

# Trust in pension funds financial performance, its' public perception, and their effect on voluntary pension savings participation.

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## Abstract

We investigate the determinants of trust in one's pension fund and the effect of trust on having additional pension savings. Our identification is based on using exogenous shocks due to pension cuts and indexation, and how these are perceived. These instruments allow identifying the effect of trust in pension funds on participation in voluntary pension savings. We disentangle the effect of age, birth cohort and time in the determination of trust, and contradict previous findings of a positive age gradient with trust. This implies that in the future the general level of trust in pension funds will decline. This study also finds a positive effect of trust on additional pension savings. Hence, the positive correlation found in previous studies can be interpreted as unbiased. Lastly, we add to the current debate on self-employment and retirement preparation. Our findings suggest that the decision to become self-employed and arrange for one's own pension savings is likely not driven by the desire to exit the occupational pension system, as those who make additional pension savings arrangements – self-employed workers among them – actually trust their pension fund.

*Keywords:* Trust, additional pension savings, cohort-time effect, self-employment

JEL codes: G51, J32

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# 1. Introduction

The Dutch pension system suffered from threats to sustainability, that built up over decades. Underlying causes were aggravated population aging, the occurrence of a deep financial crisis, a prolonged period of low interest rates, and structural shifts in the labor market, such as the strong growth in non-traditional forms of employment, that induced many workers to leave the occupational pension system.

All these developments put pressure on the ability of funds to conduct their tasks of providing defined benefits to their participants. For instance, the financial crisis induced a drop in the funding ratio of many pension funds. This required recovery measures, including a halt on indexation, or even curtailing nominal benefits. These recovery measures could have reduced trust in pension funds, who were seen as breaking their promises of delivering a certain level of benefits. It is in this context that the Dutch government drafted a reform strategy of the pension system, which is expected to be come into force by July 2023.

. We discuss the relevant elements of the proposed policy changes in the next section.

Previous studies, schematically summarized also in the appendix, already highlighted the impact of the (perceived) performance of pension funds on trust in the abilities of one's pension fund. Van der Cruijssen and Jonker (2019) find that trust in the pension funds' ability to pay benefits at all times is negatively related with the belief that the pension fund had to take any recovery measures. Using dummy variables for nominal benefit curtailing and indexation, Van Zaal (2017) also finds a significant effect of cuts and indexation on trust. His findings indicate that the negative effect of cuts is age-related and especially important for the elderly, while the indexation dummy was only significant for the working population.

The present study elaborates on the role of recovery measures when it comes to trust, and links it to participation in voluntary pension savings. The level of trust in Dutch pension funds underwent a significant drop in 2008, and recovered only marginally afterwards. For policy questions, it is important to know what behavior this may have unlocked (Van der Cruijssen et al., 2019). Earlier literature found a positive effect of trust on the willingness to participate in a pension system. For example, Van Dalen and Henkens (2015) find a correlation between a lack of trust and a higher tendency to opt out. The research by Agnew et al. (2012) on automatic and voluntary enrolment in 401(k) savings plans in the US shows similar findings. They find that a low level of trust in financial institutions is essential for explaining saving behavior. Related research by Agnew et al. (2007) suggests that participants are more likely to opt out of automatic enrolment plans when their trust is low. However, the aforementioned studies only consider the correlation between trust and pension participation. Because trust as well as saving behavior may be affected by many unobservable variables – including the

attitude to risk or the propensity to save – a causal relationship cannot be established by these studies. Moreover, there may be a reversed causality problem, in which the direction of the relationship between trust and pension savings is difficult to determine. In a study of the intertwining of financial literacy, trust in financial institutions, and retirement planning, Ricci and Caratelli (2017) address the issue of potential endogeneity of trust. The authors initially opt for an Instrumental Variables (IV) approach, but because they also account for the potential endogenous regressor financial literacy, the identification strategy and interpretation of the result is troubled. To correctly disentangle trust and financial literacy, the authors use a regional-based indicator of social capital as a proxy for trust. They find that social capital positively impacts workers' decision of entering a private pension scheme and to move severance pay receipts to voluntary pension schemes. The authors acknowledge the limitations of their proxy and encourage further research on the causal impact of trust. Our study responds to this encouragement: we propose to use new instruments to explain trust, namely the exogenous (negative) shock to pension funds' investments and the perception thereof. We incorporate this into our empirical approach using information on respondents' pension indexation, and the awareness about these shocks by pension participants. We believe this is a relevant first step in an attempt to assess the effect of trust on voluntary pension saving. Yet the validity of our instruments, mostly because of how the cuts were implemented, can be questioned on different grounds. For instance, pension funds that were forced to apply cuts were diverse in many regards (assets, number of participants, past performance). Some characteristics that are difficult to quantify are worth mentioning; for instance many of these pension funds cover sectors that include many self-employed (such as pharmacists and dentists), or they cover specific firms.

The present study aims at making some progress in estimating the unbiased effect of trust on the decision to participate into voluntary pension savings. Voluntary pension savings become an option to consider if one does not trust that occupational pension funds will be able to pay out a pension benefit. More specifically, we are interested in what determines trust in the own pension fund and what is the effect of trust on having additional pension savings. Thereby, we try to circumvent the effect of unobservable variables that influence both trust and pension saving behavior. This is done here through an IV approach as well, where recovery plan information at the pension fund level on indexation is the proposed exogenous instrument for trust, along with the possibility that a respondent could have misperceived this shock. Misperception is defined as either erroneously believing that the shock was suffered, or being unaware of recovery measures that actually were implemented). We will combine data from the DNB Household Survey, DNB Trust Survey, and data from the recovery plans that DNB approved for pension funds violating their Financial Assessment Framework.

The effect of trust in one’s pension fund on having additional pension savings could be expected to follow alternative pathways. Trust is positively related to the willingness to participate in the pension system. Conversely, a low level of trust in one’s pension fund can cause participants to not save voluntarily (for instance in voluntary pension saving schemes), and in extreme cases, exit wage employment in order to avoid occupation pension savings. On the other hand, higher levels of trust could also cause a lower level of participation in voluntary pension savings arrangements: individuals who trust their pension fund might not feel the need to build additional financial buffers. In the present study, we also show how trust is affected by indexation and cuts, thus by the variation in (expected future) income; and this means that saving decisions can be affected too, for instance by way of a displacement effect. These competing explanations are central to our study.

The influence of personal attributes on trust in pension funds received increasing attention by researchers, age being one of the most prominent factor. In their analysis on determinants of trust in the pension sector, Van Dalen and Henkens (2015) ascribe a considerable role for age to explain the difference in levels of trust. They argue that over the life cycle, it becomes increasingly more distinct what to expect from your pension funds. The authors state a positive effect of aging on trust in one’s pension fund.

Our findings, instead, suggest that it is not an age effect, but a cohort-time effect that explains the lower level of trust for younger generations. In turn, we also see that trust in one’s pension fund induces participation in voluntary pension savings. Our IV models show that the effect of trust increases relative to simple OLS, suggesting traditional attenuation bias.

Lastly, this study adds to the debate on self-employment and retirement preparation. Self-employed workers must make private saving arrangements as they are not automatically included in the occupational pension system. A recent study from DNB shows that when this group lacks occupational pension savings, they typically also lack other type of savings. Most notably private pensions, but also other financial investments and even real estate investments (DNB, 2022). This could be due to many factors, including market failures (such as opacity) but also preferences. Karpowicz (2019) suggest that individuals who prefer pension plans with more freedom of choice are more likely self-employed. Van Dalen and Henkens (2015) show that dissatisfaction is one of the reasons to opt out of the pension system if it were possible to do so. The compulsory nature of the occupational pillar, in combination with funds’ increasing financial stress in the recent past, led many to wonder whether a desire to exit the compulsory pension system was driving the decision to become self-employed. Our findings suggest that this is not the case as those who make additional saving arrangements for a pension, self-employed workers among them, actually do trust the pension funds. We show that self-employed workers respond less strongly to trust as a driver of having additional pension

savings. So, the increasing share of self-employment may be driven by factors unrelated to trust in the pension funds, such as labor market rigidities.

The remainder of the study is organized as follows. Section 2 provides background information on the Dutch pension system and the changing labor market. Section 3 presents the data and the descriptive analysis. The results of the empirical analyses are presented in Section 4, followed by a sensitivity analysis in Section 5. In Section 6 we summarize our results and discuss some policy implications.

## 2. Institutional context

### 2.1 Occupational Pensions

In the Netherlands, a capital funded occupational pensions exists on top of a pay-as-you-go (PAYG) flat-rate state pension. Even though it is not mandatory for employers to offer an occupational pension plan, about 90% of the employees are covered by occupational pensions, owing to a strong lobby by the trade unions (Van der Crujisen and Jonker, 2019). Consequently, occupational pensions are often described as quasi-mandatory (Westerhout et al., 2021). Benefits are traditionally determined by individual contributions, in a defined benefit (DB) manner. However, actual entitlements depended on the financial performance of the pension funds, through the possibility of indexation or by nominal entitlement reductions (Beetsma et al., 2015). Whether a fund can index the nominal benefits to the wage or price inflation – and keep the purchasing power of retirees constant – depends on a fund’s funding ratio. The funding ratio reflects the ratio between available assets and the pension benefits liable to the current and future members. In general, if the funding ratio exceeds 110%, funds are allowed to index the nominal benefits partially or fully. Yet, if the funding ratio is too low, a fund may have to opt for measures such as higher contribution rates or reductions of benefits.

In the aftermath of the financial crisis of 2008-2013, many funds came under financial distress, struggled to index the current benefits and had to increase their premiums. This also led to a policy response, as per January 2015 a new financial assessment framework (new FTK in Dutch) was introduced. The new framework aimed at making the occupational pension system more stable, fair, and resilient to shocks. A main section of the new framework was dedicated to discounting methods for future liabilities. The most relevant part for our investigation deals with the actions to be taken if financial recovery were needed. The new framework made it possible to increase the risk profile (required funding ratio) once, at the point when the new FTK was enacted. Pension funds still had to maintain a high performance, but with renewed attention to investment risks. Funds must manage risk by conforming to risk assessment requirements, as the required funding ratio of funds in recovery mode would be increased if these were to invest in risky assets. In the new FTK, recovery modes are still imposed by the supervisor (DNB) and revolve around three possible actions: indexation stops, cuts to pension benefits, and increases of pension premiums for active participants.

Through a series of reforms starting in the late 1990s, in the new pension system that is being introduced at the moment, accrued pension wealth will be adjusted according to the funds’ performance on the financial markets (Westerhout et al., 2021). Consequently, indexation and pension cuts will happen *ex ante* during the accrual phase. Hence, the new

system does not make any promises about future benefits and aims to improve the transparency of how premiums are translated into benefits.

## **2.2 Voluntary savings**

Private savings and individual insurance plans can benefit of (fiscal) facilities and legal protections (and restrictions) that are similar to those of occupational pensions. Contributions are made on a voluntary and individual basis, mostly to insurance companies. Savings are payroll tax-exempted and so are the returns (Beetsma, 2015). Employees who wish to increase their pension savings can benefit from these types of savings, although they are mostly intended for self-employed workers who do not have an occupational pension. On aggregate, the savings involved are modest (CBS, 2020). Only a small group of employees has them, and by no means all self-employed workers arrange their pension savings voluntarily. Fiscal benefits and legal protections (creditors have no recourse to voluntary pension savings, for instance) are counterbalanced by the illiquidity and immobility of these instruments. Personal assets and homeownership are often referred to as being an additional pillar to the voluntary system. Self-employed workers often rely on these types of savings (Damman et al., 2020).

## **2.2 The Dutch labor market**

Over the course of 20 years, the share of self-employed increased from 11% to 17% of the employed population (OECD, n.d.). Of this group, most work as self-employed without employees (solo self-employed) (CBS, n.d.). Moreover, the profile of the self-employed became increasingly heterogeneous. The group of solo self-employed ranges from highly trained workers providing their skills and services to other businesses to low-skilled workers to whom certain tasks are outsourced. In particular low-skilled solo self-employed working as freelancers or sub-contractors bear higher labor market risks, with no job security and on average, lower incomes (Jansen, 2017). Labor market rigidities such as mandatory participation in worker insurance systems (disability, unemployment, and old-age), attract workers into self-employment who prefer more flexibility. On the other hand, when employers want to avoid the same rigidities, workers can essentially be forced into self-employment (Hershey et al., 2016). For example, self-employment became the standard for certain jobs such as mail (and food) carriers – making it easier for employers to hire and fire their personnel (Jansen, 2020). Consequently, as the share of self-employed workers rises, more workers have become personally responsible for their retirement savings. Many such workers tend to be financially less well-off and more in need of pension savings for their future financial well-being (Hershey et al., 2016). Pension accrual of self-employed is remarkably lower than that of employees. This holds when all aspects of wealth are considered, including private wealth and housing (Zwinkels et al., 2017, and Hershey et al., 2016)

### 3. Data and descriptive analysis

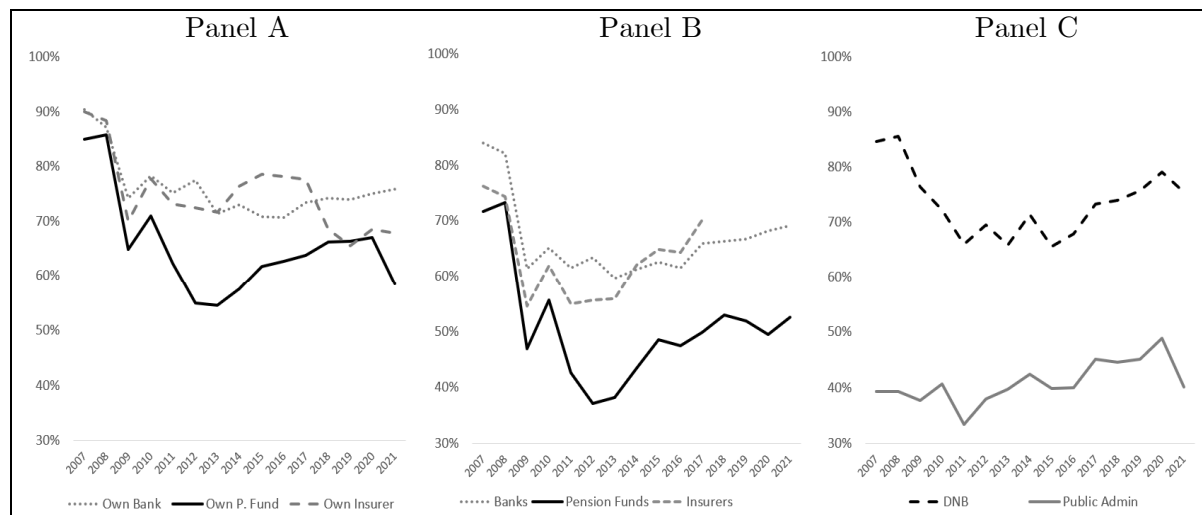
#### 3.1 Data

We use the DNB Household Survey (DHS), a sample representative of the Dutch population. The DHS annually collects information on economic and psychological determinants of household savings and is administered by CentERdata (Teppa and Vis, 2012, Marchand, n.d.). The DHS has a cross-sectional and panel component. We investigate data from 2007 to 2020. Survey participants are asked which pension fund they participate into, and this information can then be linked to balance sheet information of the different funds. We also use two additional datasets. The funds' balance sheet data is collected by the Dutch Central Bank (DNB). Finally, we use the supplementary DNB Trust Survey (DTS) in which participants are asked to respond to several statements on trust about financial institutions. This is a special module of the DHS sponsored again by DNB, that can be merged to the DHS at the person-year level.

#### 3.2 Descriptive statistics

In the DTS, respondents are asked to evaluate how much trust they have in a number of financial institutions.

**Figure 1:** Share of respondents with trust in some financial institutions



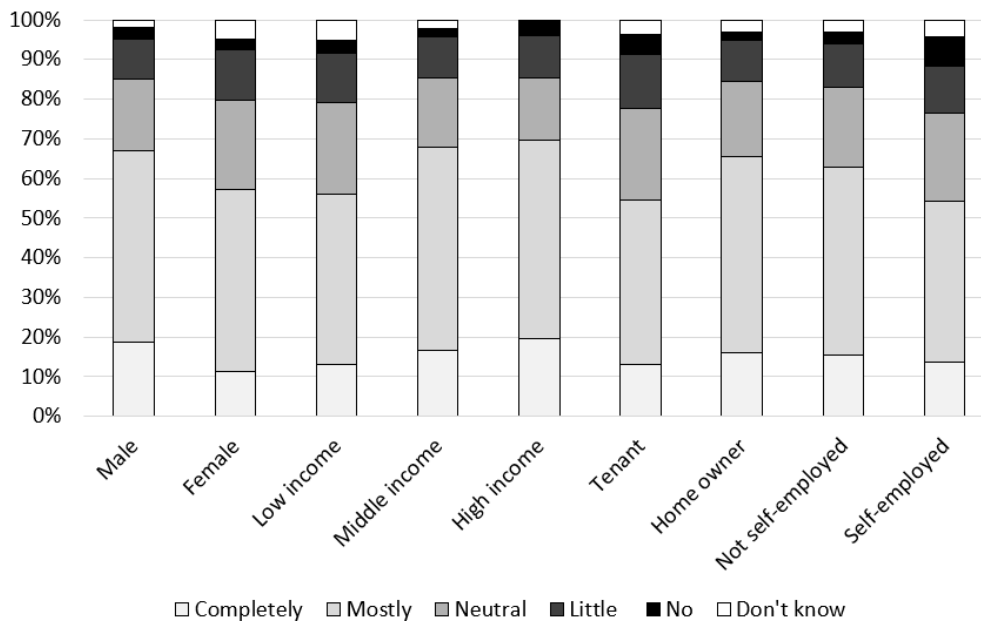
**Explanatory note:** Source DTS 2007-2021. Panel A shows trust in the own bank, pension fund and insurer. Panel B shows trust in general in banks, pension funds, and insurers. Panel C shows trust in the Dutch National Bank and in the public administration in general.

In Figure 1, we show evidence for pension funds, banks, insurers, the public administration in general, and the central bank (DNB). The wording of the survey questions pertaining to different institutions is somewhat heterogeneous. For pension funds it is asked whether one



trusts that funds will be able to pay pensions in the future. For banks, the poll probes whether banks will be able to return deposits, and for insurers whether they can manage to face their obligations. As for DNB and the public administration, the question is simply how much trust in general respondents have. As the answers are categorical, but the categories differ across questions, we have created a dichotomous variable that is equal to 1 if one reports any form of trust, and zero there is no trust or one is neutral. Don't know answers are here discarded. The figure shows that, before the financial crisis, respondents trusted similarly both their own pension fund, insurer and bank, while during the crisis, trust diminished the most for the own pension fund. Until the present day, trust has not recovered to pre-crisis levels for any of the financial institutions. Trust in pension funds is structurally lower than trust in banks, and insurers, and DNB. Only the public administration scores lower than any of the financial institutions. Trust in the own pension fund is heterogenous across the population and associated with the social-economic status of the respondent (see, Van der Crujisen and Jonker, 2019). Figure 2 shows the distribution of trust across gender, income and employment status. It shows that trust increases with income, and it is higher for males, home-owners and respondents not currently self-employed.

**Figure 2:** Trust levels of different groups, year 2021

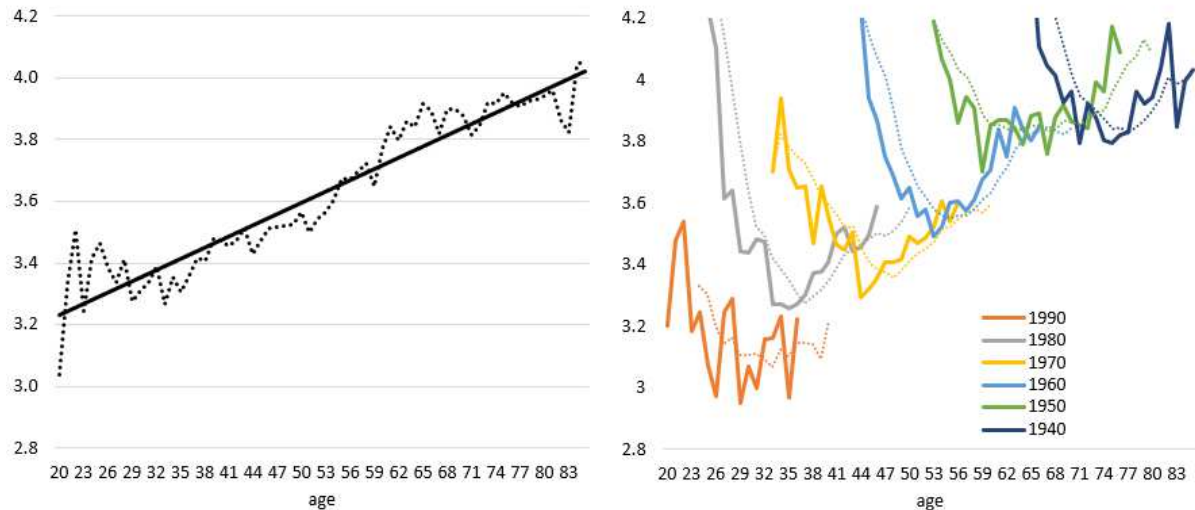


Source: DTS and DHS, own computations.

Cross-sectional analyses by Van Dalen and Henkens (2015) and Van Zaal (2017) find a positive age gradient with trust. The left panel of Figure 3 appears to confirm this. In the right panel, however, we show that much of the age patterns can be attributed to cohort-time effects. Older cohorts are endowed with higher levels of trust and, with the exception of the shock due

to the financial crisis, these tend to stay quite constant. While the positive age gradient suggests that trust increases as respondents approach retirement, the positive cohort-time effects suggest that this might not happen. In general older cohorts appear to be endowed with higher societal average trust, as they trust pension funds more than younger cohorts even when they are further away from retirement (also see Robinson and Jackson, 2001).

**Figure 3:** Trust by age (left) and cohort-time (right)



**Explanatory note:** The solid line in the left panel is a linear interpolation showing the positive age gradient. In the right panel the dotted lines represent the 5-years moving averages of the solid lines, where the age-time pattern is heterogenous across cohorts. The legend shows the oldest year of birth of a 10-years cohort. Source DTS and DHS, own computations.

Since we shall be using pension funds balance sheet data as an instrument in our regression analysis, we present some data on the financial health of the pension funds in Table 1. Pension cuts are relatively rare, but also only a quarter of the pension funds observed between 2007 and 2020 had a sufficiently high funding ratio to index benefit to inflation at some point. For 72% of them<sup>1</sup>, no indexation was the most common policy.

**Table 1:** Pension fund indexation and age

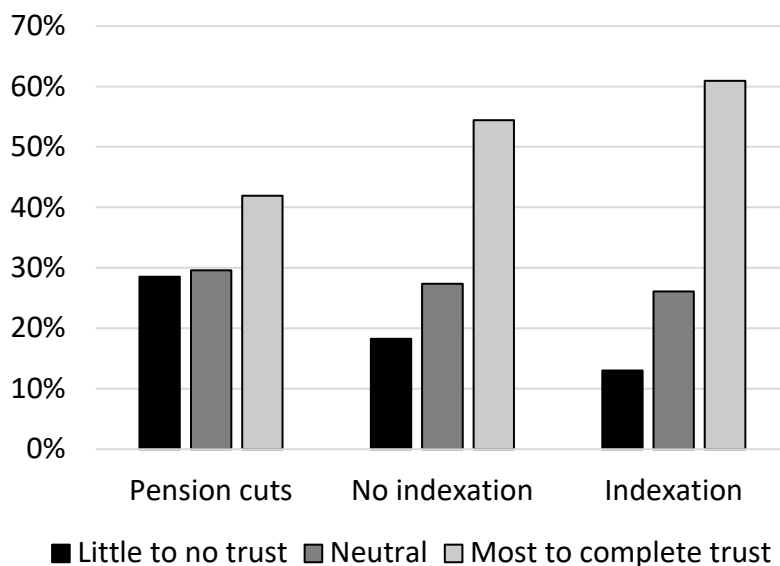
	Cuts	No Indexation	Indexation
Age 20-40	16%	27%	57%
Age 41-55	20%	27%	53%
Age 55-99	23%	28%	48%
N		19871	

**Explanatory note:** Statistics based on households in the DHS, merged to balance sheet data from DNB.

<sup>1</sup> In our estimating sample, about 70% of respondents belongs to one of the 32 funds that are listed as an option in the DHS questionnaire. The rest reports another (typically smaller) fund membership, which is then enquired in an open-ended question. In total we have 52 different pension funds' affiliations. About 45% of respondents report participating in one of the two largest funds in the Netherlands.

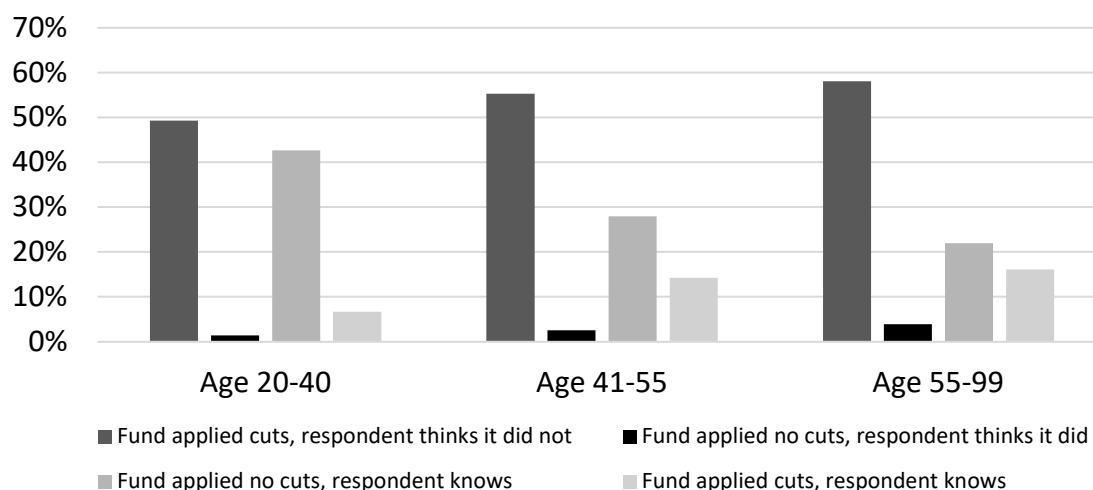
Figure 4 presents the relationship between trust, pension cuts and indexation. For funding ratios that allow indexation, participants are more likely to trust their pension fund. Similarly, the level of distrust (absence of trust) is highest for those funds that had to cut benefits, compared to funds that did not. This is in line with previous findings by Van Zaal (2017).

**Figure 4:** Trust in pension fund and indexation



**Explanatory note:** Statistics based on households in the DTS and DHS, merged to balance sheet data (DNB).

**Figure 5:** Awareness and pension fund indexation



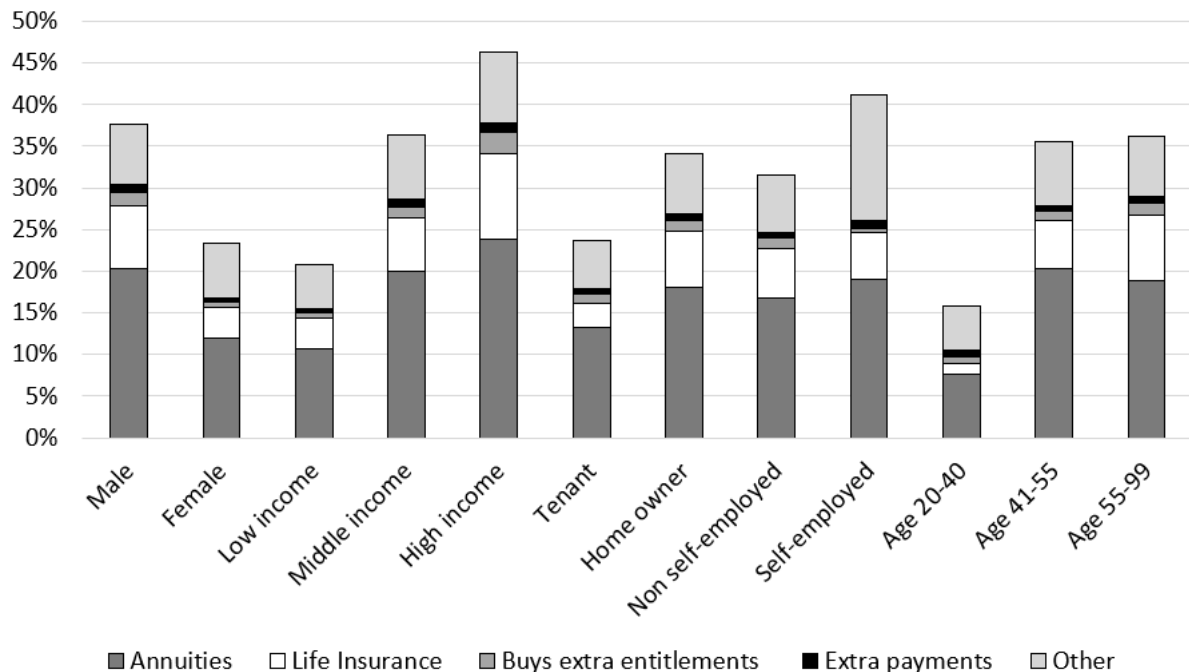
**Explanatory note:** Statistics based on households in the DTS and DHS, merged to balance sheet data (DNB).

In Figure 5, we combine the information on the respondents' fund indexation cuts to the answers in the DHS questionnaire asking whether one is aware of having suffered any cut.

Some respondents appear to be unaware of the cuts that have actually been applied by their funds (about 3% of the sample, no matter their age). The opposite situation, respondents mistaken in thinking that they had received negative indexation, is far less common. Real and (wrongly) perceived indexation, will be used as instruments later on to explain participation in voluntary pension savings.

In our analysis, we also test whether respondents with low trust participate in voluntary pension arrangements, using DHS data. Figure 6 shows the distribution of additional voluntary pension saving vehicles, broken down by respondent characteristics. The Figure shows that most individuals have no additional pension savings (all bars are below 50%). Annuities are the most common type of voluntary arrangement, followed by life insurances and other (unspecified) arrangements, while the arrangements through the employer (buying additional entitlements or signing in on higher contributions) are the least popular. The Figure also shows that there is a relationship with social economic status. Most voluntary savings are observed with high income, older respondents and home-owners (see also Bassett et al., 1998; Jansen, 2020). The savings balance on these voluntary accounts is not reported in the data. That is why we only study participation in these arrangements.

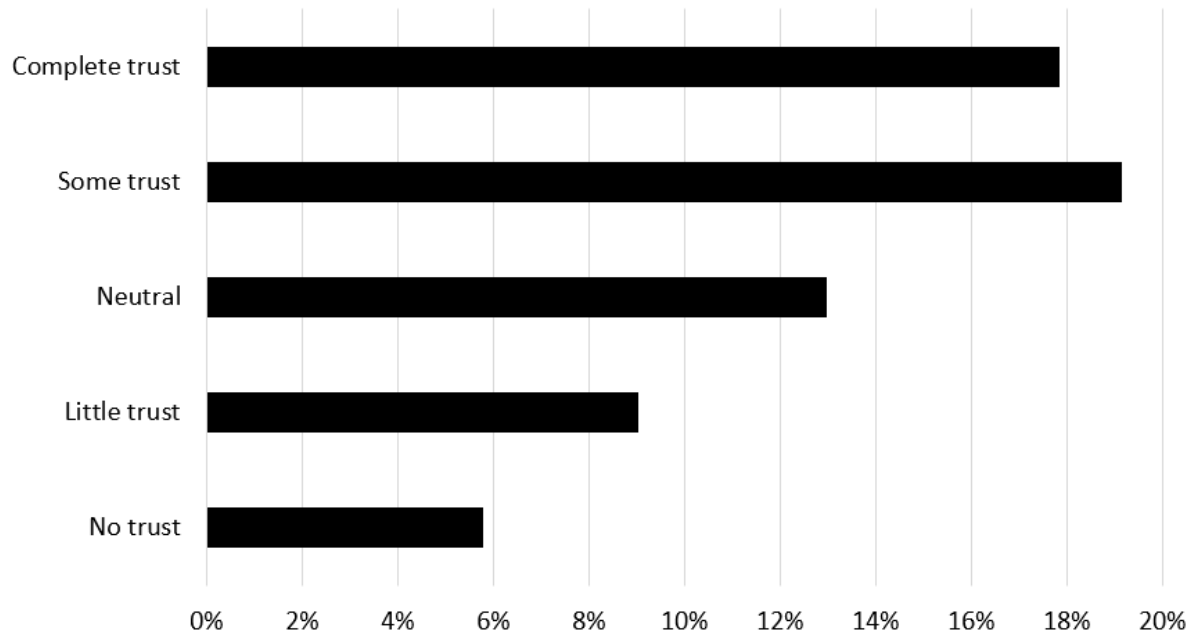
**Figure 6: Voluntary pension arrangements and observable household characteristics**



**Explanatory note:** Source, DHS data, own computations. Period 2007-2021

Finally, Figure 7 shows the relationship between trust and additional pension savings. It shows that higher levels of trust are positively related to having additional pension arrangements.

**Figure 7: Voluntary pension savings and trust in own pension fund in 2021**



**Explanatory note:** Statistics based on households in the DTS, merged to DHS data.

## 4. Empirical strategy

The descriptive evidence above suggests some intuitive relationships between trust in the own pension fund and observable characteristics. We test whether these relationships are significant within a multivariate analysis by estimating the following equation:

$$T_{i,t} = \gamma_0 + \gamma_1 Z_{f,i,t} + \gamma_2 X_{i,t} + \gamma_3 Y_t + \gamma_4 C_i + u_{i,t} \quad (1)$$

In equation (1),  $T$  stands for trust of individual  $i$  at time  $t$ . It takes integer values between 1 and 5, with 1 indicating no trust. On the right hand side,  $Z$  is the level of indexation, in percentage points, (negative in case of cuts) of pension fund  $f$  in each period, complemented with the (wrongly) perceived indexation described above.  $X$  is a vector containing individual characteristics, including age and trust in other institutions,  $C$  contains time invariant variables such cohort, and  $Y$  proxies business cycles effect that are relevant for funds' investments, captured by GDP growth (we cannot use year dummies because we correct for age and year of birth already).

In Table 2, we present 5 different specifications of (1), namely a simple OLS (Model 1)<sup>2</sup>, an OLS with robust standard errors (Model 2), ordered logistic model (Model 3), a random effect model (Model 4) and a fixed effect model (Model 5). This progression is meant to progressively take into account the panel structure of the data. As there is no consensus on how to deal with fixed effect ordered logistic regressions in the presence of panel data with time-varying regressors, for comparability we rely more on linear models. Notice that there is no qualitative difference in result from the ordered logistic when compared to the OLS estimates (direction and significance of the coefficients). The table shows some features that are common across all specifications. First, the recovery measures have the expected effect on trust. There is a significant positive relation between the level of indexation (or pension cuts) and whether the participant trust their pension fund. This means that trust is higher the more a fund indexed the benefits. Also (wrongly) perceived indexation is significantly related to trust, where those unaware of actually applied cuts have higher trust in their fund. The opposite situation, the wrong belief that funds applied cuts, is not significant. Both parameters are however jointly significant.

We also see that trusting other financial institutions is positively related to trusting the own pension fund, this is also true for the public administration, but the estimated coefficient is lower. This could suggest a role for unobservables, whereby trusting people trust all institutions more. This might explain the somewhat lower magnitude of the trust indicators

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<sup>2</sup> A simple logit model delivers very similar results, but is not reported.

in Model 5, as in the fixed effect estimation these types of unobserved individual-fixed characteristics are filtered out. So, while unobservables seem to affect at the same time trust in pension funds and financial institutions, these do not explain their relationship in full.

**Table 2:** Regressions for trust in own pension fund

	Model 1 OLS	Model 2 OLS robust	Model 3 Ordered Logit	Model 4 RE	Model 5 FE
Pension cuts & indexation	7.626***	7.626***	19.450***	6.232***	5.890***
Fund applied cuts, respondent thinks it did not	0.115***	0.115***	0.266***	0.084***	0.081***
Fund applied no cuts, respondent thinks it did	-0.152	-0.152	-0.346	0.012	0.107
Self-employment	-0.002	-0.002	0.009	-0.018	0.055
Trust in DNB (0/1)	0.337***	0.337***	0.698***	0.249***	0.181***
Trust in Public Admin. (0/1)	0.147***	0.147***	0.337***	0.116***	0.070***
Trust in Banks (0/1)	0.543***	0.543***	1.229***	0.383***	0.288***
Male	0.075***	0.075***	0.220***	0.099***	
Age 18 - 30	-0.076***	-0.076***	-0.164***	-0.070***	-0.066***
Age 31 - 40	-0.019***	-0.019***	-0.041***	-0.022***	-0.017**
Age 41 - 50	-0.019***	-0.019***	-0.045***	-0.019***	-0.017***
Age 51 - 60	0.007*	0.007	0.019*	0.003	0.003
Age 61 - 70	-0.002	-0.002	-0.007	-0.003	-0.005
Age > 70	-0.006	-0.006	-0.010	-0.009*	-0.012**
Cohort after 1994	-1.779***	-1.779***	-4.018***	-1.835***	
Cohort 1994 - 1990	-1.536***	-1.536***	-3.615***	-1.639***	
Cohort 1989 - 1985	-1.413***	-1.413***	-3.241***	-1.565***	
Cohort 1984 - 1980	-1.169***	-1.169***	-2.746***	-1.358***	
Cohort 1979 - 1975	-0.951***	-0.951***	-2.292***	-1.143***	
Cohort 1974 - 1970	-0.818***	-0.818***	-2.018***	-0.992***	
Cohort 1969 - 1965	-0.720***	-0.720***	-1.802***	-0.893***	
Cohort 1964 - 1960	-0.553***	-0.553***	-1.422***	-0.700***	
Cohort 1959 - 1955	-0.492***	-0.492***	-1.293***	-0.631***	
Cohort 1954 - 1950	-0.310***	-0.310***	-0.832***	-0.445***	
Cohort 1949 - 1945	-0.313***	-0.313***	-0.844***	-0.415***	
Cohort 1944 - 1940	-0.258***	-0.258***	-0.721***	-0.319***	
Cohort 1939 - 1935	-0.177***	-0.177**	-0.515**	-0.246***	
Cohort 1934 - 1930	-0.221***	-0.221***	-0.651***	-0.237***	
Family size	0.026**	0.026	0.064*	0.023	0.014
Single without children	0.054	0.054	0.116	0.010	-0.028
Couple with no children	0.056	0.056	0.124	-0.017	-0.060
Couple with children	0.006	0.006	-0.001	-0.049	-0.028
Single with children	0.087	0.087	0.240	0.064	0.060
Education: secondary (lower)	-0.032	-0.032	-0.073	0.065	0.293**
Education: secondary (higher)	0.023	0.023	0.044	0.119**	0.229*
Education: secondary (vocational)	0.017	0.017	0.017	0.117**	0.244**
Education: tertiary (lower)	-0.023	-0.023	-0.095	0.085	0.151
Education: tertiary (higher)	-0.052	-0.052	-0.189	0.055	0.134
Gross income / 10 <sup>3</sup>	0.013***	0.013***	0.034***	0.010***	0.005
Homeowner	0.027*	0.027	0.059	0.008	-0.076*
GDP growth	0.021***	0.021***	0.053***	0.025***	0.026***
Constant	5.838***	5.838***		5.969***	5.340***
Observations	22,220	22,220	22,220	22,220	22,220
R-squared	0.224	0.224		0,22	0.068
Number of id				5,818	5,818

**Explanatory note:** Model 1: basic OLS. Model2: OLS with robust standard errors. Model 3: ordered logit model. Model 4: RE model. Model 5: FE model. Reference cases: cohort born before 1930, elementary or no education, other cohabitation forms . We have tested whether cuts have a larger effect relative to indexation. Our result (not shown) is that we cannot reject the null hypothesis of the two effects being equal. All models with the exception of model 3 (ordered logit) show marginal effects, model 3 presents just coefficients. \*\*\* p<0.01, \*\*p<0.05, \*p<0.10.

The cohort effects, where the oldest cohort is reference group, suggest that older cohorts are more trusting, while the age-time effects are more negative for younger respondents. Those are age splines, so for instance those between 18-30 become approximately 0.07 less trusting (in the trust scale from 1 to 5), each year they become older, while for older individuals the reduction is at most 0.01. The remaining factors to have a similar impact in all models are related to income and gender. This is the case for the positive effect of gross income (Van der Crujssen and Jonker, 2019; Chaudhuri and Gangadharan, 2002) and GDP growth. The latter is a time effect and shows that respondents are more trusting in periods of higher growth. In the fixed effect model, although we obtain an unbiased estimator, we must drop all time-varying variables. Given our discussion about the cohort effects, this is a drawback as the descriptive evidence shows pronounced cohort differentials. Fortunately, the main coefficient of interest, that on indexation, is very similar in Models 4 and 5. Within sample simulations with these results, show that if indexation had been 1%-point higher all over the sample period (which is a large increase given the average conditional indexation being 1.4%), trust would have increased only very slightly, from 3.64 to 3.70.

The results in Table 2 not only explain how trust was affected by pension fund indexation, but could also serve as a first stage of an IV model where indexation and pension cut and the (wrongly) perceived indexation are used as instruments to explain participation in voluntary pension savings. To this purpose, the following relationship is estimated:

$$s_{i,t} = \beta_0 + \beta_1 T_{i,t} + \beta_3 X_{i,t} + \beta_4 Y_t + \beta_5 C_i + \varepsilon_{i,t} \quad (2)$$

Here  $X$ ,  $Y$  and  $C$  are defined as in (1) and are expected to affect voluntary pension savings (Bassett et al., 1998; Jansen, 2020),  $s$  is a dichotomous variable capturing voluntary pension savings participation, and  $\beta_1$  is the effect of the trust (in pension funds only) variable ( $T$ ). Above, we have discussed how trust in one's pension fund could be endogenously related to trust in other financial institutions. When we look at voluntary savings participation, this endogeneity could be even stronger, as factors affecting saving decisions that are unobserved here – think for instance of risk aversion, or the propensity to save and trust – could affect trust in the pension funds as well. Linde (2019) finds that individuals that are more risk averse are more likely to engage in additional pension savings out of precaution. Also, in game theory, the perception towards risk is often labelled as an important driver for the decision to trust a counterpart (see, e.g., Snijders and Keren, 1999).

In this case, IV can be used to overcome the problem of such endogenous regressors. For the IV regression, two conditions must hold: instrument relevance and exogeneity. Formally, the



first condition boils down to testing that  $Cov(T_{i,t}, Z_{i,t}) \neq 0$ , while the second implies that  $E(\varepsilon_{i,t}|Z_{f,t}) = 0$ . The first condition was already tested above. Results for our models for voluntary savings are included in Table 3, where we also add a specification focused only on self-employed workers.

**Table 3:** Linear probability models for participation in voluntary pension savings

	Model 6	Model 7	Model 8	Model 9
	OLS	IV	Panel IV (RE)	Panel IV (employed)
Trust in own pension fund (1/5)	0.011**	0.138***	0.138***	0.262***
Trust in DNB (0/1)	0.019**	-0.024	-0.025*	-0.052***
Trust in Public Admin. (0/1)	0.010	-0.009	-0.012	-0.021*
Trust in Banks (0/1)	0.004	-0.066***	-0.047**	-0.100***
Male	0.092***	0.082***	0.076***	0.042***
Self-employment	-0.170***	-0.168***	-0.088***	-0.080***
Age 18 - 30	0.001	0.011**	0.015**	0.027**
Age 31 - 40	-0.007***	-0.004**	-0.005**	-0.002
Age 41 - 50	-0.003	-0.000	-0.008***	-0.008**
Age 51 - 60	-0.005*	-0.006***	-0.012***	-0.010***
Age 61 - 70	-0.009***	-0.009***	-0.011***	-0.013**
Age > 70	-0.012***	-0.011***	-0.014***	-0.010
Cohort after 1994	-0.500***	-0.256***	-0.418***	-0.138
Cohort 1994 - 1990	-0.489***	-0.274***	-0.453***	-0.219
Cohort 1989 - 1985	-0.472***	-0.273***	-0.456***	-0.212
Cohort 1984 - 1980	-0.399***	-0.233***	-0.433***	-0.212
Cohort 1979 - 1975	-0.349***	-0.211***	-0.398***	-0.211
Cohort 1974 - 1970	-0.266***	-0.147**	-0.321***	-0.145
Cohort 1969 - 1965	-0.212***	-0.107**	-0.259***	-0.081
Cohort 1964 - 1960	-0.116*	-0.035	-0.165**	-0.001
Cohort 1959 - 1955	-0.118*	-0.047	-0.133**	0.022
Cohort 1954 - 1950	-0.017	0.029	-0.061	0.087
Cohort 1949 - 1945	-0.054	-0.009	-0.073	0.038
Cohort 1944 - 1940	-0.035	0.002	-0.037	-0.061
Cohort 1939 - 1935	-0.073	-0.046	-0.073	0.104
Cohort 1934 - 1930	-0.035	-0.004	-0.017	0.278
Family size	-0.012	-0.015***	-0.013*	-0.006
Single without children	0.036	0.028	0.067**	0.089*
Couple with no children	0.006	-0.002	0.050*	0.071*
Couple with children	-0.017	-0.018	0.033	0.046
Single with children	-0.001	-0.013	0.015	0.014
Education: secondary (lower)	-0.030	-0.026	-0.003	0.013
Education: secondary (higher)	0.003	-0.001	0.018	0.025
Education: secondary (vocational)	-0.003	-0.005	0.014	0.028
Education: tertiary (lower)	0.021	0.023	0.037	0.056
Education: tertiary (higher)	0.047	0.053***	0.047*	0.050
Gross income / 10 <sup>3</sup>	0.008***	0.006***	0.006***	0.004
Homeowner	0.043***	0.040***	0.023**	0.002
GDP growth	0.0001	-0.003*	-0.003*	-0.008***
Constant	0.331***	-0.429	-0.422	-1.351**
Observations	22,220	22,220	22,220	13,514
Number of id			5,818	4,051
p-value of Sargan-Hansen test, $\chi^2$		0.09	0.10	0.23

**Explanatory note:** Model 6: Standard OLS. Model 7: standard IV. Model 8: RE panel IV. Model 9: same as Model 8, sample employed only (wage-employed and self-employed). Reference cases: cohort born before 1930, elementary or no education, other cohabitation forms \*\*\*p<0.01, \*\*p<0.05, \*p<0.10.

As in the case of trust, we present first OLS results (Model 6), standard IV (Model 7), and two random effect models (Models 8 and 9), the latter focusing on the population of employed respondents only. In all cases we computed robust standard errors, clustering at the respondents' level. Table 3 shows a positive relationship between trust in the own occupational pension funds and participation in voluntary pension savings. The relationship to trust in Banks and DNB is instead generally negative, possibly indicating that pension savings are seen as an alternative to savings in the banking system that is more popular among those who trust the banking system less. The effect in the OLS regression has a much lower magnitude relative to the IV regressions. For these models, we had already discussed the relevance of the instruments, here we also show results of the Sargan-Hansen test, that allow us to reject the null hypothesis that the instruments are not valid at the 5% level, and for the random effect models, also at 10%. So, the positive correlation found in previous studies can be interpreted as a causal effect of trust on participating in voluntary pension savings.

Self-employed are less likely to answer that they participate in an additional arrangement. Possibly this is also the case because some of these arrangements (buying extra entitlements and paying extra premiums) are only available for those who have an employer, though the finding is common in other studies as well (Mastrogiacomo and Alessie, 2014), as self-employed workers are less likely to have additional pension savings of any type. Cohort-time and age effects reveal higher participation of older cohorts, and a negative age gradient for older ages. All variables connected to the social economic status show positive and often significant coefficients.

The results suggest that the likelihood of having additional pension savings rises if an individual's trust level increases by one step on the ordinal five-point scale. In ordinal scales, answer values only indicate rankings, but a difference in ranks does not have a cardinal interpretation (e.g., a specific change in intensity), nor does it allow for interpersonal comparability. Individuals may interpret the various answer categories very differently; the associated adjectives may be used differently by different people. For instance, "complete trust" can mean different things to different individuals. In similar line of reasoning, a step from complete distrust to predominant distrust cannot be viewed as an equal step as from neutral to predominant trust, for example.

To give an additional feeling of the magnitude of the estimated effects, we perform again a within sample simulation using Model 7, for the increase in the share of individuals that would have additional pension savings if everybody were to have complete trust in pension funds. Our results show that participation in voluntary savings would increase from approximately 21% to 39%.

## 6. Summary and policy implications

In this study we propose to use two new instruments to explain the effect of trust on participation in voluntary pension savings, namely two shocks related to the financial performance of pension funds. These are the level of indexation of respondents' occupational pension funds in the DHS population, and their (wrongly) perceived indexation.

We show that trust is significantly related to these instruments, and increases with indexation and its' positive perception. Our descriptive evidence also shows that people do not necessarily build more trust as they grow older, but rather that different birth cohorts enter adult life with a certain trust endowment which is lower for each younger cohort. Therefore, it is to be expected that the average level of trust in one's pension fund will be lower across society as the older cohorts get replaced by younger ones. Consequently, pension funds should be aware that trust is declining, and that each group of retirees is likely to have less trust, relative to previous ones. This is relevant because it may have a number of implications. If it is just age driving trust in pension funds, then policy might want to relay the message to young workers that their perception might change "by itself". So there is a potential commitment problem as young workers might need to commit to a plan of action that they would refuse if they were to only factor their current beliefs. If trust is driven by cohort differences, then participants need mostly information on intergenerational redistribution and risk sharing, so that they understand all relevant issues of redistribution and solidarity in the system.

As the recovery measures of pension funds play a considerable role in explaining the level of trust participants have in their fund, this suggests some avenues for pension funds to act on. Public sentiments about pension funds revolve around the dissatisfaction with the unforthcoming indexation. In the transition to the new system, the necessary funding ratio to index benefits was reduced, enabling more funds to use indexation (Rijksoverheid, 2022a). At the same time, once the transition is over, it is unclear how participants will respond to a lack of pension promises (Rijksoverheid, 2020). In the new system, the funding ratio will no longer be a relevant policy parameter. Yet, prior to the introduction of the new contract, we witnessed a rapid rise in these ratios which allowed indexing pensions again after almost a decade. As the general public had learnt how to follow this parameter, readjusting to a contribution-based system might initially affect trust in the new system. It is possible that the role of pension funds in explaining uncertain future pension benefit (Van Dalen and Henkens, 2021) will play a pivotal role in determining trust.

We find a positive effect of trust on savings in line with previously studied correlations between trust and pension decisions (see e.g., Van der Crujssen and Jonker, 2019; Van Dalen, Henkens and Kortleve, 2021). With the planned introduction of more freedom of choice for

different pension pay outs – such as a lumpsum payments – those who have low trust are expected to prefer these forms of pay-outs. At the same time we complement previous findings by arguing that older birth cohorts have higher level of trust in their pension funds relative to younger cohorts, but it is not necessarily ageing that accounts for this.

We show that self-employed workers are less likely to have additional pension savings, and are thus not only less likely to have occupational pensions. The present policy’s aim of including self-employed workers in the occupational pension system might in this light be seen as hard to achieve. Mandatory pensions in combination with the funds’ increasing difficulties to index the benefits in the past, could be seen as one of the rigidities that workers might want to escape by becoming self-employed. Our findings show that participants into voluntary pension savings, including self-employed workers, actually trust their pension fund. We have tested (not shown in the paper) whether there is a difference in this respect between employees and self-employed workers, but found it to be not significant. This shows that it is not lack of trust, thus a desire to abandon occupational pensions, that pushes workers to become self-employed. The increasing share of the labor force working as self-employed is therefore not due to a high distrust of pension funds.

If we were to speculate further, and project these results based on past experiences to the future setting of the pension system, we might expect that trust in pension funds should not be a reason to opt-out of the occupational pension system for self-employed that is possibly envisaged for the near future (Rijksoverheid, 2021).

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## Appendix A

Overview table with main findings and methods in the cited literature

Study	Aim	Evidence	Identification strategy
Van der Cruijssen and Jonker (2019)	Estimate influence of people's expectations about expenses during retirement and trust in pension funds on preferences for different pension arrangements.	most workers prefer a flat-rate annuity, but workers who expect declining expenses during retirement are more likely to opt for a high/low annuity-based pension and/or a lump sum payment at retirement	Correlation study
Van Zaal (2017)	Investigate one's trust in pension funds over a longer period of time, and estimate the effect of pension cuts and indexation on trust.	A participant whose fund applied nominal cuts loses trust in their fund, compared to the years where the fund did not cut. Indexation, on the other hand, increases the trust of participants. The effect of nominal cuts is strongest for the oldest group, whereas indexation is most important for the trust of the youngest groups.	Fixed effects regression
Van Dalen and Henkens (2015)	Examine the trends and determinants of trust in pension funds.	Important determinants for trust in pension funds are stability and honesty. Participants of funds that underwent nominal cuts have less trust in their pension fund, compared to participants at funds that did not cut pensions nominally. Participants that exit the pension fund mostly do so because of dissatisfaction with their pension fund. Trust does not seem to play a role for quitters.	
Agnew et al. (2012)	Assess the impact of financial literacy and mistrust in 401(k) participation with automatic enrolment plans and voluntary plans.	The study finds a strong correlation between knowledge of plan features and participation in both types of plans. Moreover, participants who do not trust financial institutions are more likely to quit automatic enrolment plans.	Correlation study
Agnew et al. (2007)	Assess the impact of financial literacy and mistrust in 401(k) participation with automatic enrolment plans and voluntary plans.	Financial literacy improves savings behavior in both types of 401(k) plans. Meanwhile, mistrust of financial institutions appears to be very important in influencing savings behavior in automatic enrolment plans, with participants more likely to opt out if they lack trust.	Probit regression.
Ricci and Caratelli (2017)	Investigate the role of both financial literacy and trust in voluntary pension plan participation.	Trust has a positive influence on both the decisions to enter a private pension scheme or to devote the severance pay to a private pension scheme.	Probit / IV probit regression