Demotivating Workers: Retrenchment of pension rights and negative reciprocity

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Abstract

This paper identifies the causal impact of a retrenchment of pension rights on the job motivation of negatively reciprocal workers. The paper complements the evidence from lab experiments that highlight the behavioral relevance of reciprocity in stylized labor markets. We use unique matched survey and administrative data that include individual measures of reciprocity. Our data set covers male employees in the public sector in the Netherlands who faced an unexpected major pension reform in 2006, which was initiated by the government. We compare job motivation of employees who were born in 1950 and therefore face a substantial retrenchment of their pension rights to job motivation of slightly older employees who remain entitled to generous pension benefits. We find that job motivation declines among negatively reciprocal individuals who face the unexpected drop of pension rights, while we do not observe a negative treatment effect among non-reciprocal employees. Positively reciprocal inclinations do not trigger differences in job motivation between the treatment and control group.

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1 Introduction

Experimental economists and psychologists have provided ample evidence showing that reciprocity influences individuals' decision making in controlled enviroments (see e.g., Fehr and Gächter, 2000).[1] Reciprocity is an in-kind response to friendly actions or hostile acts which has been proven to have a large impact on human behavior in stylized labor markets (e.g., Fehr et al., 1993) and in other field experimental settings (e.g., Falk and Zehnder, 2007; and Brown et al., 2004). A distinction can be made between negative reciprocity, which indicates retaliatory tendencies, and positive reciprocity, which relates to cooperative reciprocal behavior. In labor relationships, positively reciprocal employees increase effort above the required level when being treated generously by their employer (see e.g., Akerlof, 1982; and Rabin, 1993); while negative reciprocity leads workers to retaliate, e.g. by reducing effort, when treated unfairly.[2]

Nevertheless, it is important to evaluate the role of reciprocity in a natural labor market setting, in which confounding factors and constraints might undermine the behavioral relevance of reciprocal inclinations. However, field studies that empirically assess the economic relevance of reciprocity in a labor market context are scarce. One exception is Krueger and Mas (2004) who documented that a labor strife at a US tire production site coincides with the production of substantially lower quality tires, arguably a result of workers reducing effort during the strife, suggesting that the strife induced workers to respond in a negatively reciprocal way.

Dohmen et al. (2009) relate measures of reciprocal inclinations of respondents in the German Socio-Economic Panel Study (SOEP) to actual labor market outcomes, thereby

[1] Numerous studies have shown that individuals reciprocate trust in trust games (Berg et al., 1995). Moreover, it has been documented that individuals (in bargaining games) are willing to reject unfair offers even at personal cost (e.g. Güth et al., 1982; Camerer and Thaler, 1995) and that individuals who participated in public good games were prepared to punish others who violated certain norms of cooperation or fairness (e.g. Fehr and Gächter, 2000; Carpenter and Seki, 2005).

[2] Ederer and Fehr (2008), for example, find that subtle forms of deceit undermines the effectiveness of effort provision in a dynamic tournament setting.

providing more direct evidence for a link between reciprocity and economic outcomes. Their findings that positive reciprocity is significantly correlated with higher wages and working harder while negative reciprocity is correlated with a higher chance of being unemployed are suggestive of a causal relation. However, reverse causality (i.e. running from outcomes to self-assessed reciprocal inclinations) cannot be entirely ruled out. Also, the data only allow for an imperfect assessment of a direct link between particular friendly or hostile actions of employers and behavioral responses of workers that can be traced to reciprocal inclinations because the data contain only limited information on the treatment of workers. Moreover, to the extent that such information is available (e.g. for wages), it is not clear whether the treatment is perceived as fair or not.

The key advantage of our study is that we are able to rely on data from a natural experiment, in order to examine how reciprocal workers respond in terms of job motivation, a key determinant of work effort (see Bowles et al., 2001), when they are treated in a way that is likely to be experienced as unfair. We exploit exogenous variation in pension rights of Dutch public sector employees that is brought about by a major policy reform which treats two very similar groups of employees differently. The legislative change curtailed the pensions of those born in 1950 (and later), but did not change the pension benefits of employees born in 1949 (and earlier). When workers born in 1950 compare their pension rights to their status quo before the policy change and also to the pension rights of those who are only slightly older and still enjoy the more generous pension rights of the old regime, they are likely to perceive the policy change as unfair.

Since the government, which is typically regarded as the policy-maker, initiated the change, public sector employees born in 1950 may perceive their employer as being directly responsible for the retrenchment of their pension rights, which entails a breach of an informal agreement, and the unfair treatment relative to their slightly older colleagues.[3]

[3]Since the second half of the 1970s, new entrants in the public sector received the prospect of early retirement and high pension benefits. The pension provision was used by the public sector as one of the

Given this 'unfair' treatment, we expect that employees in our treatment group (i.e., those who were born just after December 31, 1949) with strong negatively reciprocal inclinations become less motivated for their job than workers in our control group, who are slightly older (i.e., those born just before January 1, 1950) but otherwise similar.

We test this hypothesis using unique matched survey and administrative pension fund data on male employees in the Dutch public sector who were born in 1949 or 1950. The data include information on employees' job motivation, retirement expectations and reciprocal inclinations. The latter are elicited from answers to 6 questions, which have been shown by Perugini et al. (2003) to measure positive and negative reciprocity. We compare the level of job motivation of employees in the treatment group with job motivation of employees in the control group, and assess whether the treatment effect depends on employees' degree of negative reciprocity. We find that the exogenous decrease in pension benefits is associated with a significant reduction in job motivation among negatively reciprocal employees. We do not observe that job motivation deteriorates significantly for individuals with weakly negatively reciprocal inclinations, nor for non-reciprocal employees. Positively reciprocal inclinations do not lead to differences in job motivation between the treatment and control group.

The paper is organized as follows. In the next section, we provide more details on the exogenous shock in the public sectors' pension system in the Netherlands that constitutes the treatment in the experiment that we analyze. The data, sample selection and descriptive statistics are described in Section 3. In Section 4, we present our estimation strategy. Results are presented in Section 5, and Section 6 concludes.

means to attract new employees.

2 Reform of the public sectors' pension system

Before discussing some details of the pension reform, we briefly provide some key features of the Dutch pension system. The Dutch pension system consists of three pillars: 1) a public old age pension that is paid to all inhabitants aged 65 and older, 2) a supplementary sectoral pension, and 3) voluntary private pension plans. The public old age pension is essentially a pay-as-you-go system, in which pensions of the population currently older than 65 is financed by income taxes. Supplementary sectoral pensions are of the defined benefit type and very wide-spread, as participation in these schemes is in general mandatory. The sectoral pension schemes are negotiated between unions and employer organizations at the sector or firm level and are officially laid down in collective agreements. Both employers and employees contribute to the sectoral pension fund. Additional voluntary pension plans offered by private insurance companies, which typically take the form of savings plans that yield annuity payments at retirement age, are less well prevalent.

Early retirement before the age of 65 is primarily made possible through the sectoral pension system (i.e. the second pillar), which provides early retirement schemes. Until 2006, the sectoral pension schemes were facilitated by the government through a preferential tax treatment, which allowed employees and employers to deduct their share of the contribution to the sectoral early retirement schemes, leading to substantial tax advantages due to the progressive tax system (Euwals et al., 2006). Under the scheme that was in place until January 2006, a typical public sector employee who had worked for 40 years in the public sector could retire at a replacement rate of 70% at the age of 62 years and 3 months.[4]

In 2006, a reform in the Dutch pension system abolished the favorable tax treatment of early retirement schemes for all public sector employees born in 1950 or later. As a result of the reform, a new pension scheme (ABP flexible pension scheme) was launched

[4]Traditionally, workers in the Netherlands retire when achieving a replacement rate of 70%.

on January 1, 2006. Employees born before 1950 and who worked continuously in the public sector since April 1, 1997 remain entitled to the generous old pre-pension rights, which means that they can still retire at the age of 62 years and 3 months at a replacement rate of 70 percent. In contrast, employees born after 1949 and those who had not worked continuously in the public sector for the past 10 years are subject to the new less generous system, which is essentially characterized by a drop in pension benefits and/or an increase in the pension contribution payments (to partly compensate the drop in pension benefits).[5] The stated intention of policy makers was to provide stronger incentives for retiring at an older age. Under the new scheme, an employee born in 1950 or later, only attains a replacement rate of 64% when retiring early at the age of 62 years and 3 months. This is substantially below the replacement rate of 70% that still applies to early retirees who are born before 1950. In order to retire at a replacement rate of 70%, retirement has to be postponed by 1 year and 3 months.

Since the government, which is regarded as the corporate management of the public sector, initiated the reform, public sector workers who are affected by the reform can hold their employer directly responsible for their deteriorating pensions.[6] Details of the new pension system were only communicated in the second half of 2005, so that there was not much scope for workers born just after the cutoff date (i.e. December 31, 1949) to offset the drop in their pension benefits, e.g. by engaging in extra savings plans, because of the limited time horizon to retirement. For younger workers, the increase in pension contributions will partly offset the decrease in pension benefits over time.

[5]Because participation in the pension system of the public sector is mandatory, workers born after 1949 were not able to evade the new pension scheme.

[6]The abolishment of the tax treatment was not limited to the public sector but did also apply to workers in the private sector. However, the major difference with the private sector is, that the government is not only the initiator of the pension reform but also acts as the employer in the sectoral bargaining process.

3 Data

We use survey data that we match to administrative data for male employees in the public sector who were born in 1949 or 1950.[7] The administrative data comes from the 'Algemeen Burgelijk Pensioenfonds' (ABP), the pension fund for public sector employees. The data contain detailed information on individuals' pension rights built up at ABP, annual wage income, tenure in the public sector, and the size of the organization were someone is employed.

Survey data are available for two years. The data in the initial wave were gathered in two stages one year after the introduction of the new pension system. Initially, we sent an invitation to all 27,871 male public sector employees who were born in 1949 or in 1950 to participate in the survey. The invitation letter asked them to provide us with their email address if they were interested in participation. In March 2007, we re-approached the 11,458 male public sector employees who had provided their contact details by an email that contained the link to the web-based survey.[8] In total, 8,526 individuals started answering the questionnaire in 2007, but only 7,739 completed it successfully. In March 2008, we sent an e-mail invitation with a link to a second web-based survey to all 8,526 individuals who had logged on to the 2007 questionnaire, of whom 6,078 respondents completed the survey. In this second wave, we asked detailed questions on reciprocal behavior, job motivation and retirement expectations.

The empirical analysis in this paper draws on the second wave of the survey. We restrict the sample to those employees who had continuously worked in the public sector since 1997 (thereby excluding 260 employees, who are not eligible for the pre-reform early

[7]We focus on male employees only, because male workers aged 57 or 58 are in general the main wage earner in their family. Moreover, only a small selective group females of this birth cohort is still working.

[8]The likelihood of selectivity bias due to questioning through internet is negligible because at least 91% of the public workers aged 55 years or older have an internet connection at home (TNS nipo, 2006). Moreover, a large number of respondents do also have internet access at their work.

retirement option even if they were born before 1950).[9] Moreover, we excluded workers who are employed in some specific burdensome occupations (such as firemen, ambulance and police personnel) where other early retirement schemes are still in place that allow them to retire early whiteout experiencing a substantial drop in income. Our final sample consists of 5,488 men. Due to item-non-response on variables of interest, the estimation sample is somewhat smaller, containing 4,397 men of which 2,311 who were born in 1950 forming the treatment group and 2,086 who were born in 1949 belonging to the control group.

The dependent variable in our econometric specifications is a measure for job motivation, which is based on a 5-level Likert item that asked respondents to indicate how well the following statement applied to them personally: 'At times, I have difficulties to motivate myself for my job'. Answer categories ranged form 1 ('does perfectly apply to me') to 5 ('does not apply to me at all'). Our reciprocity indicators are based on a reciprocity scale which has been developed by Perugini et al. (2003). From their scale, we use the six items that had the highest loadings on the principal components that measure positive and negative reciprocity in their samples for the UK and Italy, and also for Germany. These 6 items were also included in the 2005 wave of the German Socio-Economic Panel Study (SOEP), and were used in the study by Dohmen et al. (2009). Respondents had to indicate on a 5-point scale (1 means 'does not apply to me at all' and 5 means 'does perfectly apply to me') how well they identified themselves with each of the following six statements: 1) If someone does me a favor, I am prepared to return it; 2) If I suffer a serious wrong, I will take revenge as soon as possible, no matter what the costs; 3) If somebody puts me in a difficult position, I will do the same to him/her; 4) I go out of

[9]It is conceivable that the career interruptions of workers in this special group are caused by unobserved individual characteristics which may also be related to reciprocal behavior. By excluding this selective group of workers we avoid potential self-selection into the treatment group that might confound the treatment effect. However, in an control analysis we will include the workers who did not work continuously work in the public sector since 1997.

my way to help somebody who has been kind to me before; 5) If somebody offends me, I will offend him/her back; 6) I am ready to undergo personal costs to help somebody who helped me before. Statements (2), (3) and (5) refer to negative reciprocity in which we are primarily interested. Statements (1), (4) and (6) refer to positive reciprocity. We construct our measures of positive and negative reciprocity by taking the arithmetic average of the respondents' answers to questions (2), (3), (5) and (1), (4), (6), respectively.[10]

A relevant concern is how well these survey questions measure reciprocal inclinations of the individuals in our sample. Various factors such as strategic motives, self-serving biases or lack of attention could possibly induce respondents to distort or unintentionally miss-report their true reciprocal behavior (Camerer and Hogarth, 1999). We are confident, however, that our measures are valid indicators of reciprocity, albeit measured with error, for the following reasons. First, previous research has demonstrated the validity of survey questions on related social preferences, e.g., 'trust' (see Fehr et al., 2003; Bellemare and Kröger, 2007; and Falk and Zehnder, 2007). Second, Dohmen et al. (2009) show that the survey measures of reciprocity that we employ in this study are correlated with behavioral outcomes in a way that we would expect (e.g., negatively reciprocal workers are more likely to be unemployed).

Table 1 presents descriptive statistics for the entire sample (Column (1)), and for the control group (Column (2)) and the treatment group (Column (3)) separately. Concerning our variable of interest, we do not observe any differences in job motivation between the treatment and control group in the raw data.

Similarly, there are no significant differences in averaged responses to each of the six different reciprocity measures between the treatment and control group, indicating that the change in pension rights did not affect social preferences. The distributions of answers to the six reciprocity questions for the entire sample show the same patters as for

[10]We will also perform robustness analyzes in which the measures of positive and negative reciprocity are based on a principal component analysis.

the respondents in SOEP (see Dohmen et al., 2009). The sample averages for the three items that measure negative reciprocity range from 2.6 to 3.1 and are smaller than the averages for the items measuring positive reciprocity (4.3 to 3.7). A substantial number of respondents reports that the statements on positive reciprocity apply to them perfectly, while respondents identify themselves on average less with the statements on negative reciprocity.[11] The variance within the negative reciprocity measures is larger than within the positive reciprocity measures. In Table 1, we also report summary statistics for our two reciprocity measures that are constructed by averaging agreement with the three statements concerning positive and negative reciprocity respectively. The main conclusion to be drawn from the descriptive statistics remains unchanged: There are no differences in reciprocal behavior between the treatment and the control group.

Finally, to verify whether the employees in our sample are aware of the exogenous shock in their pension rights, we measure retirement expectations using answers to the following question: 'Suppose, you would retire at the age of 62. How large would your pension benefit be as a percentage of your net wage income?' The summary statistics in Table 1 shows that respondents who are affected by the pension reform expect a significantly lower replacement rate, namely 67%, when retiring early at age 62, while older employees expect on average a pension income at the replacement rate of 72% when retiring at age 62. These expectations are remarkably close to the actual replacement rates of 64% and 70% respectively, which they are forecasted to receive based on their past and projected pension contributions. Therefore, it is reasonable to conclude that employees are on average aware of the consequences of the new pension system. Furthermore, Table 1 shows the the means and standard deviations of the control variables which are used in our analyzes (see Section 4).

[11] Another interesting similarity with the study of Dohmen et al. (2009) and with the evidence from laboratory experiments is that respondents do agree less with positive reciprocity statements when the costs of reciprocating increase.

4 Empirical strategy

To identify the effect of reciprocity on job motivation, we make use of a natural experiment, in which an exogenous change in pension rights affected differently two sub-groups of workers who are very similar with respect to observed, and arguably also with respect to unobserved characteristics, given the large number of subjects in both groups. In light of demographic changes it had been acknowledged for some time that there would be a need to reform the pension system in the future. In that sense a change in pension rights was not entirely unexpected. But the particular type of a discontinuous assignment rule and the strong differential treatment of workers born around January 1, 1950 came as a surprise to public sector employees when it was announced on July 5, 2005. Assignment to the treatment in pension rights depends in a deterministic way on the birth date b_i of public worker i. The assignment rule is discontinuous and has the following form

$$d_i = \begin{cases} 1 & \text{if } b_i \geq \bar{b} \text{: } = 1 \text{ January 1950,} \\ 0 & \text{otherwise.} \end{cases} \tag{1}$$

where d_i is the assignment indicator. Based on previous experimental evidence, we would expect that the level of job motivation is lower in the treatment group, especially for those who have negatively reciprocal inclinations. The expected level of job motivation can be stated as

$$E(t_i) = \alpha + \beta F(D_i, NR_i), \tag{2}$$

where $\alpha = E(t_{0i})$ is the level of job motivation without an exogenous change in pension rights and $\beta = E(t_{1i}) - E(t_{0i})$ is the difference in job motivation caused by a function

of assignment to the treatment (D) and the degree of negative reciprocity (NR). In our empirical application we define $F(D_i, NR_i) = D_i \times NR_i$.

There is no indication that persons who were born near the date $\bar{b}$ differ with regard to characteristics other than the difference in pension rights. Therefore, comparing the level of job motivation of employees with different degrees of negative and positive reciprocity who were born in 1949 with those who were born in 1950 will yield unbiased estimates of the treatment effect and provide insights about how the treatment effect depends on reciprocal inclinations (cf. Hahn et al. (2001) for a discussion of regularity conditions at the threshold for selection). We estimate the treatment effect with ordered probit models of the form

$$JM_i = \alpha + \beta_1 D_i + \beta_2 NR_i + \beta_3 D_i * NR_i + X_i\eta + \epsilon_i \tag{3}$$

where JM_i indicates the level of job motivation of worker i and D_i is the treatment dummy variable which equals 1 if the employee was born in 1950 and 0 otherwise. We are primarily interested in the coefficient β_3 which shows whether negatively reciprocal individuals in the treatment group behave differently from negatively reciprocal individuals in the control group or the non-reciprocal.

X_i is a matrix of control variables that includes annual wage income, the number of years in which workers have built up their pension, marital status, self reported health status, educational attainment, the sub-sector of the employees, and the measure of positive reciprocity and its interaction with the treatment dummy. Because workers could anticipate the change in the pension system 5 months in advance, it is also necessary to account for the possibility that workers restored part of their pension benefits by increasing their personal pension savings. Therefore, we include an indicator for extra pension

savings since 2006.

5 Estimation results

A. Job motivation, negative reciprocity and the treatment

In this section, we present estimates of the impact of the retrenchment in pension rights on job motivation as a function of reciprocal inclinations. As explained above, we hypothesized job motivation of negatively reciprocal public sector employees who are affected by the reform to be lower than of workers in the control group, who are not affected by the change, whereas this does not hold for the non-reciprocal workers in the treatment group.

Table 2, which shows ordered probit estimates with standard errors in brackets, indicates that this hypothesis is supported empirically: Workers who are in the highest quartile of the distribution of negative reciprocity become strongly de-motivated by the pension reform. Hence, consistent with behavior observed in laboratory experiments, we find that employees who have stronger negative reciprocal inclinations react more strongly to the drop in their pension rights and have a considerably lower job motivation than similar employees in the control group. This does not hold for the treated with less negative reciprocal inclinations. Concerning the control variables, we find that employees with bad health are less motivated while log yearly wage income is positively related to job motivation.

Column 1 in Table 3 contains the results of the ordered probit model estimates including the treatment dummy variable, the indicators for negative and positive reciprocity and the two interaction terms between reciprocity and the treatment dummy and control variables as specified in equation 3. The estimation results are in line with the results presented in Table 2. The coefficient of the interaction effect between the treatment variable and our indicator for negative reciprocity is negative and significantly different from zero,

while the coefficient of the treatment dummy variable is insignificant, which implies that the negative treatment effect primarily exists for the negative reciprocal. The interaction between positive reciprocity and the treatment variable has no effect on the level of job motivation.

We also observe a direct relationship between the reciprocity indicators and the level of job motivation, although it should be mentioned that opposed to the interaction between reciprocity and the treatment effect, we cannot establish the direction of causality. We find that negative reciprocity is significantly negatively related to job motivation while positive reciprocity is positively related. However, the coefficient of our indicator of positive reciprocity is not significant. These findings are broadly in line with experimental evidence (e.g Fehr et al., 1993; Brown, et al., 2004).

Columns 2 and 3 of Table 3 present additional robustness checks. Column 2 contains OLS estimates and shows that the coefficients do not differ from the analysis in Column 1. This exercise shows that our results are robust to the econometric method used. Column 3 contains ordered probit estimates for alternative measures of negative and positive reciprocity which are constructed based on a principal component analysis on the six underlying items. The analysis reveals that the six survey questions yield two distinct, orthogonal, components with eigenvalues larger than one. Questions about negative reciprocity have high loadings on the first component while questions on positive reciprocity have low loadings on this component. The reverse is true for loadings on the second component. We find that our results are robust to the use of these alternative measures. The size of the coefficient of the interaction effect between negative reciprocity and the treatment remains substantial and highly significant.

B. Treatment effects for different birth cohorts

An interesting question is whether workers who were born more closely around the treatment threshold react more strongly to the retrenchment of their pension rights than workers who are born later in 1950. It is plausible to expect that negatively reciprocal workers who were born only shortly after January 1, 1950 and who are comparing their status quo before the policy change with the pension rights of those who were born just a few weeks earlier and fall still under the more generous old regime, will perceive the policy change as particularly unfair. Hence, we would expect that this specific group will be more de-motivated than workers with less negatively reciprocal inclinations or workers who were born later in 1950.

Table 4 provides estimates of differences in job motivation as a function of reciprocal inclinations for workers born in different quarters in 1950 and for those born in in the fourth quarter of 1949. The treatment group in Column 1 consists of workers who were born in the first quarter of 1950 while the group in Column 2 consists of workers born in the second, third or fourth quarter of 1950. We find empirical support for our hypothesis: negatively reciprocal workers who were born just after January 1, 1950, are stronger de-motivated than workers who were born later in the year. The size of the coefficient of the interaction term between negative reciprocity and the treatment variable is substantial and significant in Column 1, while the coefficient becomes smaller and insignificant in the next column. This indicates that workers who were born in the first three months in 1950 perceive the policy change as more unfair than workers born later in that year.

Compared to the results in Table 3, we find some small differences in the estimated coefficients for the control variables. The coefficient of the negative reciprocity measure is negative but insignificant. The size of the coefficient of the variable measuring whether workers increased their pension savings is larger in the sample of employees born later in 1950.

An additional question is whether the effect of the interaction between the treatment effect and negative reciprocity can be attributed to the seasonality of birth. Within the health literature there are several studies that show that individuals who are born in the winter have more often mood disorders and hence may be less motivated (see for example Mino et al., 2000). We checked whether seasonality of birth plays a role by performing additional estimations, using the same set of explanatory variables as in Table 3 for workers born in the first quarter of 1949 or in the first quarter of 1950. The idea is that if only seasonality of birth is responsible for the observed treatment effect, we would not find a significant coefficient for the interaction between the treatment dummy and our indicator of negative reciprocity, since we compare only workers who were born in the winter. We find, however, that the interaction effect remains strongly significant (coefficient is -0.218 with a standard error of 0.080).

Furthermore, we analyzed whether there exists a relief effect among workers in the control group. It may be possible that the level of job motivation of those born just before January 1, 1950 is positively affected by the fact that positive reciprocal workers are grateful that they still are entitled to the old pension rules. We therefore restricted the sample to workers born in 1949 and regressed our job motivation variable on a dummy indicating whether workers are born in the last quarter of 1949 or not, our reciprocity indicators and the interaction effects between the quarter dummy and our indicators for negative and positive reciprocity and the additional control variables as specified in Table 3. If a relief effect would be present, we would expect a significant positive effect of the interaction between the quarter dummy and positive reciprocity. The main finding is that the coefficient of the interaction between the quarter dummy and positive reciprocity is negative and insignificant (coefficient is -0.029 with a standard error of 0.112) indicating that no relief effect is present.

C. Sector heterogenous effects

One of the key advantages of this paper is that public sector employees may hold their employer directly responsible for their deteriorating pensions, since the government, which is regarded as the corporate management of the public sector, initiated the pension reform by abolishing the favorable tax treatment. However, the extent to which employees hold their employer responsible may differ across the different sub-sectors in the public sector. The public sector can be divided into 15 sub-sectors of which some sectors are less related to the central government than others.[12] The central government (i.e. the civil service, provinces and local governments) is primarily responsible for the policy reform while the other 8 sectors are less related to the government sector. Particularly those who work in the covil service may hold their employer responsible for the policy reform. Consequently, we would expect that the interaction between the treatment term and the indicator for negative reciprocity should be larger for employees who work in government sector, especially for civil servants.

We test this conjecture by estimating ordered probit models separately for workers in the government sector (the sectors mentioned above) and workers in the remaining sub-sectors. Columns 1 and 2 of Table 5 show the estimated results of these two separate regression analyzes. As expected, we find that the size of the coefficient of the interaction between the treatment term and our indicator for negative reciprocity is much larger for employees in the government sector. Moreover, the coefficient is only significant for the government sector. Columns 3 and 4 contain the results of separate estimates for civil servants and workers in the other sub-sectors. The table shows as expected that the coefficient of the interaction between the treatment term and negative reciprocity is even larger for civil servants. Hence, government employees that are working in the sector that is closest related to the policy makers that initiated the pension reform have a lower job

[12]The 15 sub-sectors are: civil service, defence (only civilian personnel), provinces, municipalities, judiciary, primary and secondary education, intermediate vocational education, higher vocational education, universities, research and scientific policies, teaching hospitals, district water boards, water, energy and public utilities, voluntary members (including ABP and public transport) and a remaining category.

motivation compared to other workers which are further removed from the policy making process.

D. Risk behavior

We further checked to what extent workers who are less willing to take risks react differently to the policy change than workers who are more prepared to take risks. Since policy changes are usually surrounded with uncertainty, we expect that negatively reciprocal workers who are less willing to take risks are more de-motivated by the policy change than negatively reciprocal workers who are more willing to take risks. For determining the preparedness to take risks we used the following survey question: 'Are you generally a person who is fully prepared to take risks or do you try to avoid taking risks?' Answers categories ranged from 0 ('risk adverse') to 10 (''fully prepared to take risks).[13] Next, we constructed two samples: a group of workers who are less willing to take risks and have a score below the median and a group of workers who have a score above the median. Columns 3 and 4 show the estimation results for the two groups. The table shows as expected that the interaction between the treatment term and the indicator for negative reciprocity is negative and significant for workers who are less prepared to take risks, whereas the coefficient is smaller and insignificant for workers who are more willing to take risks.

[13]See Dohmen et al. (2005) for evidence on the behavioral validity of this survey question.

E. Alternative indicator of productivity

The decrease in job motivation of negative reciprocal workers in the treatment group will most likely result in reduced effort and may distort the positive effects of the pension reform on labor force participation which the government expects to achieve. Obviously there are no good indicators of individual productivity of public sector employees. However, in a recent paper by De Grip et al. (2009) a relationship is found between the unexpected drop in pension rights and their mental health. The latter use the same data as in this paper to examine the relation between mental health and the treatment and found that workers in the treatment group are significantly more depressed than those who are born in 1949. Since depression is known to be a relevant determinant for among others lower productivity, mistakes at work, faulty products, increased sickness absence (see OECD, 2008), the mental health variable may serve as an useful alternative indicator for productivity.[14] When we estimate a probit regression including all the explanatory variables as reported in Column 1 of Table 3 on the depression indicator, we find that workers in the treatment group who are strongly negatively reciprocal are indeed more depressed (the coefficient of the interaction dummy equals 0.012 with a standard error of 0.005) than less negatively reciprocal workers. The fact that this effect is also found using this alternative indicator of productivity gives confidence in our estimates on job motivation.

[14]For measuring mental health, De Grip et al. (2009) used the CES-D8 indicator of depression which is derived from the Center for Epidemiologic Studies Depression Scale The CES-D8 consists of eight items of which six negatively phrased statements that reflect the presence of depressive symptoms and two positively phrased statements that reflect the absence of depressive symptoms. To create the variable used in our analyzes, we first dichotomized (yes/no) responses and reversed the coding of the positively phrased items to achieve a count variable from 0 to 8, where higher values suggest worsening depressive symptoms. In the next step, we constructed a dummy variable which indicates if workers are considered to be depressed. Following De Grip et al. (2009) we used the suggested score of 4 and above, which indicates probable clinical depression.

F. Workers whit career breaks since April, 1997

To avoid possible selection biases that may confound our analyzes of the behavioral relevance of reciprocal inclinations, we did not include workers with career breaks after April, 1997. However, although it is conceivable that the career interruptions of these workers are caused by unobserved individual characteristics which may also be related to reciprocal behavior, the inclusion of these workers introduces an additional treatment group and control group. Remember that the legislative change also curtailed the pensions of those who were born in 1949 and who did not work continuously since April, 1997. Therefore we estimated ordered probit models on a sample including workers with career breaks. The results are presented in Table A1 of the appendix. Column 1 of the table presents estimation results for workers who are born in 1949. Column 2 contains estimation results for the 1949 cohort as well as for the 1950 cohort. In Column 1, the treatment dummy equals 1 for workers who are not entitled to the old pension rights since they did not work continuously since April, 1997, and equals 0 for those who remain entitled to the old pre-pension rights. The main result of this exercise is that we find a significant and negative coefficient of the interaction effect between the treatment variable and our indicator for negative reciprocity. Again, the coefficient of the treatment dummy is insignificant implying that primarily negative reciprocal workers with curtailed pension rights are strongly de-motivated. The model in Column 2 includes two treatment dummy variables. The first treatment dummy equals 1 for workers who were born in 1949 and who are not entitled to the old pension rights and is coded 0 otherwise. The second treatment dummy equals 1 if workers were born in 1950 and equals 0 for those born in 1949. The analysis reveals that both interactions between the treatment dummy variables and our indicator for negative reciprocity are negative and significantly different from zero. In first instance, the negative reciprocal workers of the 1949 treatment group appear to be slightly more de-motivated than those who are in the 1950 treatment group. However,

the difference in size of the two coefficients is not significant at the 5%-level.

6 Conclusion

In this paper, we have shown that reciprocity is an important determinant of job motivation. Using a natural experiment, we found that a decrease in pension rights triggers a decrease in job motivation among negatively reciprocal employees. Negatively reciprocal workers who are born in the first three months of 1950 are more de-motivated than those who were born later in 1950, plausibly because the former perceive the differential tax treatment as more unfair because their age hardly differs from the age of those who are not affected by the reform. Moreover, we find that especially negatively reciprocal civil servants, who are more likely to hold their employer responsible for the policy change, are most de-motivated. Also, negatively reciprocal workers in the treatment group, who are less willing to take risks, have a significantly reduced job motivation.

These results complement earlier experimental evidence. In accordance with an ultimatum game, the drop in motivation can be interpreted as the sanctioning of unkind or hostile actions (e.g. Güth et al., 1982; Camerer and Thaler, 1995). Our evidence shows that negatively reciprocal individuals do not only sanction actions which they perceive as unkind or hostile in laboratory settings, but behave in the same manner when they feel that they are treated unfairly by their employer. Consequently, the intended effects of a pension reform that aims to increase labor fore participation can be distorted by the decreasing job motivation of negatively reciprocal workers who feel that they are treated unfairly. Therefore, it is crucial to think of reform designs that provide less scope for being perceived as unfair by particular groups. In the specific example of tax legislation that affects pension rights, an alternative design that entails less discontinuous differences in pension rights would arguably cause less disruption in terms of negatively reciprocal

responses.

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Table 1
Descriptive statistics

	Entire sample	**Born in 1949**	**Born in 1950**
Job motivation	3.33	3.33	3.33
	(1.14)	(1.12)	(1.16)
Take revenge for a serious wrong	3.06	3.06	3.06
	(1.04)	(1.04)	(1.05)
Retaliate for being put in a difficult position	2.54	2.54	2.54
	(0.85)	(0.84)	(0.86)
Reciprocate insult with an insult	2.60	2.60	2.62
	(0.91)	(0.90)	(0.91)
Reciprocate a favor	4.29	4.31	4.27
	(0.64)	(0.63)	(0.64)
Exert effort to help somebody who is kind	4.11	4.11	4.11
	(0.62)	(0.62)	(0.62)
Undergo personal costs to help someone who was helpful before	3.73	3.73	3.72
	(0.70)	(0.69)	(0.71)
Negative reciprocity (averaged)	2.73	2.74	2.73
	(0.79)	(0.78)	(0.79)
Positive reciprocity (averaged)	4.04	4.05	4.04
	(0.51)	(0.50)	(0.51)
Expected retirement benefit at age of 62 (in % of net present wage)	69.02	71.66	66.62
	(11.67)	(11.67)	(11.14)
Extra pension savings in previous year (1 if savings increased)	0.25	0.22	0.27
	(0.43)	(0.41)	(0.44)
Yearly wage (in euros)	53,132	53,132	53,131
	(16,420)	(15,957)	(16,938)
Log size of organization	7.13	7.13	7.13
	(1.78)	(1.79)	(1.77)
Marital status	0.92	0.92	0.91
	(0.28)	(0.27)	(0.29)
Bad health (self reported on 5-point Likert scale)	2.06	2.07	2.05
	(0.72)	(0.72)	(0.72)
Number of observations	4,397	2,086	2,311

Sample standard deviations are in parentheses below sample averages. Job motivation is based on the following 5-level Likert item: 'At times, I have difficulties to motivate myself for my job'. Answers categories ranged form 1 ('does perfectly apply to me') to 5 ('does not apply to me at all'). The measure of negative reciprocity is the individual's agreement to the three statements on the willingness to take revenge for a serious wrong, to retaliate for being put in a difficult position and to respond to an insult with an insult. The measure of positive reciprocity reflects the agreement to statements on the willingness to return a favor, to exert effort to somebody who was kind and to undergo personal costs to help someone who was helpful before. Both measures are based on the average of the three underlying items. Answers for the six reciprocity questions are on a scale between 1 to 5 where 1 means 'does not apply to me at all' and 5 means 'does apply perfectly to me'. The expected retirement benefit at age of 62 is based on the following survey question: 'Suppose you would retire at the age of 62. How large would your pension benefit be in percentage of your net wage income?' The yearly wage income is based on administrative data of the public sector's pension fund.

Table 2

Treatment effect on job motivation across quantiles of the distribution of negative reciprocity

Dependent variable:	**(1)**	**(2)**	**(3)**	**(4)**
Job motivation	**0-25%**	**25-50%**	**50-75%**	**75-100%**
Treatment dummy	-0.029	-0.131	-0.058	-0.350***
	(0.091)	(0.087)	(0.084)	(0.102)
Negative reciprocity	-0.101***	-0.095***	-0.099***	-0.106***
	(0.030)	(0.031)	(0.031)	(0.030)
Positive reciprocity	0.036	-0.010	0.038	0.020
	(0.040)	(0.043)	(0.042)	(0.044)
Extra pension savings in previous year	-0.041	-0.050	-0.086*	-0.080
	(0.049)	(0.049)	(0.048)	(0.051)
Number of years contributed to the pension fund	-0.001	0.000	-0.002	-0.002
	(0.004)	(0.004)	(0.004)	(0.004)
Log yearly wage	0.382***	0.264**	0.273**	0.324***
	(0.110)	(0.110)	(0.107)	(0.117)
Log size of organization	-0.014	-0.018	-0.012	-0.007
	(0.019)	(0.019)	(0.019)	(0.019)
Marital status	0.112	0.012	0.062	0.009
	(0.075)	(0.078)	(0.074)	(0.082)
Bad health (self reported)	-0.381***	-0.398***	-0.421***	-0.366***
	(0.029)	(0.029)	(0.029)	(0.030)
Age	-0.025	-0.041**	-0.013	-0.038*
	(0.019)	(0.019)	(0.019)	(0.020)
Observations	2,720	2,685	2,806	2,444

Ordered probit estimates. The dependent variable is a measure for job motivation which is based on the following 5-level Likert item: 'At times, I have difficulties to motivate myself for my job'. Answers categories ranged form 1 ('does perfectly apply to me') to 5 ('does not apply to me at all'). The treatment effect on job motivation is estimated for 4 different quartiles of the distribution of negative reciprocity. The measure for negative reciprocity is constructed using the average of three underlying questions on negative reciprocity. Columns 1 to 4 contain estimates for workers in ascending order of negative reciprocity. Thus the workers that have been selected for the regression analysis presented in Column 4 exhibit strongly negative reciprocal behavior. Additional control variables are: educational levels; sector fixed effects. Standard errors are in parentheses. $***<0.01$, $**<0.05$, $*<0.10$

Table 3

Negative reciprocity, treatment and job motivation

Dependent variable:	**(1)**	**(2)**	**(3)**
Job motivation			
Interaction treatment and negative reciprocity	-0.108***	-0.109**	-0.058***
	(0.041)	(0.043)	(0.022)
Interaction treatment and positive reciprocity	-0.043	-0.035	-0.016
	(0.064)	(0.066)	(0.024)
Negative reciprocity	-0.102***	-0.099***	-0.058***
	(0.031)	(0.031)	(0.016)
Positive reciprocity	0.033	0.018	0.013
	(0.047)	(0.049)	(0.018)
Treatment dummy	0.333	0.294	-0.139**
	(0.276)	(0.283)	(0.064)
Extra pension savings in previous year	-0.136***	-0.138***	-0.136***
	(0.038)	(0.039)	(0.038)
Number of years contributed to the pension fund	-0.004	-0.004	-0.004
	(0.003)	(0.003)	(0.003)
Log yearly wage	0.242***	0.215**	0.239***
	(0.085)	(0.087)	(0.085)
Log size of organization	0.002	0.005	0.002
	(0.014)	(0.015)	(0.014)
Marital status	0.100*	0.109*	0.101*
	(0.058)	(0.060)	(0.058)
Bad health (self reported)	-0.394***	-0.403***	-0.393***
	(0.023)	(0.023)	(0.023)
Age	-0.032**	-0.033**	-0.033**
	(0.015)	(0.016)	(0.015)
Constant		3.316***	
		(1.150)	
Observations	4,397	4,397	4,397

The dependent variable is a measure for job motivation which is based on the following 5-level Likert item: 'At times, I have difficulties to motivate myself for my job'. Answers categories ranged form 1 ('does perfectly apply to me') to 5 ('does not apply to me at all'). The measures of negative and positive reciprocity used in the estimations presented in Columns 1 and 2 are constructed by taking the average of the three underlying items. Column 1 presents results which are based on Ordered probit estimates. Column 2 presents OLS coefficient estimates. Column 3 shows Ordered probit estimates on measures of negative and positive reciprocity which are constructed using principal component analysis on the six underlying questions. The measure of negative reciprocity is the individual's agreement to the three statements on the willingness to take revenge for a serious wrong, to retaliate for being put in a difficult position and to respond to an insult with an insult. The measure of positive reciprocity reflects the agreement to statements on the willingness to return a favor, to exert effort to somebody who was kind and to undergo personal costs to help someone who was helpful before. Answers for the six reciprocity questions are on a scale between 1 to 5 where 1 means 'does not apply to me at all' and 5 means 'does apply perfectly to me'. Additional control variables in the estimations are: educational levels; sector fixed effects. Standard errors are in parentheses. $***< 0.01$, $**< 0.05$, $*< 0.10$

Table 4

Treatment effect on job motivation: Results for different birth cohorts

Dependent variable:	**(1)**	**(2)**
Job motivation	**I 1950 vs IV 1949**	**I-III 1950 vs IV 1949**
Interaction treatment and negative reciprocity	-0.165**	-0.114*
	(0.082)	(0.069)
Interaction treatment and positive reciprocity	-0.134	0.033
	(0.131)	(0.110)
Negative reciprocity	-0.081	-0.086
	(0.061)	(0.061)
Positive reciprocity	-0.005	-0.005
	(0.098)	(0.098)
Treatment dummy	0.861	0.136
	(0.550)	(0.465)
Extra pension savings in previous year	-0.108	-0.230***
	(0.077)	(0.052)
Number of years contributed to the pension fund	-0.003	-0.006
	(0.005)	(0.004)
Log yearly wage	0.175	0.204*
	(0.172)	(0.123)
Log size of organization	0.002	0.022
	(0.030)	(0.020)
Marital status	-0.084	0.147*
	(0.133)	(0.079)
Bad health (self reported)	-0.479***	-0.388***
	(0.048)	(0.033)
Observations	1,092	2,143

The dependent variable is a measure for job motivation which is based on the following 5-level Likert item: 'At times, I have difficulties to motivate myself for my job'. Answers categories ranged form 1 ('does perfectly apply to me') to 5 ('does not apply to me at all'). In Column 1, workers born in the first quarter of 1950 are compared to workers in the control group who were born in the fourth quarter of 1949. Column 2 compares workers born in the second, third or fourth quarter of 1950 with those born in the fourth quarter of 1949. The measures of negative and positive reciprocity used in the estimations are constructed by taking the average of the three underlying items. The measure of negative reciprocity is the individual's agreement to the three statements on the willingness to take revenge for a serious wrong, to retaliate for being put in a difficult position and to respond to an insult with an insult. The measure of positive reciprocity reflects the agreement to statements on the willingness to return a favor, to exert effort to somebody who was kind and to undergo personal costs to help someone who was helpful before. Answers for the six reciprocity questions are on a scale between 1 to 5 where 1 means 'does not apply to me at all' and 5 means 'does apply perfectly to me'. Additional control variables in both estimations are: educational levels; sector fixed effects. Standard errors are in parentheses. $***<0.01$, $**<0.05$, $*<0.10$

Table 5

Treatment effect on job motivation: heterogenous sector effects

Dependent variable:	**Government (including local authorities)**		**Civil service**	
Job motivation	**Yes**	**No**	**Yes**	**No**
Interaction treatment and negative reciprocity	-0.175***	-0.062	-0.249**	-0.077*
	(0.063)	(0.056)	(0.101)	(0.046)
Interaction treatment and positive reciprocity	-0.065	-0.014	-0.054	-0.030
	(0.095)	(0.089)	(0.151)	(0.071)
Negative reciprocity	-0.091*	-0.103***	-0.030	-0.115***
	(0.048)	(0.040)	(0.075)	(0.034)
Positive reciprocity	0.043	0.015	0.078	0.011
	(0.071)	(0.064)	(0.111)	(0.052)
Treatment dummy	0.609	0.078	0.674	0.221
	(0.402)	(0.382)	(0.639)	(0.307)
Extra pension savings in previous year	-0.200***	-0.097**	-0.292***	-0.109***
	(0.059)	(0.049)	(0.096)	(0.041)
Number of years contributed to the pension fund	-0.004	-0.003	0.002	-0.005*
	(0.004)	(0.004)	(0.007)	(0.003)
Log yearly wage	0.151	0.362***	0.292	0.286***
	(0.126)	(0.109)	(0.196)	(0.089)
Log size of organization	0.002	-0.010	0.010	-0.007
	(0.012)	(0.017)	(0.029)	(0.012)
Marital status	0.041	0.143*	0.027	0.118*
	(0.090)	(0.077)	(0.131)	(0.065)
Bad health (self reported)	-0.338***	-0.438***	-0.348***	-0.405***
	(0.035)	(0.031)	(0.055)	(0.025)
Age	-0.042*	-0.026	-0.070**	-0.024
	(0.022)	(0.021)	(0.036)	(0.017)
Observations	1,995	2,402	811	3,586

The dependent variable is a measure for job motivation which is based on the following 5-level Likert item: 'At times, I have difficulties to motivate myself for my job'. Answers categories ranged form 1 ('does perfectly apply to me') to 5 ('does not apply to me at all'). The measures of negative and positive reciprocity used in the estimations are constructed by taking the average of the three underlying items. The measure of negative reciprocity is the individual's agreement to the three statements on the willingness to take revenge for a serious wrong, to retaliate for being put in a difficult position and to respond to an insult with an insult. The measure of positive reciprocity reflects the agreement to statements on the willingness to return a favor, to exert effort to somebody who was kind and to undergo personal costs to help someone who was helpful before. Answers for the six reciprocity questions are on a scale between 1 to 5 where 1 means 'does not apply to me at all' and 5 means 'does apply perfectly to me'.

Table 6

Treatment effect on job motivation and risk behavior

Dependent variable:	**Prepared to take risks**	
Job motivation	**Below median**	**Above median**
Interaction treatment and negative reciprocity	-0.151**	-0.080
	(0.065)	(0.054)
Interaction treatment and positive reciprocity	0.029	-0.070
	(0.104)	(0.083)
Negative reciprocity	-0.064	-0.126***
	(0.049)	(0.040)
Positive reciprocity	0.034	0.017
	(0.077)	(0.061)
Treatment dummy	0.187	0.341
	(0.443)	(0.357)
Extra pension savings in previous year	-0.176***	-0.124**
	(0.060)	(0.048)
Number of years contributed to the pension fund	-0.011**	0.000
	(0.005)	(0.003)
Log yearly wage	0.168	0.211**
	(0.145)	(0.107)
Log size of organization	0.008	-0.005
	(0.023)	(0.019)
Marital status	0.098	0.090
	(0.087)	(0.079)
Bad health (self reported)	-0.456***	-0.344***
	(0.037)	(0.030)
Age	-0.016	-0.047**
	(0.024)	(0.020)
Observations	1,791	2,601

The dependent variable is a measure for job motivation which is based on the following 5-level Likert item: 'At times, I have difficulties to motivate myself for my job'. Answers categories ranged form 1 ('does perfectly apply to me') to 5 ('does not apply to me at all'). The measures of negative and positive reciprocity used in the estimations are constructed by taking the average of the three underlying items. The measure of negative reciprocity is the individual's agreement to the three statements on the willingness to take revenge for a serious wrong, to retaliate for being put in a difficult position and to respond to an insult with an insult. The measure of positive reciprocity reflects the agreement to statements on the willingness to return a favor, to exert effort to somebody who was kind and to undergo personal costs to help someone who was helpful before. Answers for the six reciprocity questions are on a scale between 1 to 5 where 1 means 'does not apply to me at all' and 5 means 'does apply perfectly to me'. The preparedness to take risks is based on the following survey question: 'Are you generally a person who is fully prepared to take risks or do you try to avoid taking risks?' Answers categories ranged from 0 ('risk adverse') to 10 (''fully prepared to take risks). Additional control variables in both estimations are: educational levels; sector fixed effects. Standard errors are in parentheses. $***< 0.01$, $**< 0.05$, $*< 0.10$

Appendix

Table A1

Treatment effect on job motivation: Workers with career breaks

Dependent variable:	**(1)**	**(2)**
Job motivation		
Interaction treatment 1949 and negative reciprocity	-0.269**	-0.244**
	(0.115)	(0.114)
Interaction treatment 1949 and positive reciprocity	0.064	0.061
	(0.152)	(0.151)
Interaction treatment 1950 and negative reciprocity		-0.104**
		(0.041)
Interaction treatment 1950 and positive reciprocity		-0.040
		(0.064)
Negative reciprocity	-0.095***	-0.102***
	(0.031)	(0.031)
Positive reciprocity	0.020	0.033
	(0.048)	(0.047)
Treatment dummy 1949	0.622	0.520
	(0.656)	(0.653)
Treatment dummy 1950		0.325
		(0.275)
Observations	2,240	4,593

The dependent variable is a measure for job motivation which is based on the following 5-level Likert item: 'At times, I have difficulties to motivate myself for my job'. Answers categories ranged form 1 ('does perfectly apply to me') to 5 ('does not apply to me at all'). Column 1 presents estimation results for workers who are born in 1949. The treatment dummy equals 1 for workers who are not entitled to the old pension rights since they did not work continuously since April, 1997, and equals 0 for workers who remain entitled to the old pre-pension rights. Column 2 contains estimation results for the 1949 and the 1950 cohort. The model includes two treatment dummy variables. The first treatment dummy equals 1 for workers who were born in 1949 and who are not entitled to the old pension rights and is coded 0 otherwise. The second treatment dummy equals 1 if workers were born in 1950 and equals 0 for those born in 1949. The measures of negative and positive reciprocity used in the estimations are constructed by taking the average of the three underlying items. The measure of negative reciprocity is the individual's agreement to the three statements on the willingness to take revenge for a serious wrong, to retaliate for being put in a difficult position and to respond to an insult with an insult. The measure of positive reciprocity reflects the agreement to statements on the willingness to return a favor, to exert effort to somebody who was kind and to undergo personal costs to help someone who was helpful before. Answers for the six reciprocity questions are on a scale between 1 to 5 where 1 means 'does not apply to me at all' and 5 means 'does apply perfectly to me'. Additional control variables in estimations are: extra pension savings in previous year; number of years contributed to the pension fund; yearly wage (in logs); size of organization (in logs); marital status; age; bad health; educational levels; sector fixed effects. Standard errors are in parentheses. $***<0.01$, $**<0.05$, $*<0.10$