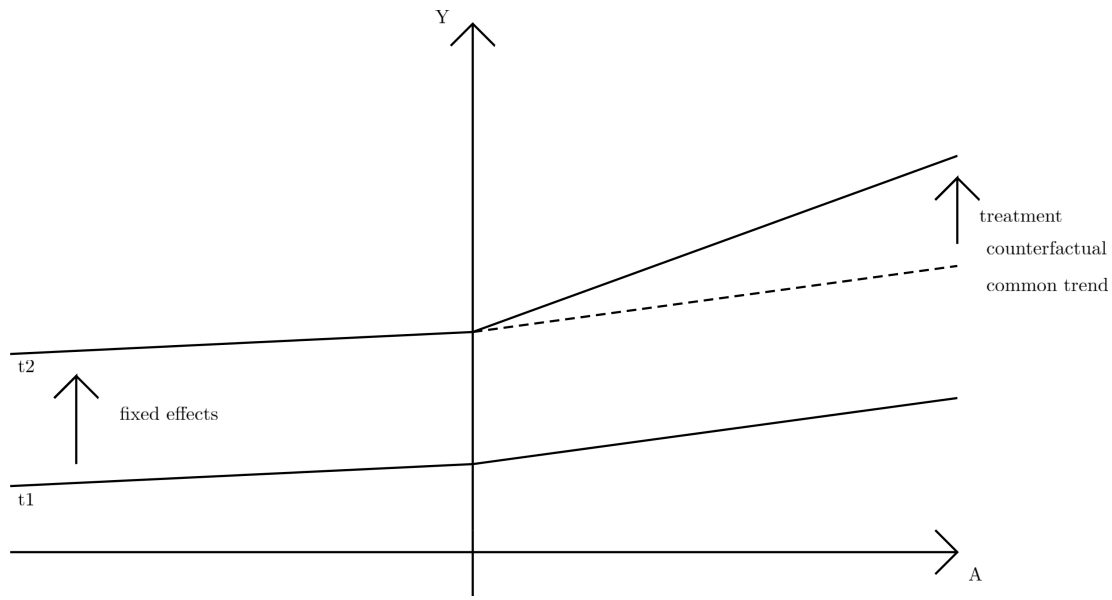


Figure 3: A graphical representation of the regression (2), indicating the difference in cohort fixed effects and the treatment effect. *Notes:* The representation assumes positive γ_A, $\gamma_{A\theta}$, α_{t_2} and zero $\gamma_{\delta_{\tau t}\theta}$, $\gamma_{\delta_{\tau t}A}$ and γ_θ.

groups as a robustness check. A_i is the age difference of the partners in months, positive for individuals with a younger partner. $\theta(.)$ is the Heaviside step function, which is equal to 1 when the age difference is positive and 0 when it is negative (i.e. it indicates whether the partner is younger or older). $\delta_{\tau t}$ is the Kronecker delta, which is equal to 1 when $\tau = t$ and 0 otherwise (i.e. it indicates whether the individual is in the birth cohort τ). λ_τ are the cohort fixed effects for birth cohort τ, γ_A is the age difference fixed effect and α_τ are the treatment effects per cohort, relative to t_1. The γ_θ and $\gamma_{A\theta}$ terms are included so that the treatment term is not biased. Individual controls are denoted by X_{it} and ϵ_{it} is the error term. A graphical representation of the two cohort regression, with positive slopes, can be seen in Figure 3.

A positive α_τ will signify a postponement of retirement for those affected by the supplement abolishment, compared to the control birth cohort t_1. As we do not expect high income young partners to respond to the policy change (as, if gross income is more than approximately € 1400/month they would not receive a supplement), we restrict the sample to partners that would, most likely, earn less than €1,400/month. In our main analysis we regard individuals as not affected by the policy change if four and five years before they reach SPA their partner has labour income above €20,000/year.[7] As seen in our results in Section 5, the lack of early (pre-2007) income reaction ensures that our cutoff does not give rise to a selection bias. The income cap could give rise to an issue with regard to older partners, as

[7]This is slightly bigger than € 1400/month. As the supplement acts as an effective tax it could affect also partners that are slightly above the threshold.

they might have already retired, resulting to a low wage income. We, therefore, do a robustness check by explicitly excluding partners that are retired 5 years before the individual's SPA.

With regard to extra control variables, it must be taken into account that the supplement was means-tested and lasted until the younger partner reached pension age. Hence, we use the income of the younger partner as a control to account for the means tested aspect. We, also, control for household wealth, the sex of the individual and the partner, migrant background, etc.

4.2 Younger Partner Labour Supply Response

In case the labour supply of the younger partners was increased in the aftermath of the announcement of the abolishment of the AOW supplement, in order to secure an extra, long term, income, that should also be visible in their labour supply in the later years. In terms of Equation 1 that would correspond to an decrease of L_t for the partner in the years after the announcement of the policy change. We use labour income as a proxy of labour supply.

In order to analyse the income data of the partner we set up a different regression model than Equation (2). This is due to the fact that the income level includes a two-step decision. The first is whether to work or not, the second is how much to work. If one runs a regression model as for the other variables, there will most likely be a selection bias. That is due to the fact that those not working are most likely of lower capabilities than those that do, on average, hence if they are forced to work they will most likely receive lower income.

We, therefore, set up a Heckman regression (Heckman, 1979). This includes a probit regression on whether one is working or not (i.e., whether the labour income is larger than zero or not) and a linear regression on the income of those that do work, including the inverse Mill's ratio as a dependent variable. The first step, referred to as selection, needs to be non-collinear with the second. Hence, we shall use the liquid wealth of the household as a control in the first step but not in the second. Other than that, the variables used are exactly the same as in Equation (2).

The dependent variable will be the wage income of the partner t^* years before the individual reaches SPA. Setting t^* to be equal to five, four, three, etc (as well as negative for those who chose or managed to respond only after the SPA of the individual) we can probe their reaction. In that case, the treatment effect should give us the total (both early and late) response to the change in the law in labour supply. More specifically, the selection regression will give the effect of the policy change in the probability of working, i.e. the employment rate. The linear regression gives the effect on the income received,

conditional on being employed.

4.3 Savings Response

A rational household is expected to react to the abolishment of the AOW supplement by increasing their liquid wealth, in order to smooth consumption after the individual reaches SPA. That would correspond to a reduction of consumption, C_t in Equation 1, for the periods prior the SPA of the individual. A past savings response will be visible in the stock of wealth later on. Therefore, we can probe a forward looking savings decision from 1996 onwards by looking at wealth data starting at 2006 (the years for which we have wealth data available).

Our assumption is that households use the accumulated wealth in order to finance their consumption during the negative income shock. A house (or other illiquid assets), even though part of the household's wealth, cannot (easily) be used for the purpose of consumption smoothing. Therefore, we chose W^{t^*} to represent the net liquid wealth of the household, i.e. cash, savings and stocks minus non-mortgage loans. House ownership, though, reduces the monthly expenditures. Hence, we also use a control variable indicating home ownership.

We investigate the wealth that an affected household has accumulated in a specific year. More precisely, we look at the wealth a certain number of years before the individual reaches SPA, so that we compare birth cohorts at the same point of their lives. In doing so, we run an identical regression to (2) with the wealth of the household, t^* years before the individual's SPA, W^{t^*}, as the dependent variable.

The coefficient α_τ signifies the extra wealth accumulated by birth cohort τ compared to cohort t_1 due to the policy change, t^* years before the respective individual's SPA. t^* runs from 5 years before SPA until one year after. The difference of these α_τ over a year indicates the additional savings of the treatment group, relative to the control group. As we look at the wealth near SPA, myopic household could also react. Thus we can identify those in case of an increasing savings rate.

4.4 Disentangling the two reforms

As mentioned above, another reform was enacted at the same time as the discontinuation of the AOW supplement. The pillar two reform strongly disincentivized early retirement. In principle, the effects of this reform do not depend on the age difference of partners and, therefore, will not affect the α_τ coefficient from Equation (2).

In practice, if the partner of a post-1950 individual is older they might retire under the old system

and it has been shown that partners try to coordinate their retirement (Gustman and Steinmeier, 2010). The individual cannot retire early due to the pillar two reform, hence, the older partner has an incentive to delay retirement. The younger the older partner is (i.e., the less negative their age difference), the easiest it is to delay retirement. This effect would show up as an increase to the coefficient of $\delta_{1955t} \cdot A_i$ in Equation (2) for the treatment birth cohorts in the regression on the partners' labour supply. For our treatment group (individuals in the treatment cohort with a younger partner) the effect on individuals with a younger partner in the 1951 birth cohort compared to the 1949 birth cohort is given by the sum of the coefficients of $\boldsymbol{\delta_{1955t} \cdot \theta(A_i) \cdot A_i}$ and $\delta_{1955t} \cdot A_i$. Therefore, a positive effect in the coefficient of $\delta_{1955t} \cdot A_i$ due to the pillar two change will induce a spurious negative effect in the $\boldsymbol{\delta_{1955t} \cdot \theta(A_i) \cdot A_i}$.[8]

Although we cannot formally disentangle this spurious negative effect using Equation (2), we are able to identify its presence for three reasons. First, as just mentioned, the value fo the coefficient of $\boldsymbol{\delta_{1955t} \cdot \theta(A_i) \cdot A_i}$ is expected to be of similar size and opposite sign as $\delta_{1955t} \cdot A_i$. Second, this channel affects the older partners of individuals independently of their income, whereas the policy change we are studying only affect individuals with low income partners. Hence, if the coefficient of $\boldsymbol{\delta_{1955t} \cdot \theta(A_i) \cdot A_i}$ is the same independently of whether our sample includes high-income partners or not, we can attribute this negative effect to the pillar two reform. Third, when the individual reaches their SPA their older partner does not need to delay retirement, hence the effect disappears. this means that our estimates for the labour response of partner at or after the individuals' SPA are not biased.

5 Results

In this section we present the results of our analysis, starting with the results on our analysis of the individual's retirement response, discussed in Section 4.1. Then we present the results for the income response of the younger partner (see Section 4.2), followed by the results on the savings response of the household (see Section 4.3).

5.1 Retirement Response of the Older Individual

For our analysis retirement data are available extend until the end of 2016. This allows us to probe the response of the 1951 birth cohort, for individuals born in the first six months. We use the 1948 and 1949 birth cohorts as controls. Initially we use the regression (2) without controls. From the sample we

[8] This is due to the fact that individuals with a younger partner are not affected by this pillar two effect, hence the coefficient of $\boldsymbol{\delta_{1955t} \cdot \theta(A_i) \cdot A_i}$ will be such as to cancel out the effect of the pillar two change to individuals with older partner in the $\boldsymbol{\delta_{1955t} \cdot \theta(A_i) \cdot A_i}$ coefficient.

exclude individuals who have never worked and those whose partner earned more than €20,000/year five and four years before the individual reached SPA.

In Table 3, columns (1)-(3), quote the variables from Equation (2) next to the value of its coefficient given by running the regression, without any extra control variables (X_{it}). Hence, the numbers quoted for δ_{1948t} are the fixed effects on early retirement for the 1948 birth cohort, and similarly for the other two birth cohorts. The numbers quoted next to A_i are the coefficients of early retirement with respect to age difference and similarly for the other variables.

The value of interest for us (presented on the top line of the regression tables) is the coefficient of the interaction term $\boldsymbol{\delta_{1951t} \cdot \theta(\mathbf{A_i}) \cdot \mathbf{A_i}}$, as it encodes the response of the 1951 birth cohort per month of age difference when the individual has a younger partner, i.e. the response per month of lost supplement. Despite the large sample, we do not find a response significantly different from zero. Column (4) is an exception, but as illustrated by columns (5) and (6) this is due to the non-linear relation between early retirement and the sex dummy.[9] Thus, our analysis suggests that individuals do not respond to the loss of the supplement by prolonging their working lives.

The effect of the pillar two policy change can be seen in the cohort fixed effects, which are given in absolute terms (i.e. there is no constant in the regression). We observe that the fixed effect for 1951 (the coefficient of δ_{1951t}) is much less negative than the corresponding fixed effects for the 1949 (the coefficient of δ_{1949t}) and the 1948 (the coefficient of δ_{1948t}) birth cohorts. This signifies that the individuals in our sample in the 1951 birth cohort postpone retirement by an average of 16 months (the difference of the 1951 and 1949 fixed effects). Note that the fixed effects for the 1948 and 1949 birth cohorts are virtually the same, as no policy change affected them. Moreover, cohort fixed effects differ between male and female individuals. Female individuals (column (5)) reduce early retirement a lot more than male ones do. So, the former in our sample respond a lot more to the pillar two policy change, as we had also observed and explained in Figure 2.

Control variables

Columns (4)-(7) in Table 3 provide the results of the regression when controls are included. For conciseness, we present the results using only the 1949 birth cohort as control group, given that they remain largely the same when using the 1948 birth cohort as well. We run the regression separately for female and male individuals and for male non-homeowners, which are more liquidity constrained.

Wage^p_{b4} signifies the effect of the wage of the partner four years before the individual reaches SPA (we

[9] Hence, from now on we will present results separately for male and female individuals and will not focus on the results for the whole analysis sample (as in columns (1)-(4)).

Table 3: Retirement Response (in months)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Control group	1949	1948	1948&1949	1949	1949	1949	1949
Population		Analysis sample		Analysis sample	Female	Male	Male non-homeowners
diff-in-diff							
$\boldsymbol{\delta_{1951t} \cdot \theta(\mathbf{A_i}) \cdot \mathbf{A_i}}$	0.0401	0.00898	0.00898	0.0613**	-0.00319	0.0154	0.0339
	(1.43)	(0.33)	(0.33)	(2.16)	(-0.03)	(0.33)	(0.42)
δ_{1948t}		-41.93***	-41.93***				
		(-54.49)	(-54.49)				
δ_{1949t}	-39.21***		-39.21***	−41.37***	−30.74***	−40.16***	−41.43***
	(-47.56)		(-47.56)	(-30.07)	(-15.20)	(-23.33)	(-11.65)
δ_{1951t}	-23.53***	-23.53***	-23.53***	−26.22***	−8.055***	−32.05***	−29.81***
	(-27.88)	(-27.88)	(-27.88)	(-15.90)	(-3.21)	(-15.79)	(-7.63)
A_i	0.0114	-0.0144	-0.0144	0.0615***	0.0514**	-0.0190	-0.0148
	(0.65)	(-0.86)	(-0.86)	(3.36)	(2.34)	(-0.54)	(-0.22)
$\delta_{1949t} \cdot A_i$			0.0257				
			(1.06)				
$\delta_{1951t} \cdot A_i$	-0.0469**	-0.0212	-0.0212	−0.0666***	-0.0216	-0.0189	-0.0577
	(-2.02)	(-0.94)	(-0.94)	(-2.81)	(-0.75)	(-0.43)	(-0.77)
$\theta(A_i)$	-1.634	0.480	0.480	0.838	2.436	0.178	0.558
	(-1.51)	(0.47)	(0.47)	(0.76)	(0.90)	(0.13)	(0.18)
$\delta_{1949t} \cdot \theta(A_i)$			-2.115				
			(-1.41)				
$\delta_{1951t} \cdot \theta(A_i)$	-2.988*	-5.103***	-5.103***	-2.553	-4.773	3.360*	2.577
	(-1.88)	(-3.29)	(-3.29)	(-1.62)	(-1.11)	(1.66)	(0.60)
$\theta(A_i) \cdot A_i$	0.0388*	0.0699***	0.0699***	-0.0129	−0.147***	0.0701*	0.0836
	(1.91)	(3.52)	(3.52)	(-0.62)	(-2.68)	(1.92)	(1.21)
$\delta_{1949t} \cdot \theta(A_i) \cdot A_i$			-0.0311				
			(-1.09)				
other controls							
Wage^p_{b4}(in €1000s)				0.130***	0.262***	0.0933*	-0.117
				(3.24)	(4.14)	(1.87)	(-1.06)
LiquidWealth_{b4}(in €1000s)				−0.00490***	−0.00247*	−0.00566***	−0.0413***
				(-4.61)	(-1.65)	(-3.92)	(-5.00)
OwnHouse_{b4}				−7.817***	−5.521***	−9.081***	
				(-12.85)	(-5.52)	(-11.84)	
SPA Apr				−4.454***	−4.892**	−4.388***	-2.325
				(-3.59)	(-2.03)	(-3.05)	(-0.83)
SPA May				−2.835**	-1.982	−3.206**	-1.247
				(-2.41)	(-0.91)	(-2.30)	(-0.45)
SPA June				−4.672***	−4.632**	−4.695***	-3.847
				(-3.80)	(-1.98)	(-3.26)	(-1.38)
SPA July				−3.379***	−5.046**	−2.743**	-2.583
				(-2.98)	(-2.39)	(-2.05)	(-0.98)
SPA Aug				−4.362***	−5.567***	−3.867***	-3.654
				(-3.75)	(-2.62)	(-2.79)	(-1.31)
SPA Sept				−4.403***	−5.164**	−4.288**	−6.297*
				(-3.01)	(-2.04)	(-2.38)	(-1.74)
SPA Oct				−4.843***	−8.402***	-2.792	-5.923
				(-3.27)	(-3.18)	(-1.56)	(-1.62)
SPA Nov				−3.056**	−4.389*	-2.393	-3.560
				(-2.10)	(-1.76)	(-1.32)	(-0.97)
SPA Dec				−7.700***	−11.06***	−5.967***	−7.227*
				(-5.00)	(-4.04)	(-3.21)	(-1.84)
Female				13.57***			
				(15.72)			
Wage_{b5}(in €1000s)				0.273***	0.184***	0.289***	0.313***
				(15.29)	(6.15)	(13.97)	(6.87)
First gen.				4.354***	2.092	6.036***	8.023***
				(4.27)	(1.19)	(4.83)	(4.63)
Second gen.				-1.153	-2.283	-0.542	1.056
				(-0.96)	(-1.13)	(-0.36)	(0.36)
N	19,261	20,320	29,975	18,513	6,232	12,281	2,982
r2	0.468	0.478	0.504	0.496	0.430	0.529	0.454

t statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

The dependent variable is the individual's early retirement, R_{it}. Column (1) uses 1949 as the base control, regression (2) uses 1948 and (3) uses 1948 as the base cohort and 1949 as a placebo treatment cohort. Columns (4)-(7) include extra controls. Column (4) uses the whole sample, (5) the females, (6) the males and (7) the male non-homeowners. *Notes:* Base month = March, Base immigration status = not immigrant.

do not look further close as they might retire by then). Similarly, Wage_{b5} is the wage of the individual five years prior to reaching SPA and Wealth_{b4} the wealth of the household four years before SPA. OwnHouse_{b4} is a dummy variable that signifies whether the couple owns the house they stay, four years before SPA of the individual. "SPA Apr", etc. are fixed effects of the month the individual reaches SPA, relative to reaching SPA on March. Finally, "First gen." and "Second gen." are fixed effects of the migration status of the individual, relative to not being an immigrant.

Next, we consider the parameter estimates of the other control variables in columns (4)-(7). This is not the focus of our analysis, but sensible results indicate the robustness of our regression setup. The coefficient of Wage_{b5} is positive and significant for all regressions. This suggests that people with higher wages extend their working lives. Next, we observe that the coefficient of Wealth_{b4} is negative and significant for all regressions. This, again, logically suggests that individuals with higher wealth retire earlier, as (for example) they feel less financial need to work longer, or save more in order to retire earlier. A similar result is that the coefficient of OwnHouse_{b4} is negative and significant, as owning a house is another form of wealth. The positive effect of Wage^{p}_{b4} probably signifies some attributes that make an individual postpone their retirement and is correlated with their partner's income and we do not control for. That could be education level, for example. It is worth noting, that male individuals seem to be more responsive to financial incentives, as the point estimates for Wage_{b5}, Wealth_{b4}, OwnHouse_{b4} and Wage^{p}_{b4} are larger, in absolute terms, in column (6) compared to column (5).

The months fixed effects are most likely a combination of birth month fixed effects and the decision of individuals to retire later or earlier given the month that is most convenient. Finally, first generation immigrants tend to postpone retirement, most likely due to the fact that they have spend fewer years in the Netherlands and, hence, have accumulated both less state pension rights due to the residency requirement and less pillar two pension rights due to fewer years worked. Second generation migrants typically have spent their whole life in the Netherlands, explaining why no effect is observed for them.

Appendix B presents further robustness check that confirm the null result for the coefficient of interest. In conclusion, we find that individuals did not respond to the supplement discontinuation by delaying retirement.

5.2 Younger Partner Income Response

Next, we present the results for the income response of the younger partner. Similarly to before we use the 1948 and 1949 birth cohorts as control groups and the 1951 and 1952 birth cohorts as treatment

groups. As discussed in the methodology, we use a Heckman two-step regression that has the same set-up for the two steps as is Equation (2). The sample excludes individuals whose partner earned more than €20,000 5 and 4 years before they reached SPA. We also exclude households with wealth larger than €100,000 5 years before the individual's SPA, but the results are largely the same when we do not make this selection.

In Table 4 we present the results for the income of the partner in the calendar year that the individual reaches SPA. Column (1) displays the results for the female sample, (2) for the male, (3) for the male sample that own their house and (4) for those male individuals that do not.[10]

We present the results for both stages of the Heckman two-stage regression. The names for the coefficients follow closely those of Table 3. The coefficients of $\delta_{\mathbf{1951t}} \cdot \theta(\mathbf{A_i}) \cdot \mathbf{A_i}$ are insignificant in both stages. This means that the younger partners are neither more likely to work nor increase their working hours as a response to the supplement discontinuation when the individual reaches SPA (the year the shock arrives).

Columns (1)-(4) of Table 4 display the results of stage one of the Heckman two-step regression, i.e. the selection of whether the partner is working or not. This is a probit regression on the employment of the partners. The positive coefficient of $\theta(A_i)$ indicates that younger partners have a higher probability of working. This is expected, as older partners at the SPA of the individual are already retired.

Columns (5)-(8) display the results of stage two. This is a regression on the level of the income of the partners who work. With respect to the control variables, we observe the following. As expected, owning a house has a negative effect on the income of the partner (seems positive for male individuals, but only due to non-linearity of house-ownership as seen by columns (7) and (8)). First generation immigrants have a higher income, more likely due to the fact that they postpone retirement as seen in the previous section, but are less likely to work. Finally, we note that the inverse Mill's ratio is significant in columns (5) and (6), indicating that minor selection effects are indeed present.

Younger Partner employment response around individual's SPA

Next, we probe the income of the younger partner in the years around the individual's SPA. The results presented are driven by male individuals that own their home, so we will focus on this part of the sample. In Figure 4 we present the evolution of the effect on the probability of working (i.e., the first step Heckman regression) for which we have significant results over time, for male homeowners (i.e., for their mostly female partners). The figure plots the coefficients of $\delta_{\tau\mathbf{t}} \cdot \theta(\mathbf{A_i}) \cdot \mathbf{A_i}$ for birth cohorts 1949, 1951 and

[10]The separation on homeownership is not presented for female individuals, as the sample is not large enough (not many female individuals of that age have a younger partner) and therefore most of the results are insignificant

Table 4: Wage of Partner at SPA of individual.

	Employment				Income level (€)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Population	Female	Male	Male homeowners	Male non-homeowners	Female	Male	Male homeowners	Male non-homeowners
diff-in-diff								
$\delta_{\mathbf{1951t}} \cdot \theta(\mathbf{A_i}) \cdot \mathbf{A_i}$	0.000738	-0.00428	-0.00420	-0.00398	49.56	-18.45	1.680	30.97
	(0.35)	(-1.53)	(-1.24)	(-0.80)	(0.42)	(-0.44)	(0.03)	(0.46)
δ_{1948t}	-1.031^{***}	-1.549^{***}	-1.324^{***}	-1.635^{***}	89192.4^{***}	-12487.2	-733.3	12345.3
	(-15.99)	(-21.93)	(-10.00)	(-12.36)	(3.41)	(-1.28)	(-0.08)	(0.85)
δ_{1949t}	-1.083^{***}	-1.587^{***}	-1.353^{***}	-1.658^{***}	89555.7^{***}	-13332.5	-1681.0	11027.8
	(-15.29)	(-21.15)	(-9.92)	(-11.74)	(3.32)	(-1.35)	(-0.19)	(0.75)
δ_{1951t}	-1.168^{***}	-1.383^{***}	-1.138^{***}	-1.561^{***}	93074.5^{***}	-11151.2	166.3	11069.8
	(-16.06)	(-18.18)	(-8.46)	(-10.01)	(3.32)	(-1.23)	(0.02)	(0.79)
A_i	0.00552^{***}	0.00700^{***}	0.00776^{***}	0.00583^{*}	-190.3^{**}	82.24^{**}	68.87	-7.443
	(8.69)	(3.55)	(3.16)	(1.77)	(-2.22)	(1.98)	(1.42)	(-0.13)
$\delta_{1949t} \cdot A_i$	0.000449	-0.00244	-0.000944	-0.00402	-48.94	-36.41	-67.18	35.74
	(0.47)	(-0.92)	(-0.27)	(-0.94)	(-0.86)	(-0.93)	(-1.33)	(0.62)
$\delta_{1951t} \cdot A_i$	-0.00110	0.00308	0.00297	0.00240	14.34	9.492	-6.685	-34.15
	(-1.23)	(1.12)	(0.90)	(0.49)	(0.26)	(0.24)	(-0.14)	(-0.53)
$\theta(A_i)$	0.133^{**}	0.388^{***}	0.350^{***}	0.434^{***}	-235.2	5302.8^{***}	3506.0^{**}	310.5
	(2.02)	(6.91)	(5.26)	(4.05)	(-0.06)	(2.87)	(1.99)	(0.10)
$\delta_{1949t} \cdot \theta(A_i)$	-0.0354	0.106	0.0856	0.120	2012.3	1551.7	1528.4	1349.4
	(-0.36)	(1.30)	(0.88)	(0.76)	(0.36)	(1.30)	(1.16)	(0.66)
$\delta_{1951t} \cdot \theta(A_i)$	0.153	0.00766	0.00651	0.0613	-7941.2	642.1	454.2	2381.6
	(1.48)	(0.09)	(0.07)	(0.36)	(-1.28)	(0.58)	(0.38)	(1.12)
$\theta(A_i) \cdot A_i$	-0.00121	-0.000319	-0.000325	0.0000321	57.92	-12.31	-14.27	13.33
	(-0.86)	(-0.16)	(-0.13)	(0.01)	(0.72)	(-0.42)	(-0.38)	(0.32)
$\delta_{1949t} \cdot \theta(A_i) \cdot A_i$	0.00147	0.00146	0.000317	0.00226	-8.778	28.71	60.68	-30.86
	(0.71)	(0.54)	(0.09)	(0.52)	(-0.08)	(0.74)	(1.19)	(-0.57)
other controls								
OwnHouse_{b5}	0.0928^{***}	0.211^{***}	0.0175	0.0177	-3385.9^{*}	1754.8^{**}	-1193.3	-413.0
	(4.16)	(11.51)	(0.17)	(0.24)	(-1.84)	(2.18)	(-1.10)	(-0.55)
SPA Feb	-0.0683	-0.119^{**}	-0.194^{***}	0.0478	2978.5	-264.4	-596.0	1684.1
	(-0.94)	(-1.99)	(-2.70)	(0.43)	(0.68)	(-0.30)	(-0.57)	(1.41)
SPA Mar	-0.0186	-0.0370	-0.0626	0.0167	2391.6	629.5	150.8	2111.5^{*}
	(-0.27)	(-0.66)	(-0.94)	(0.16)	(0.59)	(0.89)	(0.20)	(1.86)
SPA Apr	0.00425	-0.0409	-0.0860	0.0817	755.8	-185.4	-568.1	804.9
	(0.06)	(-0.73)	(-1.30)	(0.78)	(0.19)	(-0.26)	(-0.74)	(0.68)
SPA May	-0.0116	0.00584	-0.0476	0.138	2776.6	564.2	25.75	967.0
	(-0.17)	(0.10)	(-0.72)	(1.30)	(0.69)	(0.82)	(0.04)	(0.73)
SPA Jun	0.0258	-0.0104	-0.0748	0.148	342.9	558.7	-150.7	1714.5
	(0.37)	(-0.19)	(-1.13)	(1.41)	(0.08)	(0.81)	(-0.20)	(1.27)
SPA Jul	0.0550	0.0288	-0.00629	0.117	5.660	935.2	371.0	1269.7
	(0.83)	(0.53)	(-0.10)	(1.13)	(0.00)	(1.38)	(0.54)	(1.01)
SPA Aug	0.0296	0.0352	0.0398	0.0247	-148.8	1182.1^{*}	429.3	2726.1^{**}
	(0.44)	(0.64)	(0.61)	(0.24)	(-0.04)	(1.73)	(0.61)	(2.48)
SPA Sep	0.0629	0.0451	0.0338	0.0813	-1827.8	653.8	283.1	463.0
	(0.94)	(0.83)	(0.53)	(0.78)	(-0.46)	(0.95)	(0.41)	(0.40)
SPA Oct	0.0348	0.0736	0.000827	0.256^{**}	2392.1	1365.8^{*}	479.1	1316.0
	(0.50)	(1.32)	(0.01)	(2.43)	(0.59)	(1.86)	(0.68)	(0.76)
SPA Nov	0.0571	0.0495	-0.00179	0.164	-635.0	1082.4	407.2	1184.2
	(0.83)	(0.89)	(-0.03)	(1.56)	(-0.16)	(1.53)	(0.58)	(0.83)
SPA Dec	0.0254	0.132^{**}	0.0875	0.228^{**}	1756.7	1741.8^{**}	831.4	1027.4
	(0.36)	(2.36)	(1.32)	(2.13)	(0.43)	(2.09)	(1.09)	(0.63)
Wage_0(in €1000s)	0.00925^{***}	0.00455^{***}	0.00376^{***}	0.00917^{***}	-132	68.9^{***}	53.4^{***}	-2.17
	(5.12)	(8.94)	(6.88)	(6.26)	(-0.79)	(4.09)	(3.90)	(-0.04)
First gen.	-0.176^{***}	-0.232^{***}	0.00545	-0.379^{***}	8462.6^{**}	-788.3	1072.6^{**}	1614.0
	(-4.21)	(-7.52)	(0.12)	(-8.45)	(2.46)	(-0.85)	(2.41)	(0.76)
Second gen.	-0.0391	-0.0237	-0.0212	-0.0316	2480.9	612.8	608.7	1002.4
	(-0.84)	(-0.65)	(-0.49)	(-0.45)	(0.89)	(1.35)	(1.32)	(1.35)
Wealth_{b5}(in €1000s)	-0.000282^{***}	0.000126^{**}	0.000109^{**}	0.00110^{*}				
	(-4.96)	(2.41)	(2.17)	(1.87)				
Mills lambda					-52664.0^{***}	9347.3^{*}	4644.6	-3176.0
					(-3.15)	(1.88)	(0.95)	(-0.45)
N	26,984	32,758	22,921	9,837	26,984	32,758	22,921	9,837

t statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

The dependent variable is the income of the partner. The table displays the results for the two steps of the Heckman regression for the wage of the partner at the individual's SPA. Regressions (1) & (5) use the female sample and (2) & (6) the male. (3) & (7) use male individuals that own their house and (4) & (8) male individuals that do not. *Notes:* Base month = March, Base immigration status = not immigrant.

1952 over time, with the zero of the x-axis at the SPA of the individual. It, therefore, gives the effect of the policy relative to the 1948 base birth cohort. For the 1952 birth cohort, data is available only up to one year before SPA. The coefficients are seen as scatter-points with the corresponding error bars that represent the 95% confidence level. As expected, the 1949 placebo birth cohort gives insignificant

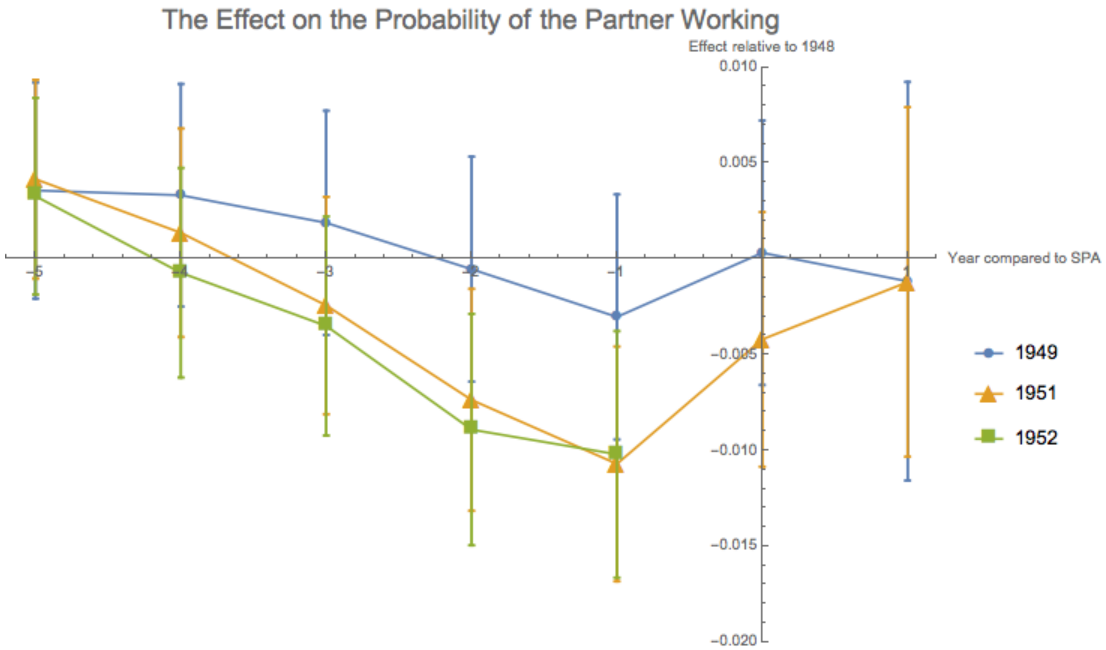


Figure 4: A graphical representation of the coefficients of the term $\delta_{\tau\mathbf{t}} \cdot \theta(\mathbf{A_i}) \cdot \mathbf{A_i}$, relative to 1948, for the probability of the partner working around the individual's SPA. The blue dotted curve corresponds to the birth cohort 1949, the orange triangle curve to 1951 and the green squared curve to 1952. The error bars represent the 95% confidence level. *Note:* The sample used is male individual homeowners, i.e. the effect is for the mostly female partners of male homeowners. Similar results are found for the level of the income, but with lower significance.

effects. For the other two treatment birth cohorts we observe a negative effect for the two years before the individual's SPA. As discussed in Section 4.4, this is the effect of the pillar two reform that happened simultaneously with the AOW supplement reform. This reform induces this spurious negative effects by altering the ability of individuals to coordinate their retirement with their older partner.

As discussed in Section 4.4, we use three checks to confirm the conjecture that the negative coefficients are due to the pillar two reform. First, as seen in Figure 4 the effect dies out at SPA. Second, as shown in Table 5 we observe the same negative coefficient also for individuals with high-income partner. Third, as shown in Table 6 the value fo the coefficient of $\delta_{\mathbf{1955t}} \cdot \theta(\mathbf{A_i}) \cdot \mathbf{A_i}$ is of similar size and opposite sign as $\delta_{1955t} \cdot A_i$.[11]

Therefore, we observe no employment response for the partner up to three years before the individual's

[11]The Table presents the coefficients for two years prior to SPA, but the same holds for one year prior to SPA.

Table 5: Effect on probability of work for low and any income partner

	(1) SPA-2	(2) SPA-1
	Low income partner	
$\delta_{\mathbf{1951t}} \cdot \theta(\mathbf{A_i}) \cdot \mathbf{A_i}$	-0.00736**	-0.0107***
	(-2.49)	(-3.42)
$\delta_{\mathbf{1952t}} \cdot \theta(\mathbf{A_i}) \cdot \mathbf{A_i}$	-0.00891***	-0.0102***
	(-2.89)	(-3.11)
	Any income partner	
$\delta_{\mathbf{1951t}} \cdot \theta(\mathbf{A_i}) \cdot \mathbf{A_i}$	-0.00782***	-0.0114***
	(-2.74)	(-3.76)
$\delta_{\mathbf{1952t}} \cdot \theta(\mathbf{A_i}) \cdot \mathbf{A_i}$	-0.0102***	-0.0133***
	(-3.46)	(-4.18)

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

The coefficients of $\delta_{\tau\mathbf{t}} \cdot \theta(\mathbf{A_i}) \cdot \mathbf{A_i}$ for the birth cohorts 1951 & 1952 for two (SPA-2) and one (SPA-1) years before SPA. The top panel displays the results for the sample in which the partner income five and four years before SPA has been capped to €20,000/year. The bottom panel displays the results for the sample with no constraint on the partner's income. *Note:* The sample used is male individual homeowners.

Table 6: Effect on the partner employment at SPA-2

	(1) Male	(2) Male homeowners
$\delta_{1951t} \cdot A_i$	0.00419*	0.00591**
	(1.67)	(2.11)
$\delta_{1952t} \cdot A_i$	0.00561**	0.00956***
	(2.24)	(3.28)
$\delta_{\mathbf{1951t}} \cdot \theta(\mathbf{A_i}) \cdot \mathbf{A_i}$	-0.00586**	-0.00782***
	(-2.31)	(-2.74)
$\delta_{\mathbf{1952t}} \cdot \theta(\mathbf{A_i}) \cdot \mathbf{A_i}$	-0.00681***	-0.0102***
	(-2.68)	(-3.46)
N	42758	30136

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Selected coefficients of the regression on the partner employment two years before the individual's SPA are displayed. Column (1) uses the male sample & (2) the male homeowners.

SPA and from the SPA onwards. Moreover, for two and one year before the SPA the coefficients presented in Table 5 for the sample including high-income partner are indistinguishable from the coefficients of the low-income partner sample. This indicates that no (sizeable) positive response due to the AOW

supplement reform is present in those years either.[12] Hence, we conclude that there is no partner labour supply response attributable to the supplement discontinuation.

5.3 Savings Response

Here we present the results for the savings response of the household. As mentioned in Section 4.3, we do so by looking at the response of the households through their stock of liquid wealth. We use a regression similar to Equation (2) but with the liquid wealth of the household t^* years prior to the individual's SPA, W^{t^*}, as the dependent variable. Similarly to Table 4, Table 9 in Appendix C presents the full regression results for the wealth of the household at the individual's SPA, including all regression estimates of the control variables.

Similarly to Figure 4, Figure 5, plots the effect on the liquid wealth of the households, for male homeowners, for the birth cohorts 1949, 1951 and 1952. There's slightly less data available for the wealth of the household compared to wages, hence we can only explore the effect up to SPA of the individual for the 1951 birth cohort. For the 1951 birth cohort we observe a negative effect one year before and at the

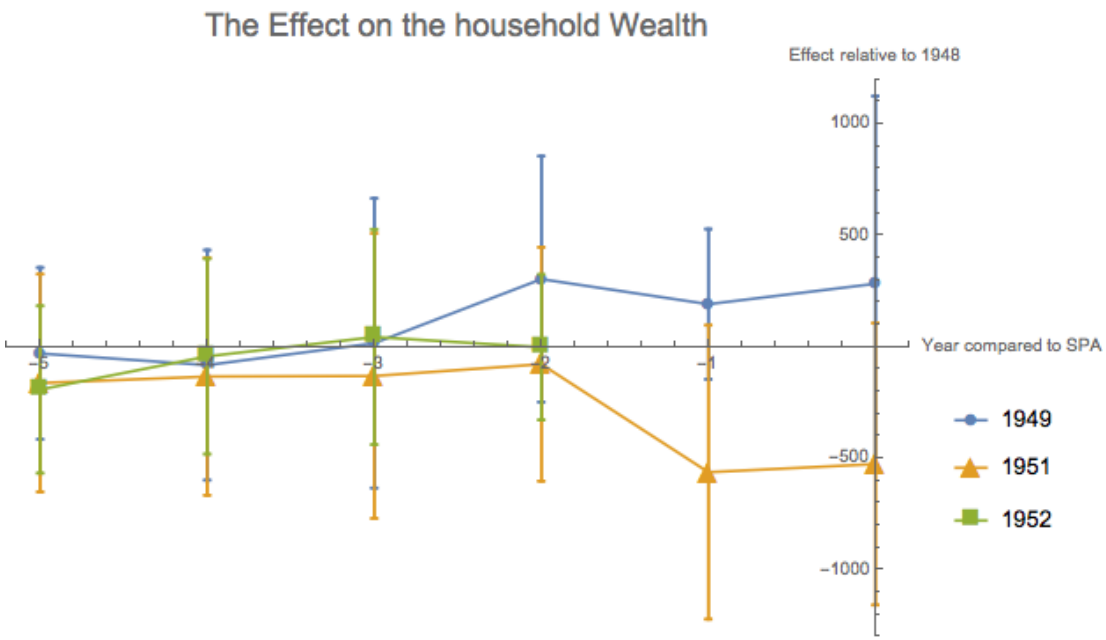


Figure 5: A graphical representation of the coefficients of the term $\delta_{\tau \mathbf{t}} \cdot \theta(\mathbf{A_i}) \cdot \mathbf{A_i}$, relative to 1948, for the liquid wealth of the households around the individual's SPA. The blue dotted curve corresponds to the cohort 1949, the orange triangle curve to 1951 and the green squared curve to 1952. The error bars represent the 95% confidence level. *Note:* The sample used is male individual homeowners.

SPA of the individual with a level of confidence of around 90% compared to the 1948 birth cohort and

[12] A positive response due to the supplement discontinuation would drive a wedge between there two values, making the one for the low-income partner sample less negative.

around 95% compared to the 1949 birth cohort. Wealth accumulated during a calendar year is booked in the tax data at the beginning of the next year. Hence the effect observed at one year before and at the SPA corresponds to wealth accumulated two and one year before SPA. Thus we attribute this negative effect to the labour supply effect of the previous section due to the pillar two reform.

Similarly to Table 5, Table 7 presents the relevant coefficients for the low-income partner and full samples. Again, the point estimates are closely matched, confirming that the negative effect is due to the pillar two reform. Finally, similarly to the labour supply effect the value fo the coefficient of $\delta_{\mathbf{1955t}} \cdot \theta(\mathbf{A_i}) \cdot \mathbf{A_i}$ is of similar size and opposite sign as $\delta_{1955t} \cdot A_i$ as seen in Figure 5.

Table 7: Effect on the household wealth

	SPA-1	SPA
	Low income partner	
	(1)	(2)
$\delta_{1951t} \cdot \theta(A_i) \cdot A_i$	-561.9*	-525.4
	(-1.67)	(-1.63)
	Any income partner	
	(3)	(4)
$\delta_{1951t} \cdot \theta(A_i) \cdot A_i$	-452.4	-458.1
	(-1.50)	(-1.64)

t statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

W^{t^*} is regressed. The coefficients of $\delta_{\tau\mathbf{t}} \cdot \theta(\mathbf{A_i}) \cdot \mathbf{A_i}$ for the birth cohorts 1949 & 1951 are given, one year prior to and at SPA. The top panel coefficients are for the sample in which partner income five and four years before SPA has been capped below 20,000 euros. The bottom panel refers to the sample with no constraint on partner income.

No savings response to the AOW supplement discontinuation is detected for up to two years prior to SPA. For one year before and at SPA the negative effect is of similar size for low and high-income partners, indicating again that no positive response due to the supplement reform is present. Hence, we conclude that there is no savings response attributable to the supplement discontinuation.

5.4 Discussion of Results

Our results indicate that households did not react to the announcement of the discontinuation of the AOW supplement. More precisely, they did not react in the years prior to being affected by the change, as would be expected according to consumption smoothening. Our data does not reach the years after the older individual reaches SPA, except for the income of the younger partner for the 1951 birth cohort that reaches until SPA+1, but results to an insignificant effect. This suggests that the households suffered a large shock in consumption after the older partner reached SPA. Below, we discuss possible interpretations

of our results. The first attributes the lack of significant responses to behavioural effects. Then, we discuss various scenarios of lack of information. Finally, we point out the implications of our results for policy decisions.

For a household where the partners have the average age difference of around 7 years, the total lifetime wealth shock due to the AOW supplement reform accumulates to around €70,000, if the younger partner has very low or no income. One explanation for the lack of response to this shock could be that pensioners cover the wealth loss with the AIO supplement.[13] This supplement ensures that couples live above the minimum subsistence level, equal to the minimum wage for a couple. However, in order for the partners to receive this supplement, they would be required to have little or no income other than the AOW of the older partner, and a maximum of €12,040 in assets. Therefore, only a very small part of our sample would be eligible, and, as it is discussed earlier, a majority of the eligible pensioners is unaware of the supplement itself.

An alternative, more realistic, explanation is that the lack of response is due to behavioural responses or due to lack of information (or both). The first can be interpreted in terms of the mental accounting framework (see Thaler, 1990). Under this framework wealth is non-fungible, meaning that households consider future income wealth as a different kind of wealth compared to current income and assets. As such, the marginal propensity to consume is considered by Thaler (1990) to be close to zero. This implies a zero wealth effect on both consumption on goods and services (i.e. savings) and leisure (i.e. labour supply). Our results can be seen as a positive test of this hypothesis, as the abolishment of the supplement is a future income shock on the households' budgets that is found to have no effect on the households' consumption and labour supply.

A first potential form of lack of information is that either the individuals in the birth cohorts prior to 1950 were not fully aware of the existence of supplement, or the post-1949 birth cohorts were not aware of its discontinuation. As long as both birth cohorts have informed views of their (different) future income they are expected make different retirement decisions. Information of the supplement abolishment, though, was widespread. The lack of knowledge about the policy change was, initially, noted by the institutions responsible for implementing it - e.g. the Sociale Verzekeringsbank (SVB). In response, individuals in the post-1949 birth cohorts received a letter from the SVB in 2010 notifying them of the policy change. The main goal of that action (that was clearly stated in the letter) was to incentivise the younger partners to work. It did not make explicit the loss in income, hence it is unclear

[13] See Chapter 2 and https://www.svb.nl/int/nl/aio/hoeveel_bijstand/hoeveel_eigen_vermogen/index.jsp.

if it was informative in terms of reshaping their expectations on their future income.

Finally, it is pointed out that the post-1949 birth cohorts were subjected to the pillar two reform as well. This reform was amply discussed in the public sphere, largely affecting the planning of those nearing retirement. Our analysis shows that individuals extended their work-lifes by an extra three to five years. Hence, it is likely that the AOW abolishment could have been overshadowed in terms of the attention payed by households with a sizeable pillar two pension.

All these forms of lack of information are expected, though, to be experienced by part and not the whole of the population. This is supported by the government surveys that show that even six years before the policy change 20% of the population was aware of the supplement abolishment. Therefore, information lack would dilute any possible effects of those that were informed, but not completely diminish them. Hence, the zero wealth effect on all three channels points to the existence of mental accounting in the households' planning. That would, as found in our analysis, result to no behaviour difference between the households that received the supplement and those that did not.

Policy Implications

Our results have two main implications for policy. First, the main focus of the letters sent to the individuals affected by the supplement abolishment was to incentivise their younger partners to increase their labour supply. The large announcement period was intended to give enough time to the households to become informed and reshape their expectations. It is clear from our results that households did not respond to the announcement. More specifically, the younger partners did not increase their labour supply neither at announcement nor after they were informed by a letter in 2010. The latter is not surprising, given that many of the partners had not worked their whole life and by that time they were reaching the age of 60. Hence, it can be concluded that either due to miscommunication with the households, or due to behavioural effects that shrink the horizons over which they view their finances, the announcement period had no effect. Given, therefore, that it played no role in helping households alter their path of consumption, no economic benefits to those affected are observed. This work, therefore, indicates that public finances were burdened for longer that necessary by the long announcement period. It is important to note, though, that it could have given a better social acceptance to the measure.

Second, whether the pre-1950 birth cohorts were unaware to the supplement or the post-1949 unaware or did not respond to it's abolishment is irrelevant in our analysis, but it is largely relevant in terms of policy. The first could lead to inefficient allocation of resources (as households save more than they need to for retirement) and the second to households in poverty. As mentioned earlier, the former case is

less likely. The latter, on the other hand, is aggravated by the fact that many of those households that dropped below the subsistence level did not apply for the AIO supplement. Policy makers responsible for such reforms often assume that households will respond to mitigate their negative effects. Our analysis suggests that this is not always true. Hence, stronger engagement with the public is necessary to avoid such policy changes affecting very negatively the marginal households.

6 Conclusions

This work investigates the effect of an announced pension cut on households' consumption and labour supply. More specifically, we probe households' response to the announcement of the abolishment of the Dutch state pension partner supplement. This was given to individuals with a low-income younger partner when reaching the state pension age. It was abolished in 2015, with the announcement of the abolishment 20 years earlier. The abolishment resulted in a negative shock in the households' future income. Given our dataset, we explore the reaction of the households before they are hit by the income shock, i.e. how they respond in anticipation to the abolishment.

Standard Life-Cycle models predict that, given an expected negative shock in their income, households will react accordingly to smooth consumption. I.e. that they alter their consumption and labour supply path. We investigate three possible response channels: a delay in retirement of the older partner, an increase in the labour supply of the younger partner, and an increase in the households' savings rate. We deploy a differences-in-differences-in-differences regression, using birth cohorts retiring before 2015 as controls and age difference between the partners as the treatment variable. This allows us to investigate the effect per month of age difference of the partners, hence per euro of total future income loss. We find no significant results in all channels attributable to the supplement reform.

The setup of this analysis is unique in a number of ways. First, we use microdata based on tax accounts, which allows us to compute the effect with large accuracy. Second, the total wealth shock considered is sizeable, equal to around €70,000 for a couple with the average age difference and a young partner with very low or no income. This shock is dependent on the age difference of the partners and is targeted to a specific group of the population - namely individuals with low-income younger partners. Third, as beyond the income requirement for the younger partner, the supplement had no other restrictions, the sample considered is rather diverse, as it includes households with various income and wealth levels. Fourth, an active campaign to inform the public about the policy change took place and, fifth, a long announcement period would allow for households to alter their behaviour early enough. Sixth,

we investigate various channels of response, allowing us to reach a complete picture of the households' reaction.

Any wealth effect of the abolishment on all three channels could have been diluted by the lack of information in part of the population, but not become completely absent. We attribute the complete lack of response in all channels, though, to mental accounting. Under this framework households are considered to have a zero marginal propensity to consume future income. Given that the abolishment was a large shock in the future income of households with no effect on their consumption and labour supply, our result constitutes a positive test to the mental accounting hypothesis.

In terms of policy, our results deem the long announcement period unnecessary. Households did not take advantage of it, but there were costs in terms of continued government expenditure. That has implications for other policy changes that alter the future income of households. Our analysis suggests that individuals will not alter their behaviour during the announcement period. Hence policy makers can - from a welfare point of view - avoid providing long announcement periods, or, if the income shock is very large, they ought to engage the public very actively to mitigate any large negative consequences.

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A Sample building

Datasets

We merge various datasets from Statistics Netherlands. For individual labor income we use POLISBUS & SPOLISBUS from 2007 to 2017.[14] In addition, we use ZELFSTANDIGENTAB which contains the income from self-employment of individuals from 1995 to 2015. The data on household wealth is obtained from VEHTAB which contains data on the wealth of households from 2006 until 2016. It provides information about various form of assets and liabilities (house wealth, bank savings, stocks, mortgages, etc.) of the households on January 1st of every year. The retirement dates up to December 31st 2016 are obtained from PENSOVPERSOONBUS, which contains the date individuals start drawing income from their pillar two or three pension scheme. Additional information on the individuals, such as sex, date of birth and migrant background is obtained from GBAPERSOONTAB. To merge individual data to household data across time we use GBAHUISHOUDENSBUS.

Merging

These data sets were combined in order to create the sample of our interest. The process, along with our assumptions, are the following:

Since the law was enacted in 2015, the year in which the 1950 birth cohort retired (partially), target all individuals born between 1945 and 1955. This was merged with the couples database in order to create a database of all couples where at least one person in the household was born in the years 1945-1955 (the individual). We restricted our sample to couples who have been continuously together from 1996 (the year of the announcement of the law change) until 2017. In this way we ensured that couples have been continuously planning their finances as partners, both in case they respond early (at announcement) or later, near the SPA of the individual. We excluded households where at least one of the partners had a sizeable self-employed income, earning more from self-employment than wages in any year from 2007 to 2015 (this reduced the sample by 14.6%).[15] Thereby, we avoid the volatility of income from self-employment over the crisis period, as it would include multiple loss-making individuals who would skew the results. A small percentage of households has no wealth data (might not file tax returns) or the two partners have different wealth (they file separate tax returns). We remove these individuals from the sample. Finally, we drop households where at least one of the partners had a war pension since birth (1.4% of the sample), mostly due to a lost relative during the second world war. We also drop individuals

[14] POLISBUS includes data from 2006 to 2009, the 2006 data was not used, in order to avoid incomplete data, given that it was the first year these microdata were collected. SPOLISBUS includes data from 2010 to 2017.

[15] Data of self-employment income for 2016 and 2017 are not available.

from the Dutch colonies who received a pension on January 1960 (3.2% of the sample), and all those that retired before 1996 (2.3% of the sample), as the policy change was announced later on.

The resulting database includes all couples that have been continuously together since 1996, where the individual is born between 1945 and 1955, and the main source of income of the household are wages. In this database we have wages, house-ownership and household liquid wealth around the year where the individual reaches SPA, along with the retirement year and month of individuals and their partners.

Variable construction

The date that individuals reach SPA is calculated, given their date of birth and the corresponding SPA from the Dutch Tax Agency.[16] The wage income of all individuals and their partners t^* years from the date the individual reaches SPA is used, where t^* run from five calendar years before SPA until two calendar years after. This is done in order to be able to compare different birth cohorts around SPA.

The retirement dates of individuals and their partners were set equal to the dates in which individuals started drawing income from their pillar two or three pension scheme, up to and including the end of 2016.[17] For those without retirement data (around a quarter of the sample) the majority were people who had not accrued any pension rights as they had not been active in the labour market. We classified individuals without pension accumulation as the ones with a wage income smaller than €5000/year for all years 2007-2017. For the rest (around 1% of the sample), we defined their retirement year as the last year in which they earned more than €5000, excluding any possible pension income (taking into account the case were they make less than that due to retirement in the middle of the year).

B Robustness Checks

We, finally, explore the effect of choosing the control and treatment groups in various ways. For example, it could be the case that only households where the partner has even lower income than €20,000/year react. Then the response would be visible if we constrain their income in the sample even further. Similarly, we can constrain the wealth of the household, as rich households could have a relatively smaller incentive to save. Given the different retirement behaviour of the birth cohorts and the fact that we choose our sample by looking at the wage of the partner five years before the SPA of the individual we can, also, explicitly

[16] `https://www.belastingdienst.nl/wps/wcm/connect/bldcontentnl/belastingdienst/prive/werk_en_inkomen/pensioen_en_andere_uitkeringen/wanneer_bereikt_u_de_aow_leeftijd/wanneer_bereikt_u_de_aow_leeftijd`, accessed 12/05/2018

[17] The analysis of the retirement response is looking at the response in terms of a change in early retirement. Only a very small number of people works after reaching SPA. We have checked this for the birth cohort 1945, for which we have retirement data for many years after SPA.

Table 8: Response with various control and treatment specifications

Population	(I) Analysis sample	(II) Female	(III) Male
Placebo 1948-49	-0.0128	0.0317	0.00120
	(-0.40)	(0.31)	(0.02)
Not Retired Partner	0.146*	-0.0138	-0.0482
	(1.71)	(-0.09)	(-0.29)
Not high wealth	0.0648**	-0.0773	0.0268
	(2.09)	(-0.64)	(0.51)
Low wealth	0.0741**	-0.0559	0.0485
	(2.26)	(-0.44)	(0.88)
Low partner wage	0.0637**	-0.0361	0.0289
	(2.01)	(-0.31)	(0.54)
Placebo high partner wage	-0.216**	-0.395***	0.298
	(-2.02)	(-3.29)	(0.62)
Small Age Difference	0.106	0.372	-0.104
	(1.36)	(1.31)	(-0.88)

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

R_{it}, the early retirement of the individual, is regressed using the extra controls. The coefficient of $\delta_{\mathbf{1951t}} \cdot \theta(\mathbf{A_i}) \cdot \mathbf{A_i}$ is displayed for the various sample specifications. Estimates in column (I) use the whole sample, (II) only female individuals and (III) only male.

exclude partners that have already retired. Table 8 presents the coefficients of the $\delta_{\mathbf{1951t}} \cdot \theta(\mathbf{A_i}) \cdot \mathbf{A_i}$ term (i.e. the policy change effect) for various treatment and control group specifications. "Placebo 1948-49" runs a placebo regression where the control group 1948 is compared to the 1949 birth cohort as a placebo treatment group (i.e. formally the variable of interest is $\delta_{\mathbf{1949t}} \cdot \theta(\mathbf{A_i}) \cdot \mathbf{A_i}$). "Not Retired Partner" refers to the sample where the partners, in both the treatment and control groups, have not retired when we select them based on their income, so that selection bias is avoided. "Not high wealth" caps the wealth of the household at €100,000 five years prior to the individual's SPA, and "Low wealth" caps it at €50,000. "Low partner wage" uses the €100,000 cap on wealth and, moreover, caps the partner income four and five years before the individual's SPA to €15,000/year. "Placebo high partner wage" uses the same wealth cap, but considers only individuals with partners with income higher that €20,000 - in this case individuals were not affected by the policy change. Finally, "Small Age Difference" constraints the sample to couples with a maximum of five years age difference. In this way we minimise any possible non-linear age difference effects.

First, we observe significant results in column (I) for most samples. As discussed before, though, this is just due to the non-linear dependence on the sex dummy variable. Crucially, the coefficient is not significant for the 1948-1949 placebo regression. This re-enforces our earlier explanation that the significance on column (I) is due to the different response of male and female individuals to the pillar two policy change. Given that no such change occurred between the 1948 and 1949 birth cohorts, we observe no significant result. Columns (II) and (III) confirm our earlier results, namely the absence of any response in the retirement of the individual. The high partner wage placebo does indicate a significant effect, but this is most likely due to the small sample of this specification. It includes only around 200 female individuals with younger partner.

Summarising, our results indicate that individuals do not respond to the policy change by postponing early retirement. This is confirmed by using both 1948 and 1949 as the base control birth cohort, as well as using different controls and treatment group specifications with regards to wage and wealth levels. The next subsection explores whether households adjust to the income shock by means of the partner increasing their labour supply.

C Wealth Regression

Table 9: Regression on the household Wealth at the individual's SPA.

	(1)	(2)	(3)	(4)
Population	Females	Males	Males homeowners	Males non-homeowners
diff-in-diff				
$\delta_{\mathbf{1951t}} \cdot \theta(\mathbf{A_i}) \cdot \mathbf{A_i}$	-172.3	-410.4^{**}	-525.4	-199.9^{*}
	(-0.99)	(-2.08)	(-1.63)	(-1.88)
δ_{1948t}	8968.2	20696.7^{***}	23288.0^{**}	13516.0^{***}
	(1.16)	(2.92)	(2.30)	(4.10)
δ_{1949t}	8209.9	11016.1	8283.1	15767.2^{***}
	(0.87)	(0.98)	(0.55)	(4.42)
δ_{1951t}	10870.5	32970.7^{***}	41102.7^{***}	14595.8^{***}
	(1.04)	(2.86)	(2.63)	(3.57)
A_i	-59.57	-181.7^{**}	-233.9^{*}	-110.9
	(-1.08)	(-1.96)	(-1.71)	(-1.16)
$\delta_{1949t} \cdot A_i$	-197.0	-62.39	-199.4	131.3
	(-0.79)	(-0.25)	(-0.50)	(1.26)
$\delta_{1951t} \cdot A_i$	-0.696	347.1^{**}	457.6^{*}	177.8^{*}
	(-0.01)	(2.20)	(1.77)	(1.72)
$\theta(A_i)$	-28286.7^{**}	6614.4	9440.3	2782.1
	(-2.14)	(1.12)	(1.11)	(1.00)
$\delta_{1949t} \cdot \theta(A_i)$	21787.1	5349.3	9175.1	-4445.8
	(1.54)	(0.38)	(0.46)	(-0.95)
$\delta_{1951t} \cdot \theta(A_i)$	35677.4^{**}	-4104.9	-6576.4	-865.2
	(2.38)	(-0.39)	(-0.45)	(-0.21)
$\theta(A_i) \cdot A_i$	260.9^{*}	42.39	26.02	86.89
	(1.85)	(0.36)	(0.14)	(0.89)
$\delta_{1949t} \cdot \theta(A_i) \cdot A_i$	87.28	98.06	283.2	-164.0
	(0.31)	(0.37)	(0.66)	(-1.52)
other controls				
OwnHouse_0	8161.5	207.9		
	(1.35)	(0.08)		
Wage_{b5}	0.0822	-0.148	-0.203	0.115
	(0.42)	(-0.68)	(-0.78)	(1.12)
SPA Mar	1538.1	-1569.4	-2286.9	-144.9
	(0.16)	(-0.31)	(-0.31)	(-0.06)
SPA Apr	46428.2	-7892.4	-12297.1	1256.2
	(1.64)	(-1.00)	(-1.09)	(0.56)
SPA May	-3277.0	-2997.5	-5358.9	1547.2
	(-0.34)	(-0.55)	(-0.68)	(0.68)
SPA June	3304.4	8150.5	10971.6	511.8
	(0.34)	(1.22)	(1.11)	(0.24)
SPA July	3567.9	-3123.8	-5351.2	281.7
	(0.37)	(-0.54)	(-0.65)	(0.11)
SPA Aug	97.81	-391.2	-1939.2	2152.1
	(0.01)	(-0.06)	(-0.20)	(0.77)
SPA Sept	7357.5	-16724.5	-25426.6	5082.6
	(0.64)	(-1.01)	(-1.12)	(1.26)
SPA Oct	-911.4	-11835.9	-19059.8	3988.8
	(-0.08)	(-0.81)	(-0.94)	(0.96)
SPA Nov	8155.4	3399.9	3583.3	1409.2
	(0.72)	(0.43)	(0.32)	(0.41)
SPA Dec	-1904.0	3646.8	1775.9	5380.7
	(-0.15)	(0.46)	(0.16)	(1.36)
First gen.	-20238.9^{***}	901.7	9586.7^{*}	-6899.0^{***}
	(-3.43)	(0.32)	(1.91)	(-4.04)
Second gen.	-5840.1	5331.5	8175.6^{*}	-1194.1
	(-1.12)	(1.49)	(1.66)	(-0.51)
N	13,658	16,801	11,788	5,013
r2	0.00507	0.00659	0.00586	0.122

t statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

The wealth of the household at the individual's SPA, W^0, is the dependent variable. Regression (1) uses the sample with female individuals and (2) with male. (3) includes only male homeowners and (4) male non-homeowners. *Notes:* Base month = March, Base immigration status = not immigrant.