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Socio-Economic Gaps in Workers' Participation in Private Pension Programmes in Ten European Countries

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Abstract

In recent decades, many European governments have passed pension reforms to incentivise participation in private pension plans. However, we still have minimal understanding of whether participation in such plans is concentrated in certain groups or spread uniformly across society, or what their stability over time is. To illuminate the social selectivity of these plans and potential changes in that selectivity over time, we analyse six waves of the Survey of Health, Ageing and Retirement in Europe (SHARE) in ten European countries: Austria, Belgium, Czech Republic, Denmark, France, Germany, Italy, Spain, Sweden and Switzerland. Specifically, we focus on participation gaps in individual and occupational plans of workers across six dimensions: gender, education, age, social class, income, and risk preference. The results indicate large and persistent social divides in participation rates. As expected, rates are significantly higher among workers who are not close to retirement, those with an upper service occupation and those with high income. Importantly, these divides did not shrink significantly over the period considered – 2006 to 2021. Social selectivity is not consistently smaller in contexts of more mature private pension provision, whereas it is consistently smaller in countries with more generous public pensions.

Keywords: occupational pension schemes; individual pension schemes; social divides

Introduction

European social policy experts and decision-makers increasingly concur on the high potential of private pension provision. We define private pension provision as (a) non-mandatory, commonly funded and privately-managed pension plans financed jointly by employers and employees (*occupational pensions*) and (b) individual pension plans financed by individual, voluntary contributions (*individual pensions*). In classic pension policy nomenclature, *occupational* and *individual* pensions refer to

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the *second* and *third pillars* of pension provision, respectively. With the diminishing role of public administrations in ensuring retirement income (European Commission, 2015, 2021), a growing number of experts consider that private pension plans should play an increasing role in preventing old-age poverty and maintaining pre-retirement income levels (Ebbinghaus, 2015; European Commission, 2012; Holzmann, 2000; OECD, 2000). Many European governments have therefore passed pension reforms that introduce instruments seeking to incentivise the use of occupational and individual pensions (Ebbinghaus *et al.*, 2011; Hassel and Wiß, 2020; Hemerijck, 2013; OECD, 2019; Whitehouse, 2012).

The combination of decreasing public pension levels and strengthened incentives to enrol in private pension plans has already affected collective and individual saving practices by fostering participation in private pension plans (Ebbinghaus *et al.*, 2011; European Parliament, 2014; OECD, 2000). For many workers, growing reliance on private pensions will therefore cushion old-age income drops caused by dwindling public pension levels. However, private pension provision has inbuilt limits in its capacity to preserve pre-retirement income and prevent old-age poverty. By virtue of its reliance on voluntary and semi-voluntary mechanisms – rather than universal legal mandates – participation in these saving mechanisms may be heterogeneous and concentrated, particularly in privileged groups. Given this likely heterogeneity, a precise understanding of the size and temporal persistence of gaps in private pension participation is of paramount importance for pension policy design. Such information would provide valuable hints on the future capacity of the second and third pillars to prevent post-retirement income loss across major social groups.

Some studies have examined social gaps in private pension plan participation in Europe. Most of these, however, rely on descriptive statistics (Antolin *et al.*, 2012; Antolín and Whitehouse, 2009; Callegaro and Wilke, 2008), involve single-country case studies (Gallo *et al.*, 2017; Leschke, 2011; Torricelli *et al.*, 2016), or draw on cross-sectional, multivariate analysis with pooled countries (European Central Bank, 2013; Le Blanc, 2011; Schuth and Haupt, 2013). As a result, we cannot determine if contribution gaps are cross-nationally uniform or whether they have declined over time. To fill these gaps, this study addresses three important questions: (1) What are the most common social divides among participants in private pension plans? (2) How sizeable are the divides in different countries? and (3) Do these social divides diminish as private pension provision matures?

To answer these questions, we focus on workers aged 50 or older who participate in occupational and individual pension plans. Using the terminology of Nelson and Nieuwenhuis (2021), we analyse the levels and determinants of coverage rates (number of insured workers) rather than non-eligibility rates (number of potential beneficiaries who qualify for benefits) or enrolment rates (number of eligible persons who are beneficiaries). Additionally, we analyse six waves of the Survey of Health, Ageing and Retirement in Europe (SHARE) (Börsch-Supan, [several years](#)) in ten European countries: Austria, Belgium, Czech Republic, Denmark, France, Germany, Italy, Spain, Sweden and Switzerland. Capitalising on this cross-national and temporal variation, we utilise multivariate regression models to assess the socio-economic and psychological determinants of being a worker participating in occupational or individual types of (most commonly) pre-funded, defined contribution plans. We further assess whether social divides across six dimensions – gender,

education, age, social class, individual income and risk profile – in private pension participation differ cross-nationally and temporally, which indicates whether second and third pillar maturity is associated with smaller divides in participation. To our knowledge, this study is the first to examine divides across six socio-economic and attitudinal dimensions (age, education, gender, income, risk aversion and social class) from a broad cross-national and longitudinal perspective.¹

The results indicate large social divides in participation rates across the ten countries and very limited longitudinal changes in those rates. Between 2004 and 2021, in the ten countries considered, the participation rates of workers in occupational or either of the private pension schemes did not consistently increase, although they did increase with regard to individual schemes. Moreover, participation in this period was significantly higher among younger workers, those with an upper service occupation and those with high income. Social selectivity associated with these divides did not change significantly between 2006 and 2021. However, social selectivity associated with age and social class is smaller in countries with higher public pensions than in countries with immature private pension systems and low public pensions, respectively. The maturity of the private pension pillar proves to have an inconsistent relationship with the class divide as far as participation in these schemes is concerned.

Background

Reflecting the growing interest in private pension mechanisms from a wide range of actors – scholars, policymakers, think-tanks, etc. – an eclectic group of academic publications, reports from international organisations and working papers by research institutes have analysed individual-level participation in private pension plans. Since this paper focuses on social divides in participation in these plans, in this section, we examine the state of the art on socio-demographic factors related to private plan participation.

After an extensive search, we found 16 studies in English, five of which provide multivariate results, while five include descriptive statistics. Table A5 in the online appendix summarises the main results of these studies. Despite substantial differences in methodology and the range of countries and periods covered in the analyses, these studies display certain important commonalities. The most consistent findings concern the effects of individual education and income. In all the studies that consider these two dimensions, the authors report that these two factors predict private plan participation. Individuals with higher education are more likely to participate in a private pension plan than individuals with only secondary or primary education (e.g. Rey-Ares *et al.*, 2018). Similarly, high-income individuals are more likely to participate than individuals with average or lower-than-average income (e.g. Gallo *et al.*, 2017).

Age and gender have also been shown to be related to private pension participation. In several (but not all) studies, women are less likely to participate than men. Using SHARE data, Schuth and Haupt (2013), for instance, reported that men are more likely to participate in occupational plans than women, but that there is no gender gap in individual plan participation. In addition, most studies document

an interesting, hump-shaped pattern between age and participation. Using descriptive statistics on a household finance survey, the European Central Bank (2013) showed that participation peaks in the early fifties and afterwards declines precipitously.

Four studies that consider the role of wealth (i.e. houses and financial products) documented a positive influence of this factor. Le Blanc (2011) reported that participation in individual retirement accounts is significantly higher for individuals with an above-average level of financial wealth than for individuals with below-average financial wealth, although this factor might be considered endogenous to fund participation. The influence of being a homeowner appears less consistent. Research for the US (Copeland, 2003) also documented that working in a larger company substantially increases the likelihood of participation in these plans. Moreover, previous research indicated that participation depends substantially on the country of residence and individual-level characteristics. It is most common among highly-educated individuals, high-income individuals and men. There are also indications of its association with being middle-aged, employed and working in a large company.

These findings are helpful, but the literature still has two important limitations. First, since all the comparative studies pool all the countries in the models, it is difficult to assess whether a given divide is stronger in some countries than in others. We therefore do not yet know, for instance, if the influence of age is considerable larger in countries with more mature private pension systems than in other countries. Second, since none of the studies using multiple waves assesses whether the effects of key factors change over time, it remains unknown if social divides tend to decline or not. To fill these gaps, this study explores the effect of socio-economic and psychological characteristics in the ten countries and assesses whether the effect of existing divides varies cross-nationally and changes over time. Before moving on to the empirical analysis, we formulate specific hypotheses.

Hypotheses

This section considers the role of six conditions proven to be relevant predictors of participation in private pension plans: *educational levels, gender, social class, age, income, and risk preferences*. We first theorise the role of these individual-level factors, then discuss why the size of the divides produced by each of these factors could change over time or across countries at different levels of second and third pillar maturity and public pension generosity.

There are strong reasons to suggest that an individual's educational background shapes the likelihood of participation in private pension plans. Occupational and private pension plans are complex financial products, the management of which requires a modicum of financial and legal literacy more commonly found among highly-educated individuals (Atkinson and Messy, 2012). Highly-educated individuals are also more likely to be exposed to information on such financial products, which may prompt interest in them. More indirectly, highly-educated individuals appear more future-oriented than individuals who are less highly-educated (Anong and Fisher, 2013), making them more likely to engage in long-term,

individual planning. We hypothesise that highly-educated individuals are more likely to attain an occupational and individual pension plan than less highly-educated individuals (H1).

Due to persistent inequalities in the labour market and the household division of labour, gender could also shape participation in private pension plans. The fact that women tend to earn lower wages, are more likely to have career discontinuities and remain under-represented in managerial positions (Kalev and Deutsch, 2018) could likely affect their relative chances of being offered – or having the means to attain – a private pension plan. Additionally, since women are more likely to hold part-time jobs and (due to the child-raising obligations culturally assigned to them) have longer work interruptions (Platt, 2019), they have fewer chances to hold the high-prestige occupations most likely to offer occupational plans or subsidised private plans as perks. We therefore hypothesise that women are less likely to attain an occupational and individual pension plan than men (H2).

A person's social class can also shape the likelihood of having a private pension plan. Contemporary class theory notes that most occupations can be grouped as either having a 'work contract', a 'service relationship' or a mixed contract (Goldthorpe, 2000). The work contract is most common among unskilled workers and involves a short-term exchange of labour for generally low wages and a non-salary benefits package. In contrast, a service relationship is most common among managers and professionals and involves a long-term relationship with higher wages and an attractive benefits package, often including contributions to an individual or occupational plan to ensure the worker's long-term commitment to the company (Rose *et al.*, 2014). We hypothesise that service-class workers are more likely to attain an occupational and individual pension plan than members of the working class (H3).

Independently of a person's education and social class, their income may also influence the likelihood of having a private pension plan. Higher income provides more disposable resources and increases the propensity to save (Rey-Ares *et al.*, 2018), thereby facilitating private pension participation. It also fosters individual locus of control that encourages active decision-making (Gallo *et al.*, 2017). Hence, we hypothesise that individuals with higher income are more likely to have an occupational or individual pension plan (H4).

Age may also cause a divide in this regard. The database used in this study only covers people aged 50 or older. Among these people, we expect younger participants – in their fifties – to be more likely to participate than older workers since the younger age of the former means that they can benefit from longer periods of pre-retirement participation in pension plans, extending the capitalisation period and increasing their pension assets. Within our sample, age should display a negative relationship with participation (H5).

Finally, of the multiple possible psychological traits affecting fund participation, we focus on risk preference because of its relevance to investment decisions (Rey-Ares *et al.*, 2018). Indeed, several studies have shown that less risk-averse individuals are not only more likely to invest in riskier products but also to save money (for a review, see Rey-Ares *et al.*, 2018). We hypothesise that more risk-averse individuals are less likely to participate in an occupational or private pension plan (H6).

Thus far, the hypothesis discussion has not considered whether these divides may differ cross-nationally or across time periods. There are reasons to believe, however, that these social divides in workers' participation in private pension plans may vary over time and across countries, depending first on the maturity of private pension pillars, and second on the configuration of public pension pillars. Regarding the first aspect, as the second and third pillars mature through increases in the overall coverage rates of occupational and private pensions, participation in these plans could become less exclusive and more mainstream, potentially shrinking past social divides.

This possibility of decreasing coverage divides in private pension provision is implicit in recent accounts of the partial privatisation of pension provision. Ebbinghaus and Wiß (2011b: 362) noted that

mandatory pensions enforced by law or quasi-mandatory collective schemes negotiated by social partners make private pensions more like public pensions by providing broader coverage. They also often apply stricter regulation, pool risks more equitably, use economies of scale and provide more professional advice. Wider coverage also reduces social selectivity, as well as the moral hazard or selection problem; that is, those that are most difficult to cover are not included.

Under the assumption that since the early 2000s, workers' coverage rates in the second and third pension pillars have continued to increase in the ten countries considered, divides based on education, gender, social class, age, income, and risk preferences with regard to participation should decrease over time (H7). Similarly, countries with more mature second and third pillars – e.g. the Netherlands and Germany – should display significantly smaller gaps in participation than countries with less mature second and third pillars – e.g. Spain and Austria (H8).

Apart from the maturity of private pension pillars, the configuration of public pension pillars may also affect social selectivity in private pension participation. The public pillars of the ten countries considered differ substantially in terms of essential dimensions such as their non-contributory and contributory programmes, the minimum pensionable age and the average generosity of public pillars (Table A1). Of all of these, the latter dimension may be particularly influential. In countries with compulsory, earnings-related public pension programmes, medium and high-status workers ultimately have higher pensions than would otherwise be the case, which discourages their participation in private pension programmes (Korpi and Palme, 1998). Hence we hypothesise that countries with generous public replacement rates display smaller divides in participation in private pension plans (H9).

Data and methods

We use SHARE in our empirical analysis, as it allows a detailed analysis of participation in either occupational or individual pension plans. This dataset is a cross-national and longitudinal survey of a population of people aged 50 or older in 28 countries (Börsch-Supan, [several years](#)). On average, the survey has been carried

out every two years since 2004 and collects data on a wide array of socio-demographic conditions, as well as psychological traits, and distinguishes between contributions to occupational and individual private pension plans, thereby allowing us to answer our research question.

In the following analysis, we focus on waves 2 (collected in 2006) to 8 (collected in 2021) and on workers aged 50 to 76. Since our interest is in pension fund participation, we also restrict the analysis to employed workers. Of all the European countries participating in SHARE, we focus on ten that were included in all the considered waves: Austria, Belgium, Czech Republic, Denmark, France, Germany, Italy, Spain, Sweden and Switzerland.² The ten countries selected differ substantially in terms of the level of second and third pillar maturity in their pension systems: the maturity is highest in the Netherlands and Denmark and lowest in Italy and Spain (Ebbinghaus and Wiß, 2011b; OECD, 2020).

We examine three dichotomous dependent variables that take the value 1 if the respondent contributes to a supplementary pension scheme, and the value 0 otherwise. Two sections of the SHARE questionnaire include relevant questions. In the employment and pensions module, participants state whether they will be entitled to occupational pensions in the future. In the assets module, they state whether they have money in an individual private retirement account. These items have already been used as dependent variables in previous work on participation in private pension funds (Le Blanc, 2011; Schuth and Haupt, 2013). Admittedly, the different wording of these two key questions may affect variations in effects across the outcomes. However, this aspect should not influence variable effects within each outcome. Together with participation in *occupational* and *individual plans*, we consider a third outcome involving participation in *either plan* or both simultaneously. Given our interest in participation in private pension plans (not in receiving income), as mentioned above, we restrict the whole analysis to active workers. It is worth noting that this restriction means focusing on potential recipients of private pensions (Nelson and Nieuwenhuis, 2021). Since we ultimately analyse workers, we do not have information on whether, post-retirement, they will meet the eligibility criteria to benefit from – or be inclined to use – these benefits. This latter point is crucial for occupational funds, as there are regulations and scheme rules that could prevent retirees from receiving potential benefits from their funds.

We focus on six independent variables, each addressing H1–H6. A categorical *education* variable distinguishes between respondents with primary, secondary or tertiary education. We use occupational data to classify respondents according to their objective social class. According to the EGP scheme (Goldthorpe, 2000; Hendrickx, 2002), we distinguish between five main classes: *upper service class*, *lower service class*, *non-manual routine workers*, *self-employed* and *working class*. To assess the non-linear effects of age and prevent specification errors (Simonsohn, 2018), we distinguish between three different age groups: respondents younger than 60, those aged 60–69 and those aged 70 to 79. *Income*, moreover, is measured in equalised logged terms. We additionally use a categorical variable to distinguish *risk-seekers* from *risk-neutral* and *risk-averse* individuals.

Five other individual-level factors could be confounders of our main variables of interest. Individuals who were born outside their current country of residence may have more difficulties learning about investment opportunities. Living in urban

areas may also ease participation since city dwellers have easier access to financial services. Having many children may also reduce the capacity to save regularly. Workers in the financial or business sectors have easy access to the necessary information to benefit from private pension schemes. Moreover, homeownership shapes investment strategies. Accordingly, in the full models we control for being *born abroad*, *urban residence*, *number of children*, *working in the finance/business sector* and *homeowner status*. Table A6 in the online appendix contains a detailed description of the variables. Tables A9–A12 provide descriptive statistics on all variables. For all the tables, we use calibrated longitudinal weights at the individual level to “compensate for both problems of unit nonresponse in the baseline and refreshment samples of each wave, and problems of attrition in the longitudinal samples of different waves” (De Luca and Rossetti, 2018, p. 2). Furthermore, to consider the intra-group correlation we clustered standard errors at the country level.

Regarding the analytical approach, given the dichotomous nature of our dependent variables, and to facilitate the convergence of models, we estimate linear probability models (LPM). Although LPM remains unconventional in certain social sciences, they produce coefficients that are identical or quasi-identical to those from logit models (Mood, 2010). Since our main purpose is to compare average effect estimates across models with three different dependent variables, we do not explore the non-linearity of the relationship between the variables. In this context, LPM provides unbiased and consistent estimates of the average marginal effects. To facilitate interpretation, we use a linear time variable to account for a common trend across countries. In all computed specifications that do not involve cross-level interactions – between individual-level factors and country-level dimensions – we include country-fixed effects (Le Blanc, 2011).

To test H7–H9, we capitalise on (a) the time variable and indicators of (b) the maturity of the private pillars of the national pension system and (c) the generosity of public pension pillars. Since the effects of our key independent variables may change significantly over time, we estimate models with interactions between the individual-level variables and the time variable. In a second step, we replicate the main models with interactions between our key individual-level independent variables and the total assets in private pension funds as a percentage of GDP (logged), referred to here as *Ln(Assets)* (OECD, 2022).³ In a third step, we replicate the main models with interactions between our key individual-level, independent variables and the average replacement rate of public pension pillars (OECD, *several years*), referred to here as the *public pension replacement rate*. Tables A9–A12 provide descriptive statistics on all variables.

Interpretation of the size and significance of the interaction effects present well-documented challenges. Following Mize (2019), we estimate the marginal effects of the individual-level variables at different levels of the macro-level factors (wave, *Ln(Assets)* and *public pension replacement rate*). Following convention, we understand marginal effects as “the probability of choosing a certain alternative as a function of an infinitesimal change in a covariate at a given point. In other words, it is the slope of the choice probability with respect to a covariate at a given point in the covariate. The average marginal effect is the average of the marginal effects over all the observations” (StataCorp, 2021: 254).

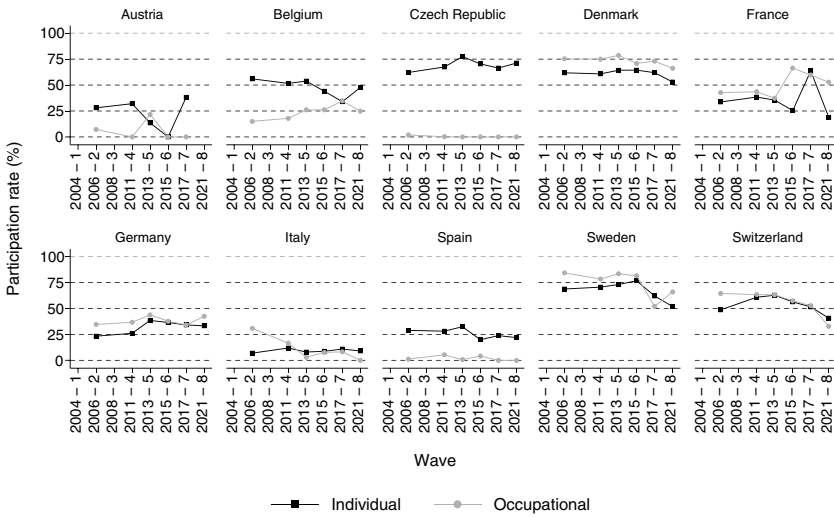


Figure 1. Participation rate of workers in individual or occupational pension plans.

Results

Descriptive analysis

Figure 1 depicts the percentage of workers that participate in private pension plans – either occupational or individual – by country for each of the nine countries. Regarding cross-national differences in participation rates, we observe substantial differences. Participation rates are highest in Denmark and Sweden (around 75%), followed by Switzerland and France (around 50%), Belgium and Germany (around 35%), and Austria, the Czech Republic, Italy and Spain display the lowest contribution rates in occupational schemes (lower than 10%). With regard to individual schemes, participation rates are highest in Belgium, the Czech Republic and Denmark (above 50%); intermediate in Sweden, Italy and France (between 25 and 50%); and low in Spain and Italy (below 25%).

Did participation rates increase over the period considered? When examining participation rates over time (Figure 1), the evidence indicates that, as far as occupational schemes are concerned, on average the rates rose in Belgium and France and declined in Denmark, Sweden and Switzerland. As for individual schemes, the rates increased in the Czech Republic and declined in Denmark, France, Spain, Sweden and Switzerland. In sum, cross-national differences in participation rates are larger for occupational rather than individual schemes. More importantly, participation rates do not show general and substantial increases in most of the countries considered.

Multivariate analysis

The average rates discussed above may not be representative if participation differs substantially across social groups in a given country. We thus utilise LPM to test H1-H9 in this subsection and assess whether social cleavages structure the likelihood of

participation. As noted above, we consider three dependent variables: (1) participation in either type of private pension plan, (2) participation in occupational plans, and (3) participation in individual plans.

We start with the effect of the socio-demographic variables *education*, *gender*, *social class*, *income* and *age*. Regarding education, having tertiary education increases the probability of participating in an individual private plan by 15 percentage points (p.p.) compared to having only primary education (models 5-6). However, having tertiary education reduces the likelihood of holding an occupational plan compared to those respondents with only primary education, although this effect is not significant (models 3-4). Due to the combined positive effect of education on individual plans and the (moderate) negative effect of education on occupational plans, the effect of education on having either type of plan is rendered non-significant. This null effect of education on participation in occupational plans may be due to the fact that financial and legal literacy is more relevant for participation in individual plans, which depends more on the individual choices of workers. These findings are therefore only partially in line with H1.

Gender also shapes the likelihood of participation in these schemes. Female workers are as likely as men to participate in individual schemes but less likely to participate in occupational schemes. Controlling for the country, survey wave and numerous other factors, the likelihood of participation in occupational schemes is 5 p.p. lower for women than for men (model 4). Women are significantly less likely to participate in either type of plan (model 2). These findings are therefore consistent with H2. The reasons for the lower likelihood of women participating in occupational but not individual schemes should be a matter for further research. However, we speculate that they may be related to differences in the occupational structure by gender.

The Hypotheses section noted that the worker's social class might influence the likelihood of them participating in these plans. The service-class reward package is expected to include benefits such as private pensions that are not included in the working-class reward package (Goldthorpe, 2000). The evidence tends to support this expectation regarding the two extreme classes. In fact, working-class individuals are significantly less likely to participate in an occupational or either type of scheme than upper service workers – i.e. employers, managers and professionals. A significant class divide, moreover, occurs in the case of the self-employed. We find a substantial reduction in the probability of participating in an occupational or either type of plan if the respondent is self-employed rather than a member of the upper service class. If a worker is not an employee, there are significant institutional barriers to participating in these schemes in the countries under analysis, which helps explain the latter result. The gap between the self-employed and upper service workers (15 p.p.) is, moreover, larger than that between the working class and upper service workers (4 p.p.). On the whole, the evidence is largely consistent with H3.⁴

Concerning the role of *income*, the effect is positive and consistently significant with regard to participation in an individual or either type of plan. The effect is also substantial. A one standard deviation increase in the natural logarithm of the equivalised income raises the probability of participating in an individual or either type of scheme by 4 p.p. In other words, with a 10% increase in the equivalised income, the

likelihood of participating in either scheme rises by 0.4 p.p. on average. Although this effect is small, the evidence is consistent with H4.

Age is another factor that shapes the likelihood of participation in private pension plans. Since workers born in recent birth cohorts benefit from longer pre-retirement periods to contribute to their schemes, they have more incentives to participate in these plans than workers born in older birth cohorts. In fact, workers aged 59 or younger – the youngest cohort – are significantly more likely to have either plan than those aged 70 to 79 (but not those aged 60 to 69). The effect is also rather substantial. The likelihood of participation in either scheme is 49 p.p. lower for workers aged 70-79 than for workers aged 50 to 59. The evidence is consistent with H5.

The Hypotheses section formulated hypotheses for an independent variable related to the psychological dispositions of respondents: *risk preferences*. Contrary to H6, we find a weak negative effect. The models in Table 1 indicate that (controlling for all factors) being risk averse reduces the likelihood of participation in individual pension plans. However, risk aversion variables do not have a consistent effect across models and are not a consistent predictor of participation in either scheme – occupational or individual.

As far as control variables are concerned, the evidence indicates strong country effects. Residents in Denmark are, on average and during the whole period, significantly more likely to participate in either scheme than in any of the other countries except Sweden. More importantly, the *wave* variable is only significant in models 5 and 6. This indicates that after controlling for compositional effects, over time there has been a positive and statistically significant increase in the likelihood of having an individual pension scheme, but not of participating in an occupational scheme. However, the former effect is not large. Each additional year increases the probability of participating in an individual scheme by 2 p.p.

With regard to individual-level control variables, two are non-significant: neither being born abroad nor living in an urban environment have a significant and consistent effect in models 2, 4 and 6. However, having more children, homeownership status and working in the finance/business sector increases the likelihood of attaining either type of plan.⁵ In sum: there are substantial social divides in participation in these schemes. Participation is widespread among workers who are further from retirement, those with an upper service class occupation or high-income, employees in the finance/business sector, parents and homeowners. Also importantly, the strongest divides occur in age, followed by social class.

Did these divides increase or decrease over the period considered? Can we observe larger divides in countries with immature pension pillars? To tap into how the evolution and maturity of private pension pillars and the generosity of public pension pillars shape these cleavages, we re-estimate the models in Table 1 – this time through interactions with *wave* and *country*. The models are included in Tables A2, A3 and A4 in the appendix. To make the interactions easier to interpret, Figures 2–4 depict the marginal effects for each of the six divides at different levels of the *wave*, *assets in private funds* and *public pension replacement rate* variables for the outcome of *either plan*. Figures A1 and A6 depict the equivalent marginal effects for the *occupational plan* and *individual plan* outcomes. Tables A13–21, report the

Table 1. LPM predicting workers' participation in an occupational, an individual or either type of private pension scheme

| | Either | | Occupational | | Individual | |
|-------------------------------------|----------|----------|--------------|----------|------------|----------|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Education (ref. Primary or less) | | | | | | |
| Secondary | -0.04 | -0.04 | -0.03 | -0.02 | -0.02 | -0.02 |
| | (0.06) | (0.05) | (0.05) | (0.04) | (0.03) | (0.03) |
| Tertiary | 0.03 | 0.04 | -0.05 | -0.03 | 0.15*** | 0.15*** |
| | (0.08) | (0.08) | (0.10) | (0.09) | (0.02) | (0.02) |
| Female | -0.05 | -0.06* | -0.05*** | -0.05*** | -0.04 | -0.05 |
| | (0.03) | (0.03) | (0.01) | (0.02) | (0.03) | (0.03) |
| Social class (ref. Upper service) | | | | | | |
| Lower service | 0.02 | 0.05 | -0.00 | 0.01 | 0.04 | 0.05 |
| | (0.05) | (0.05) | (0.02) | (0.02) | (0.04) | (0.04) |
| Routine non-manual | 0.03 | 0.04 | -0.02 | -0.00 | 0.09* | 0.09* |
| | (0.06) | (0.06) | (0.05) | (0.05) | (0.05) | (0.05) |
| Self-employed | -0.16* | -0.15* | -0.20** | -0.20** | 0.03 | 0.04 |
| | (0.08) | (0.08) | (0.07) | (0.07) | (0.06) | (0.05) |
| Working class | -0.07*** | -0.04** | -0.10*** | -0.08*** | 0.04 | 0.07* |
| | (0.01) | (0.01) | (0.02) | (0.02) | (0.04) | (0.03) |
| Ln(Equiv.income) | 0.04** | 0.04** | 0.02 | 0.02 | 0.05*** | 0.04*** |
| | (0.01) | (0.01) | (0.01) | (0.01) | (0.00) | (0.00) |
| Age (ref. Less than 60) | | | | | | |
| 60-69 | -0.05** | -0.04** | -0.02** | -0.02 | -0.05 | -0.05* |
| | (0.02) | (0.01) | (0.01) | (0.01) | (0.03) | (0.02) |
| 70-79 | -0.50*** | -0.49*** | -0.39*** | -0.39*** | -0.35*** | -0.35*** |
| | (0.10) | (0.10) | (0.09) | (0.08) | (0.04) | (0.04) |
| Risk preferences (ref. Risk seeker) | | | | | | |
| Neutral | 0.02 | 0.04 | -0.02 | -0.01 | 0.07 | 0.07 |
| | (0.06) | (0.06) | (0.05) | (0.05) | (0.05) | (0.05) |
| Averse | -0.11* | -0.09 | -0.07 | -0.06 | -0.08 | -0.08* |
| | (0.05) | (0.05) | (0.04) | (0.03) | (0.05) | (0.04) |
| Wave | 0.01 | 0.01 | 0.00 | 0.01 | 0.02* | 0.02* |
| | (0.02) | (0.02) | (0.01) | (0.01) | (0.01) | (0.01) |

(Continued)

Table 1. (Continued)

| | Either | | Occupational | | Individual | |
|------------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Country (ref. Denmark) | | | | | | |
| Austria | -0.51*** (0.02) | -0.50*** (0.02) | -0.64*** (0.03) | -0.65*** (0.03) | -0.26*** (0.01) | -0.26*** (0.01) |
| Belgium | -0.34*** (0.02) | -0.35*** (0.02) | -0.52*** (0.02) | -0.52*** (0.02) | -0.02 (0.02) | -0.03 (0.02) |
| Czech Republic | -0.28*** (0.02) | -0.27*** (0.02) | -0.73*** (0.02) | -0.71*** (0.03) | 0.17*** (0.01) | 0.18*** (0.01) |
| France | -0.28*** (0.02) | -0.28*** (0.01) | -0.26*** (0.01) | -0.27*** (0.01) | -0.23*** (0.01) | -0.23*** (0.01) |
| Germany | -0.33*** (0.01) | -0.31*** (0.01) | -0.32*** (0.01) | -0.31*** (0.01) | -0.27*** (0.01) | -0.27*** (0.01) |
| Italy | -0.59*** (0.04) | -0.60*** (0.04) | -0.57*** (0.04) | -0.56*** (0.04) | -0.38*** (0.02) | -0.40*** (0.02) |
| Spain | -0.51*** (0.04) | -0.50*** (0.03) | -0.66*** (0.04) | -0.63*** (0.04) | -0.21*** (0.04) | -0.22*** (0.05) |
| Sweden | 0.02 (0.02) | 0.05** (0.02) | 0.03* (0.02) | 0.05*** (0.01) | 0.15*** (0.01) | 0.16*** (0.02) |
| Switzerland | -0.07** (0.02) | -0.06*** (0.02) | -0.11*** (0.03) | -0.11*** (0.02) | 0.03* (0.01) | 0.03* (0.01) |
| Born in nation-state | | 0.07 (0.05) | | 0.07 (0.05) | | -0.02 (0.07) |
| Urban residence | | -0.02 (0.02) | | -0.04 (0.03) | | -0.00 (0.02) |
| Number of children | | 0.01** (0.01) | | 0.02** (0.01) | | -0.02 (0.01) |
| Homeowner status | | 0.12*** (0.03) | | 0.04** (0.01) | | 0.08*** (0.03) |
| Finance/Business | | 0.13* (0.06) | | 0.16** (0.07) | | -0.06 (0.09) |
| Constant | 0.95*** (0.12) | 0.74*** (0.14) | 0.88*** (0.09) | 0.72*** (0.10) | 0.47*** (0.07) | 0.47*** (0.11) |
| Observations | 5592 | 5592 | 5592 | 5592 | 5592 | 5592 |
| R-squared | 0.23 | 0.25 | 0.23 | 0.25 | 0.20 | 0.21 |

Robust standard errors, reported in parenthesis, are clustered by country.

Significance: * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$

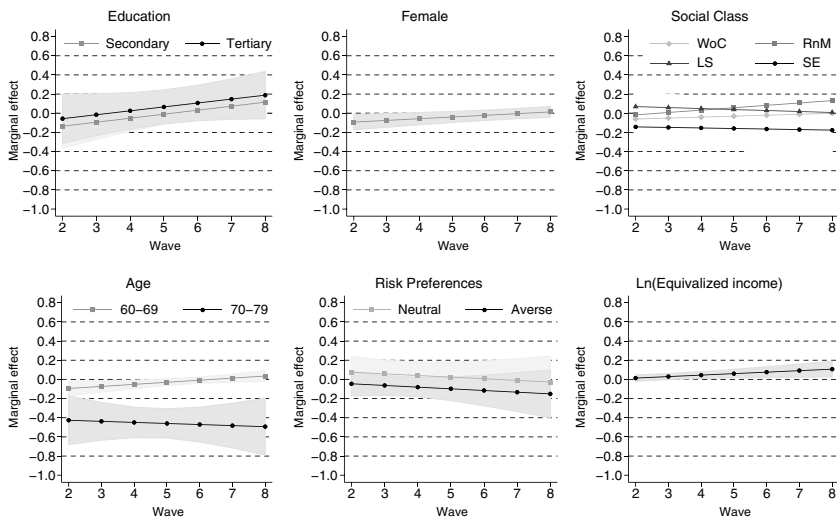


Figure 2. Marginal effects of education, gender, social class, age, risk preferences and income on the predicted probability of contributing to either private plans at different waves.

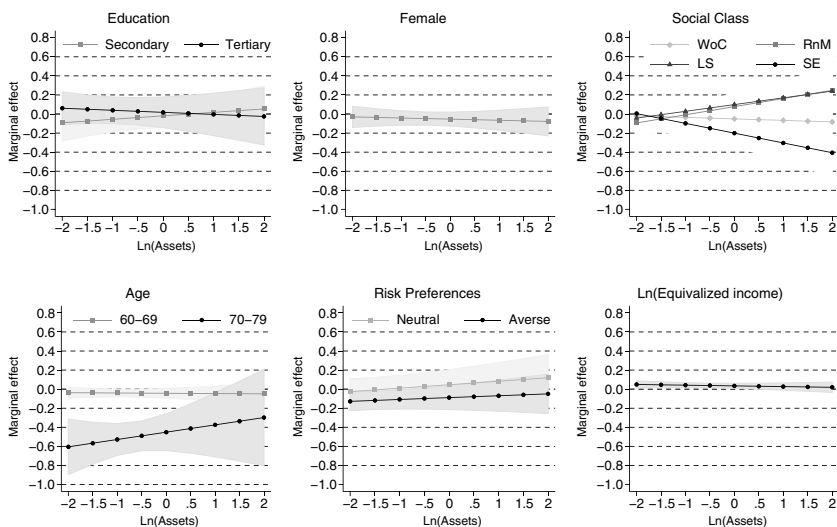


Figure 3. Marginal effects of education, gender, social class, age, risk preferences and income on the predicted probability of contributing to either private plans at different levels of Ln(Assets).

Note: “-2”: -2 SD from the mean; (...) “0”: Mean value in the macro-level factor; (...) “+2”: +2SD from the mean.

AME and marginal effects across waves and different sizes of pensions’ assets and gross replacement rates for each of the three outcomes.

We begin by testing whether the divides analysed in models 1 and 2 of Table 1 change over time. Figure 2 depicts the evolution of the marginal effects on the

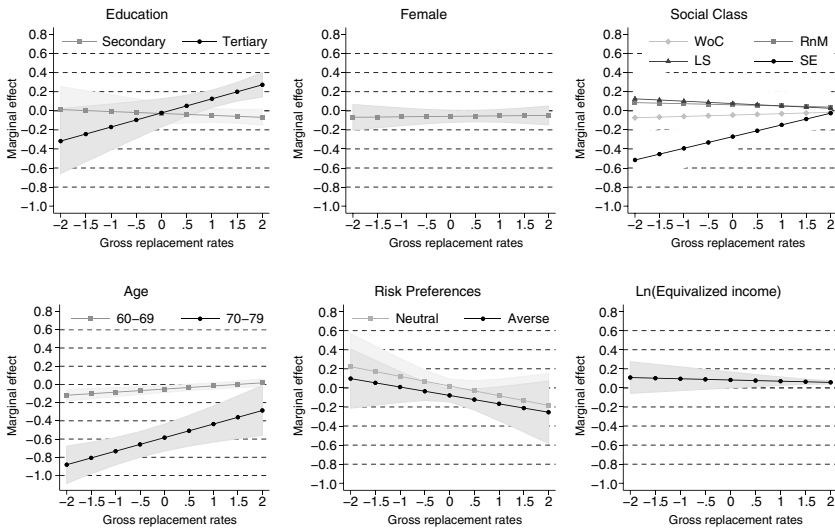


Figure 4. Marginal effects of education, gender, social class, age, risk preferences and income on the predicted probability of contributing to either private plans at different levels of gross replacement rates. Note: “-2”: -2 SD from the mean; (...) “0”: Mean value in the macro-level factor; (...) “+2”: +2SD from the mean.

probability of contributing to *either private fund* over SHARE waves 2-8 for the six focal independent variables. The six subplots indicate that the divides in education and income have actually *increased* over time. However, comparing the marginal effects of *tertiary education* and income in waves 2 and 8 indicates that the effects were not significantly different at these two extreme points in time (Table A13). Similarly, the marginal effects on gender, social class, risk preferences and income have not changed significantly over time. Equivalent patterns emerge when considering the evolution over time of gaps in participation in occupational and individual schemes (Figures A1 and A2 and Tables A16 and A17). Hence the evidence is inconsistent with H7. The major divides occurring in age and social class did not decrease over the observed period.

We also assess whether social divides depend on the maturity of the country’s second pillar. For this purpose, Figure 3 depicts the marginal effects for the six divides at different asset volume levels of private pension funds, and Tables A14, A18 and A19 report the values of those marginal effects for each of the three outcomes. Figure 3 indicates that contexts of more mature private pension pillars display smaller divides in participation in either type of scheme in two factors: age and income. The effects of age and income decrease with the maturity level. Yet, importantly, Table A14 indicates that these two divides are not statistically significant different in contexts of more mature private pillars than otherwise. The marginal effects of education, risk aversion and gender also remain similar across countries with large or small private pension pillars.

The social class divide in participation in either type of scheme is significantly sensitive to the maturation of private pension pillars (Table A14). This is because

the divide between the upper class and the self-employed proves significantly larger in contexts of more mature private pillars than otherwise. Yet this pattern is not observable when we analyze occupational and individual schemes separately (Tables A18 and A19). By contrast, divide between the upper class and the working class in participation in occupational schemes is significantly smaller in contexts of more mature private pension systems. Hence, the maturity of private pension pillars proves to have an inconstant influence on social selectivity, which is inconsistent with H8.

We finally assess the size of the gaps at different levels of public pension scheme generosity. For this purpose, we estimate interaction terms between our key independent variables and the *gross public pension replacement rate*. In this regard, we hypothesised that socio-economic gaps are smaller in contexts of generous public pension schemes. The effect of education does not shrink (Table A15). Instead, it is inverted because in countries with low public pensions highly-educated respondents are less likely to participate in either of these plans, whereas in countries with high public pensions highly-educated respondents are more likely to participate in either of these plans. The effects at these two extreme levels prove significantly different.

The class divide in participation in either type, furthermore, is not significantly smaller in contexts of more generous public pensions than in contexts of less generous public pensions. However, the divide between upper service and self-employed workers in participation in occupational schemes is significantly sensitive to public pension generosity (Table A15, A20 and A21). Moreover, for two outcomes (either scheme and occupational schemes), the age divide proves smaller in contexts of more generous public pensions than in contexts of less generous public pensions. All in all, the class and age divides in participation in occupational schemes prove sensitive to the level of public pension generosity, which is in line with H9.

Discussion

Combined pressures stemming from population ageing and precarious labour markets have led many policymakers to recommend the usage of capital-funded pension schemes (Ebbinghaus and Wiß, 2011a; OECD, 2014). Few studies, however, have examined social gaps in participation in private pensions. In this study, we test how these social divides evolve as the second and third pillars of pension systems mature. We focus on the participation of workers aged 50 or older in occupational and individual pension plans in nine European countries. The analysis reveals five main findings.

First, participation rates of workers in occupational or either type of private pension schemes did not increase consistently or substantially in the ten European countries during the period considered, 2006 to 2021. Controlling for individual-level factors, the year variable has a significant and positive effect on the likelihood of participation in an individual scheme, but not on occupational schemes or the likelihood of participation in either form of scheme.

Second, focusing on the baseline model and supporting the first six hypotheses of the study, the analysis reveals significant socio-economic gaps in participation in

private pension funds. Young workers with high income and an upper service occupation are more likely to participate in private pensions. Several of these findings are consistent with prior research. For instance, Oesch (2008) reported the positive effects of social class on participation in occupational pension plans.

Surprisingly, our analysis does not reveal significant general differences in participation across gender, education and levels of risk aversion. Individuals with tertiary education are more likely to have an individual plan, and women are less likely to have an occupational plan. However, the respondent's gender, education and risk preferences do not shape the likelihood of participation in either type of scheme. The lack of an education effect is especially surprising, mainly because this effect has been documented by prior research (Rey-Ares *et al.*, 2018). Nevertheless, the study by Rey-Ares *et al.*, for instance, did not control for social class. Hence those results may be affected by unobserved heterogeneity. The null effect of tertiary education on participation in occupational plans may be due to the fact that in previous research, education may have captured the role of social class. Working class members – who are more likely to have lower-level education – have worse reward packages and their jobs are less likely to be associated with participation in an occupational plan. All in all, the largest divides in private pension plan participation occur in age and social class.

Third, we document that the size of most of the social divides discussed above has not significantly declined over time. We indeed find that divides in education, gender, social class and age remained stable during the period under analysis. This indicates that we cannot presume that the social selectivity of private pension schemes necessarily and automatically declines over time. Despite the many policies that the governments have implemented to incentivise private savings for old age through private funds, we identify persistent social selectivity in participation in these schemes.

Fourth, our study indicates that social selectivity in participation depends on the maturity of the second and third pillars. The effects of gender, education and income are not significantly different in countries with immature private pension pillars when compared to countries with mature ones. The divide between upper service workers and the working class in participation in occupational plans is significantly smaller in countries where the assets of private pension funds represent a larger proportion of GDP. Yet the opposite happens with the divide between upper service workers and the self-employed. Hence social selectivity is not consistently affected by the maturity of private pension provision.

Fifth, the generosity of public pension provision is related to the two largest divides. The age divide proves smaller in contexts of more generous public pensions. Moreover, the class divide in participation in occupational schemes also proves smaller in contexts of more generous public pensions. Whereas in context of low public pension generosity, the self-employed are less likely to participate in occupational schemes, this divide is negligible in contexts of high public pension generosity. All in all, social selectivity in participation in these schemes has not therefore changed over time; it is inconsistently related to the maturity of private pension provision and proves smaller in contexts of more generous public pensions.

This study has clear limitations. Analysing the relationship between socio-economic factors and participation in these schemes builds on the assumption of

exogeneity. Although joining one of these schemes cannot affect the age, level of education or gender of respondents, it may shape their income. Moreover, the indicators concerning the participation in these schemes may be affected by measurement error. Many respondents may not be well-informed about whether their job provides an occupational scheme, and question wording may affect participation rates.

Future work could assess the robustness of the findings identified by this study using other sources or statistical techniques. Empirical researchers can also explore whether the abovementioned patterns apply beyond the ten European countries considered in this study. We do not have any grounds to believe that other European countries underwent a larger decline in the social selectivity of private pension contributions during this period. However, they may display different age and social class divides. Future work could also assess the individual-level and macro-level causes of the persistent and substantial social selectivity of private pension participation. We speculate, however, that it may be related to the persistent insider-outsider problem in European labour markets (Emmenegger *et al.*, 2012) and the interlocking and interdependency of political-economic institutions (Hancké, 2009) that hinder structural change. Furthermore, it would be interesting to estimate these gaps using actual recipients of private pensions (Nelson and Nieuwenhuis, 2021), especially the eligibility rate.

These findings have relevant policy implications for the highly salient field of pension policy. The assumption of continuous and inevitable growth in private fund participation that has undergirded many reforms of public pension programmes adopted in the last two decades needs to be questioned. In most European countries, far more attention should be paid to the social selectivity problem. Moreover, future pension reforms seeking to stimulate private pension participation would possibly be more successful if they included measures to incentivise participation, specifically among workers in older age groups and those in less prestigious, working-class occupations.

Supplementary material. To view supplementary material for this article, please visit <https://doi.org/10.1017/S0047279422000897>

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Competing interests. The authors declare none.

Notes

1 Although previous research has examined the role of a few of these factors in participation in these schemes (Callegaro and Wilke, 2008; Le Blanc, 2011; Schuth and Haupt, 2013), to our knowledge, no study has yet examined the role of social class (understood as large occupational groups). Nor has any study

assessed whether these divides change over time or if they differ according to the level of maturity of private pension provision or public pension generosity.

2 Austria was included in all waves (including the 2021 wave), but there are no cases in wave 8 since none of the participants in waves 2-7 who met the conditions (workers aged 50-76) participated again in wave 8.

3 The selection of country-level data on private pillar maturity was influenced by data availability. Neither the OECD nor Eurostat report longitudinal data on replacement rates for the private pillar for the ten analysed countries. Also, the OECD's data on private spending on pensions as a percentage of GDP is incomplete. For the same reason, we did not use separate indicators of assets as a percentage of GDP in occupational and individual plans. Instead, we used the assets of private pension funds as a percentage of GDP as an indicator.

4 In a sensitivity analysis excluding the risk aversion variables, most of the effects of social class remain non-significant (Table A8), indicating that risk aversion does not absorb the influence of social class.

5 In alternative models replicating Table 1 but using dummy variables for the wave, the results are equivalent (Table A7). Moreover, in models replicating Table 1 but excluding risk preferences, the results are equivalent (Table A8).

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Appendix

Table A1. Characteristics of public pension pillars in the ten countries considered

| | First-tier scheme ⁺ | Second-tier scheme ⁺⁺ | Pensionable age | Replacement rate |
|----------------|--------------------------------|----------------------------------|-----------------|------------------|
| Austria | Minimum | DB | 67 | 74.1 |
| Belgium | Minimum | DB | 67 | 43.4 |
| Czech Republic | Basic+Minimum | DB | 65 | 49.0 |
| Denmark | Basic+targeted | FDC | 74 | 29.5 |
| France | Minimum | DB + Points | 66 | 60.2 |
| Germany | | Points | 67 | 41.5 |
| Italy | | NDC | 71 | 74.6 |
| Spain | Minimum | DB | 65 | 73.9 |
| Sweden | Targeted | NDC + FDC | 65 | 41.3 |
| Switzerland | Minimum | DB | 65 | 22.1 |

Note: Structure of retirement-income provision through mandatory schemes: First-tier public scheme⁺: Residence and contribution-based; second-tier scheme⁺⁺: contribution-based. DB: defined benefit. FDC: Funded defined contribution. NDC: Notional defined contribution.

Source: OECD (2021)

Table A2. LPM predicting workers' participation in an occupational, an individual or either type of private pension scheme with interactions by wave

| | Either | | Occupational | | Individual | |
|--|---------|---------|--------------|----------|------------|---------|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Education (Primary or less) | | | | | | |
| Secondary | -0.22 | -0.22 | -0.16 | -0.16 | -0.05 | -0.05 |
| | (0.15) | (0.15) | (0.14) | (0.13) | (0.05) | (0.05) |
| Tertiary | -0.14 | -0.14 | -0.15 | -0.14 | 0.03 | 0.02 |
| | (0.16) | (0.16) | (0.14) | (0.14) | (0.09) | (0.08) |
| Female | -0.15** | -0.13** | -0.12*** | -0.11*** | -0.12** | -0.11** |
| | (0.05) | (0.05) | (0.03) | (0.03) | (0.04) | (0.04) |
| Social class (Upper service) | | | | | | |
| Lower service | 0.09 | 0.09 | 0.01 | 0.00 | 0.07 | 0.09 |
| | (0.08) | (0.09) | (0.04) | (0.06) | (0.08) | (0.09) |
| Routine non-manual | -0.07 | -0.07 | -0.17** | -0.17** | 0.05 | 0.05 |
| | (0.12) | (0.12) | (0.07) | (0.07) | (0.04) | (0.04) |
| Self-employed | -0.13 | -0.13 | -0.18** | -0.19** | 0.05 | 0.05 |
| | (0.09) | (0.09) | (0.06) | (0.06) | (0.13) | (0.13) |
| Working class | -0.10 | -0.08 | -0.16** | -0.15** | 0.02 | 0.02 |
| | (0.06) | (0.07) | (0.05) | (0.05) | (0.13) | (0.13) |
| Age (ref. Less than 60) | | | | | | |
| 60-69 | -0.15** | -0.14** | -0.10* | -0.09* | -0.03 | -0.02 |
| | (0.05) | (0.05) | (0.05) | (0.04) | (0.06) | (0.06) |
| 70-79 | -0.42** | -0.40** | -0.34*** | -0.35** | -0.24 | -0.21 |
| | (0.17) | (0.17) | (0.10) | (0.11) | (0.17) | (0.16) |
| Risk preferences (ref. Risk seeker) | | | | | | |
| Neutral | 0.08 | 0.11 | -0.01 | 0.02 | 0.15* | 0.14 |
| | (0.11) | (0.11) | (0.13) | (0.12) | (0.08) | (0.08) |
| Averse | -0.06 | -0.01 | -0.08 | -0.03 | -0.01 | -0.01 |
| | (0.10) | (0.09) | (0.12) | (0.11) | (0.08) | (0.07) |
| Ln(Equiv. Income) | -0.02 | -0.02 | -0.04 | -0.04 | 0.01 | 0.01 |
| | (0.02) | (0.02) | (0.03) | (0.03) | (0.02) | (0.02) |
| Wave (ω) | -0.03 | -0.03 | -0.04 | -0.03 | 0.01 | 0.01 |
| | (0.03) | (0.03) | (0.04) | (0.04) | (0.02) | (0.02) |
| Education (ref. Primary or less) \times Wave | | | | | | |
| Secondary \times ω | 0.04 | 0.04 | 0.03 | 0.03 | 0.01 | 0.01 |
| | (0.02) | (0.02) | (0.02) | (0.02) | (0.01) | (0.01) |

(Continued)

Table A2. (Continued)

| | Either | | Occupational | | Individual | |
|---|----------|----------|--------------|----------|------------|----------|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Tertiary $\times \omega$ | 0.04 | 0.04 | 0.02 | 0.02 | 0.03 | 0.03 |
| | (0.03) | (0.03) | (0.02) | (0.02) | (0.02) | (0.02) |
| Female \times Wave | 0.02*** | 0.02** | 0.02** | 0.01** | 0.02** | 0.02** |
| | (0.01) | (0.01) | (0.01) | (0.01) | (0.01) | (0.01) |
| Social class (ref. Upper service) \times Wave | | | | | | |
| Lower service $\times \omega$ | -0.01 | -0.01 | 0.00 | 0.00 | -0.01 | -0.01 |
| | (0.01) | (0.01) | (0.01) | (0.01) | (0.03) | (0.03) |
| Routine non-manual $\times \omega$ | 0.02 | 0.02 | 0.03*** | 0.04*** | 0.01 | 0.01 |
| | (0.02) | (0.02) | (0.01) | (0.01) | (0.02) | (0.02) |
| Self-employed $\times \omega$ | -0.01 | -0.01 | -0.01 | 0.00 | 0.00 | 0.00 |
| | (0.02) | (0.03) | (0.02) | (0.02) | (0.02) | (0.02) |
| Working class $\times \omega$ | 0.01 | 0.01 | 0.01 | 0.02 | 0.01 | 0.01 |
| | (0.01) | (0.01) | (0.01) | (0.01) | (0.03) | (0.03) |
| Age (ref. Less than 60) $\times \omega$ | | | | | | |
| 60-69 $\times \omega$ | 0.02** | 0.02** | 0.02 | 0.02 | 0.00 | -0.01 |
| | (0.01) | (0.01) | (0.01) | (0.01) | (0.02) | (0.02) |
| 70-79 $\times \omega$ | -0.01 | -0.01 | -0.01 | 0.00 | -0.02 | -0.03 |
| | (0.03) | (0.03) | (0.02) | (0.02) | (0.04) | (0.03) |
| Risk preferences (ref. Risk seeker) \times Wave | | | | | | |
| Neutral $\times \omega$ | -0.01 | -0.02 | 0.00 | -0.01 | -0.02 | -0.02 |
| | (0.02) | (0.02) | (0.03) | (0.02) | (0.02) | (0.02) |
| Averse $\times \omega$ | -0.01 | -0.02 | 0.00 | -0.01 | -0.01 | -0.01 |
| | (0.02) | (0.02) | (0.03) | (0.02) | (0.01) | (0.01) |
| Ln(Income) $\times \omega$ | 0.02** | 0.02** | 0.02 | 0.02 | 0.01* | 0.01* |
| | (0.01) | (0.01) | (0.01) | (0.01) | (0.01) | (0.00) |
| Country (ref. Denmark) | | | | | | |
| Austria | -0.51*** | -0.50*** | -0.64*** | -0.65*** | -0.26*** | -0.26*** |
| | (0.03) | (0.02) | (0.03) | (0.02) | (0.01) | (0.01) |
| Belgium | -0.35*** | -0.35*** | -0.53*** | -0.52*** | -0.02 | -0.03 |
| | (0.02) | (0.02) | (0.02) | (0.02) | (0.02) | (0.02) |
| Czech Republic | -0.28*** | -0.26*** | -0.72*** | -0.70*** | 0.17*** | 0.18*** |
| | (0.02) | (0.03) | (0.02) | (0.03) | (0.01) | (0.01) |

(Continued)

Table A2. (Continued)

| | Either | | Occupational | | Individual | |
|----------------------|----------|----------|--------------|----------|------------|----------|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| France | -0.27*** | -0.27*** | -0.26*** | -0.27*** | -0.23*** | -0.22*** |
| | (0.02) | (0.02) | (0.02) | (0.01) | (0.01) | (0.01) |
| Germany | -0.33*** | -0.31*** | -0.33*** | -0.31*** | -0.27*** | -0.27*** |
| | (0.01) | (0.01) | (0.01) | (0.01) | (0.01) | (0.01) |
| Italy | -0.58*** | -0.59*** | -0.56*** | -0.55*** | -0.38*** | -0.40*** |
| | (0.04) | (0.04) | (0.04) | (0.03) | (0.02) | (0.02) |
| Spain | -0.51*** | -0.50*** | -0.65*** | -0.63*** | -0.21*** | -0.22*** |
| | (0.04) | (0.03) | (0.04) | (0.04) | (0.04) | (0.05) |
| Sweden | 0.02 | 0.04* | 0.03 | 0.05*** | 0.15*** | 0.16*** |
| | (0.02) | (0.02) | (0.02) | (0.01) | (0.01) | (0.02) |
| Switzerland | -0.08*** | -0.07*** | -0.12*** | -0.12*** | 0.02 | 0.02 |
| | (0.02) | (0.02) | (0.04) | (0.03) | (0.01) | (0.01) |
| Born in nation-state | | 0.07 | | 0.06 | | -0.02 |
| | | (0.05) | | (0.05) | | (0.06) |
| Urban residence | | -0.01 | | -0.04 | | 0.00 |
| | | (0.02) | | (0.02) | | (0.02) |
| Number of children | | 0.02** | | 0.03** | | -0.02 |
| | | (0.01) | | (0.01) | | (0.01) |
| Homeowner status | | 0.11*** | | 0.03** | | 0.08*** |
| | | (0.03) | | (0.01) | | (0.02) |
| Finance/Business | | 0.14* | | 0.17** | | -0.06 |
| | | (0.07) | | (0.07) | | (0.09) |
| Constant | 1.10*** | 0.87*** | 1.04*** | 0.88*** | 0.47*** | 0.47*** |
| | (0.17) | (0.19) | (0.16) | (0.19) | (0.09) | (0.07) |
| Observations | 5592 | 5592 | 5592 | 5592 | 5592 | 5592 |
| R-squared | 0.24 | 0.26 | 0.25 | 0.26 | 0.21 | 0.22 |

Note: Robust standard errors, reported in parenthesis, are clustered by country.
Significance: * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$

Table A3. LPM predicting workers' participation in an occupational, an individual or either type of private pension scheme with interactions by $\ln(\text{Assets})$

| | Either | | Occupational | | Individual | |
|-------------------------------------|----------|----------|--------------|----------|------------|----------|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Education (ref. Primary or less) | | | | | | |
| Secondary | -0.03 | -0.02 | -0.03 | -0.01 | 0.00 | -0.01 |
| | (0.06) | (0.05) | (0.05) | (0.04) | (0.03) | (0.04) |
| Tertiary | 0.00 | 0.02 | -0.09 | -0.07 | 0.12*** | 0.12*** |
| | (0.07) | (0.07) | (0.08) | (0.08) | (0.03) | (0.04) |
| Female | -0.05 | -0.05 | -0.03** | -0.03* | -0.06* | -0.07** |
| | (0.03) | (0.03) | (0.01) | (0.01) | (0.03) | (0.03) |
| Social class (ref. Upper service) | | | | | | |
| Lower service | 0.07 | 0.10* | 0.01 | 0.03 | 0.07 | 0.08 |
| | (0.04) | (0.05) | (0.02) | (0.03) | (0.04) | (0.05) |
| Routine non-manual | 0.06 | 0.08 | 0.02 | 0.03 | 0.09 | 0.09 |
| | (0.06) | (0.06) | (0.05) | (0.04) | (0.05) | (0.06) |
| Self-employed | -0.21** | -0.20** | -0.24*** | -0.24** | -0.04 | -0.04 |
| | (0.07) | (0.06) | (0.07) | (0.07) | (0.03) | (0.03) |
| Working class | -0.09*** | -0.05*** | -0.09*** | -0.07*** | -0.01 | 0.01 |
| | (0.02) | (0.02) | (0.02) | (0.02) | (0.03) | (0.03) |
| Age (ref. Less than 60) | | | | | | |
| 60-69 | -0.05* | -0.04* | -0.03* | -0.03* | -0.06** | -0.06* |
| | (0.02) | (0.02) | (0.01) | (0.01) | (0.03) | (0.03) |
| 70-79 | -0.45*** | -0.45*** | -0.37*** | -0.37*** | -0.35*** | -0.35*** |
| | (0.08) | (0.09) | (0.09) | (0.08) | (0.04) | (0.04) |
| Risk preferences (ref. Risk seeker) | | | | | | |
| Neutral | 0.04 | 0.05 | 0.00 | 0.00 | 0.05 | 0.05 |
| | (0.07) | (0.07) | (0.05) | (0.05) | (0.05) | (0.05) |
| Averse | -0.10 | -0.09 | -0.05 | -0.05 | -0.13** | -0.12** |
| | (0.05) | (0.06) | (0.04) | (0.04) | (0.05) | (0.05) |
| $\ln(\text{Equiv. Income})$ | 0.04** | 0.03** | 0.02 | 0.02 | 0.04*** | 0.04*** |
| | (0.01) | (0.01) | (0.01) | (0.01) | (0.00) | (0.00) |
| Wave | 0.00 | 0.00 | -0.01 | 0.00 | 0.02 | 0.02 |
| | (0.02) | (0.02) | (0.01) | (0.01) | (0.01) | (0.01) |
| $\ln(\text{Assets}) [\alpha]$ | 0.00 | 0.01 | 0.00 | 0.01 | 0.08* | 0.08* |
| | (0.04) | (0.04) | (0.04) | (0.04) | (0.04) | (0.04) |

(Continued)

Table A3. (Continued)

| | Either | | Occupational | | Individual | |
|---|----------|----------|--------------|----------|------------|----------|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Education (ref. Primary or less) \times Ln(Assets) | | | | | | |
| Secondary \times α | 0.03 | 0.04 | 0.01 | 0.02 | 0.02 | 0.02 |
| | (0.04) | (0.04) | (0.04) | (0.03) | (0.02) | (0.03) |
| Tertiary \times α | -0.03 | -0.02 | -0.05 | -0.05 | -0.04* | -0.03* |
| | (0.04) | (0.04) | (0.05) | (0.05) | (0.02) | (0.02) |
| Female \times Ln(Assets) | -0.01 | -0.01 | 0.02 | 0.02 | -0.04** | -0.04** |
| | (0.02) | (0.02) | (0.01) | (0.01) | (0.01) | (0.01) |
| Age (ref. Less than 60) \times Ln(Assets) | | | | | | |
| 60-69 \times α | 0.00 | 0.00 | -0.01 | -0.02 | -0.02 | -0.02 |
| | (0.01) | (0.02) | (0.01) | (0.01) | (0.02) | (0.01) |
| 70-79 \times α | 0.07 | 0.08 | 0.04 | 0.04 | -0.01 | 0.00 |
| | (0.08) | (0.08) | (0.09) | (0.08) | (0.04) | (0.04) |
| Social class (ref. Upper service) \times Ln(Assets) | | | | | | |
| Lower service \times α | 0.06* | 0.07* | 0.02* | 0.04** | 0.03 | 0.03 |
| | (0.03) | (0.04) | (0.01) | (0.01) | (0.02) | (0.02) |
| Routine non-manual \times α | 0.08** | 0.09** | 0.09*** | 0.09*** | 0.01 | 0.01 |
| | (0.03) | (0.03) | (0.02) | (0.02) | (0.02) | (0.02) |
| Self-employed \times α | -0.10** | -0.10** | -0.08** | -0.08** | -0.14** | -0.14** |
| | (0.04) | (0.03) | (0.03) | (0.03) | (0.05) | (0.04) |
| Working class \times α | -0.02 | -0.02 | 0.03*** | 0.03*** | -0.08*** | -0.08*** |
| | (0.01) | (0.01) | (0.01) | (0.01) | (0.01) | (0.02) |
| Risk preferences (ref. Risk seeker) \times Ln(Assets) | | | | | | |
| Neutral \times α | 0.05 | 0.04 | 0.05*** | 0.04*** | -0.03 | -0.03 |
| | (0.03) | (0.03) | (0.01) | (0.01) | (0.03) | (0.03) |
| Averse \times α | 0.04 | 0.02 | 0.06*** | 0.04** | -0.06* | -0.06 |
| | (0.03) | (0.02) | (0.02) | (0.01) | (0.03) | (0.03) |
| Ln(Income) \times Ln(Assets) | -0.01 | -0.01 | 0.00 | 0.00 | 0.00 | 0.00 |
| | (0.01) | (0.01) | (0.01) | (0.01) | (0.00) | (0.00) |
| Country (ref. Denmark) | | | | | | |
| Austria | -0.46*** | -0.45*** | -0.59*** | -0.59*** | -0.27*** | -0.27*** |
| | (0.06) | (0.05) | (0.04) | (0.04) | (0.05) | (0.06) |
| Belgium | -0.29*** | -0.29*** | -0.46*** | -0.46*** | -0.03 | -0.03 |
| | (0.05) | (0.05) | (0.04) | (0.03) | (0.04) | (0.05) |

(Continued)

Table A3. (Continued)

| | Either | | Occupational | | Individual | |
|----------------------|----------|----------|--------------|----------|------------|----------|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Czech Republic | -0.25*** | -0.23*** | -0.68*** | -0.67*** | 0.14** | 0.15*** |
| | (0.05) | (0.06) | (0.04) | (0.04) | (0.05) | (0.05) |
| France | -0.11 | -0.11 | -0.07 | -0.09 | -0.26* | -0.25* |
| | (0.13) | (0.14) | (0.10) | (0.09) | (0.12) | (0.13) |
| Germany | -0.28*** | -0.27*** | -0.27*** | -0.26*** | -0.29*** | -0.28*** |
| | (0.05) | (0.05) | (0.04) | (0.04) | (0.04) | (0.05) |
| Italy | -0.53*** | -0.53*** | -0.50*** | -0.50*** | -0.40*** | -0.41*** |
| | (0.08) | (0.08) | (0.06) | (0.06) | (0.06) | (0.06) |
| Spain | -0.47*** | -0.45*** | -0.62*** | -0.60*** | -0.19*** | -0.20*** |
| | (0.06) | (0.06) | (0.04) | (0.04) | (0.05) | (0.06) |
| Sweden | 0.06 | 0.09** | 0.09** | 0.10*** | 0.14*** | 0.15*** |
| | (0.04) | (0.04) | (0.03) | (0.03) | (0.03) | (0.03) |
| Switzerland | -0.13*** | -0.11*** | -0.18*** | -0.17*** | 0.02 | 0.02 |
| | (0.02) | (0.02) | (0.03) | (0.03) | (0.05) | (0.04) |
| Born in nation-state | | 0.09* | | 0.08 | | -0.02 |
| | | (0.04) | | (0.05) | | (0.06) |
| Urban residence | | -0.02 | | -0.04 | | 0.00 |
| | | (0.02) | | (0.03) | | (0.02) |
| Number of children | | 0.01** | | 0.02** | | -0.01 |
| | | (0.00) | | (0.01) | | (0.01) |
| Homeowner status | | 0.12*** | | 0.03** | | 0.09*** |
| | | (0.02) | | (0.01) | | (0.03) |
| Finance/Business | | 0.19** | | 0.20** | | 0.00 |
| | | (0.08) | | (0.08) | | (0.07) |
| Constant | 0.92*** | 0.70*** | 0.85*** | 0.70*** | 0.53*** | 0.49*** |
| | (0.11) | (0.13) | (0.09) | (0.09) | (0.05) | (0.12) |
| Observations | 5358 | 5358 | 5358 | 5358 | 5358 | 5358 |
| R-squared | 0.24 | 0.26 | 0.25 | 0.26 | 0.22 | 0.23 |

Note: Robust standard errors, reported in parenthesis, are clustered by country.
Significance: * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$

Table A4. LPM predicting workers' participation in an occupational, an individual or either type of private pension scheme with interactions by gross (public) replacement rate

| | Either | | Occupational | | Individual | |
|-------------------------------------|----------|----------|--------------|----------|------------|----------|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Education (ref. Primary or less) | | | | | | |
| Secondary | -0.03 | -0.03 | -0.01 | 0.00 | 0.03 | 0.02 |
| | (0.05) | (0.05) | (0.06) | (0.05) | (0.03) | (0.03) |
| Tertiary | -0.04 | -0.02 | -0.07 | -0.05 | 0.17*** | 0.16*** |
| | (0.08) | (0.07) | (0.11) | (0.10) | (0.03) | (0.04) |
| Female | -0.05 | -0.06* | -0.02 | -0.02 | -0.05** | -0.07** |
| | (0.03) | (0.03) | (0.02) | (0.01) | (0.02) | (0.02) |
| Social class (ref. Upper service) | | | | | | |
| Lower service | 0.05 | 0.08 | 0.03 | 0.04 | 0.07 | 0.09 |
| | (0.07) | (0.07) | (0.03) | (0.04) | (0.09) | (0.09) |
| Routine non-manual | 0.05 | 0.06 | 0.04 | 0.06 | 0.09 | 0.09 |
| | (0.05) | (0.05) | (0.05) | (0.05) | (0.07) | (0.08) |
| Self-employed | -0.28*** | -0.27*** | -0.33*** | -0.32*** | 0.01 | 0.01 |
| | (0.07) | (0.06) | (0.03) | (0.03) | (0.04) | (0.04) |
| Working class | -0.09*** | -0.04* | -0.08*** | -0.06** | -0.01 | 0.01 |
| | (0.02) | (0.02) | (0.02) | (0.02) | (0.05) | (0.06) |
| Ln(Equiv. Income) | 0.09** | 0.08* | 0.07 | 0.07 | 0.07** | 0.06** |
| | (0.04) | (0.04) | (0.05) | (0.04) | (0.02) | (0.02) |
| Age (ref. Less than 60) | | | | | | |
| 60-69 | -0.06** | -0.05** | -0.03* | -0.02 | -0.08* | -0.08** |
| | (0.02) | (0.02) | (0.02) | (0.02) | (0.04) | (0.03) |
| 70-79 | -0.58*** | -0.58*** | -0.49*** | -0.48*** | -0.40*** | -0.41*** |
| | (0.06) | (0.07) | (0.07) | (0.06) | (0.04) | (0.03) |
| Risk preferences (ref. Risk seeker) | | | | | | |
| Neutral | 0.01 | 0.02 | -0.02** | -0.01 | 0.03 | 0.03 |
| | (0.03) | (0.03) | (0.01) | (0.02) | (0.03) | (0.03) |
| Averse | -0.09** | -0.08** | -0.06** | -0.06*** | -0.12** | -0.11*** |
| | (0.03) | (0.03) | (0.02) | (0.01) | (0.04) | (0.03) |
| Wave | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |
| | (0.02) | (0.02) | (0.01) | (0.01) | (0.01) | (0.01) |
| Replacement rate (γ) | -0.04 | -0.04 | 0.04 | 0.05 | -0.07 | -0.08 |
| | (0.04) | (0.03) | (0.04) | (0.04) | (0.07) | (0.06) |

(Continued)

Table A4. (Continued)

| | Either | | Occupational | | Individual | |
|---|----------|----------|--------------|----------|------------|----------|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Education (ref. Primary or less) \times Replacement rate | | | | | | |
| Secondary $\times \gamma$ | -0.02 | -0.02 | -0.02 | -0.01 | -0.08*** | -0.08*** |
| | (0.03) | (0.03) | (0.03) | (0.03) | (0.02) | (0.02) |
| Tertiary $\times \gamma$ | 0.15*** | 0.15** | 0.06 | 0.06 | 0.06** | 0.06* |
| | (0.05) | (0.05) | (0.06) | (0.06) | (0.02) | (0.03) |
| Female $\times \gamma$ | 0.01 | 0.00 | -0.03 | -0.04* | 0.04 | 0.05 |
| | (0.02) | (0.02) | (0.02) | (0.02) | (0.03) | (0.03) |
| Age (ref. Less than 60) \times Replacement rate | | | | | | |
| 60-69 $\times \gamma$ | 0.03*** | 0.03*** | 0.02* | 0.02 | 0.04 | 0.04 |
| | (0.01) | (0.01) | (0.01) | (0.01) | (0.03) | (0.02) |
| 70-79 $\times \gamma$ | 0.14** | 0.15*** | 0.15** | 0.15*** | 0.09*** | 0.10*** |
| | (0.04) | (0.04) | (0.05) | (0.04) | (0.02) | (0.02) |
| Social class (ref. Upper service) \times Replacement rate | | | | | | |
| Lower service $\times \gamma$ | -0.02 | -0.02 | -0.03 | -0.03 | -0.03 | -0.03 |
| | (0.05) | (0.05) | (0.03) | (0.03) | (0.05) | (0.05) |
| Routine non-manual $\times \gamma$ | -0.03 | -0.01 | -0.07*** | -0.06** | 0.00 | 0.01 |
| | (0.03) | (0.03) | (0.02) | (0.02) | (0.04) | (0.04) |
| Self-employed $\times \gamma$ | 0.11** | 0.12** | 0.15*** | 0.15*** | 0.00 | 0.01 |
| | (0.04) | (0.04) | (0.04) | (0.04) | (0.03) | (0.03) |
| Working class $\times \gamma$ | 0.01 | 0.01 | -0.01 | -0.01 | 0.05 | 0.06 |
| | (0.02) | (0.02) | (0.02) | (0.02) | (0.03) | (0.04) |
| Risk preferences (ref. Risk seeker) \times Replacement rate | | | | | | |
| Neutral $\times \gamma$ | -0.09 | -0.10 | -0.08 | -0.09 | 0.00 | -0.01 |
| | (0.07) | (0.07) | (0.06) | (0.07) | (0.07) | (0.06) |
| Averse $\times \gamma$ | -0.09 | -0.09 | -0.07 | -0.06 | 0.01 | 0.01 |
| | (0.07) | (0.07) | (0.06) | (0.07) | (0.06) | (0.04) |
| Ln(Income) $\times \gamma$ | -0.02 | -0.01 | -0.03 | -0.03 | 0.00 | 0.00 |
| | (0.02) | (0.02) | (0.02) | (0.02) | (0.01) | (0.01) |
| Country (ref. Denmark) | | | | | | |
| Austria | -0.37** | -0.37** | -0.60*** | -0.62*** | -0.16 | -0.13 |
| | (0.13) | (0.13) | (0.15) | (0.14) | (0.14) | (0.13) |
| Belgium | -0.34*** | -0.35*** | -0.47*** | -0.47*** | -0.03 | -0.03 |
| | (0.05) | (0.05) | (0.05) | (0.05) | (0.06) | (0.06) |

(Continued)

Table A4. (Continued)

| | Either | | Occupational | | Individual | |
|----------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Czech Republic | -0.27*** (0.07) | -0.25*** (0.07) | -0.63*** (0.07) | -0.61*** (0.07) | 0.18 (0.12) | 0.19 (0.12) |
| France | -0.23** (0.09) | -0.23** (0.08) | -0.21** (0.09) | -0.23** (0.08) | -0.19** (0.08) | -0.16** (0.07) |
| Germany | -0.29*** (0.04) | -0.27*** (0.04) | -0.29*** (0.04) | -0.27*** (0.04) | -0.22*** (0.05) | -0.21*** (0.05) |
| Italy | -0.50*** (0.11) | -0.50*** (0.11) | -0.57*** (0.13) | -0.57*** (0.13) | -0.26* (0.12) | -0.26* (0.11) |
| Spain | -0.39** (0.15) | -0.38** (0.15) | -0.61*** (0.16) | -0.60*** (0.15) | -0.17 (0.14) | -0.17 (0.13) |
| Sweden | -0.02 (0.03) | 0.01 (0.02) | 0.02 (0.03) | 0.03 (0.03) | 0.15*** (0.04) | 0.17*** (0.04) |
| Switzerland | -0.14*** (0.04) | -0.13*** (0.03) | -0.15** (0.06) | -0.15** (0.05) | 0.02 (0.02) | 0.03 (0.02) |
| Born in nation-state | | 0.05 (0.07) | 0.03 (0.06) | | 0.00 (0.07) | |
| Urban residence | | -0.02 (0.01) | -0.03*** (0.01) | | 0.02 (0.02) | |
| Number of children | | 0.02 (0.01) | 0.03*** (0.01) | | -0.02 (0.01) | |
| Homeowner status | | 0.12*** (0.03) | 0.03** (0.01) | | 0.11*** (0.03) | |
| Finance/Business | | 0.11 (0.11) | 0.09 (0.08) | | -0.06 (0.06) | |
| Constant | 0.97*** (0.07) | 0.78*** (0.11) | 0.83*** (0.09) | 0.67*** (0.07) | 0.51*** (0.13) | 0.47** (0.21) |
| Observations | 3636 | 3636 | 3636 | 3636 | 3636 | 3636 |
| R-squared | 0.32 | 0.33 | 0.29 | 0.30 | 0.22 | 0.24 |

Note: Robust standard errors, reported in parenthesis, are clustered by country.
Significance: * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$

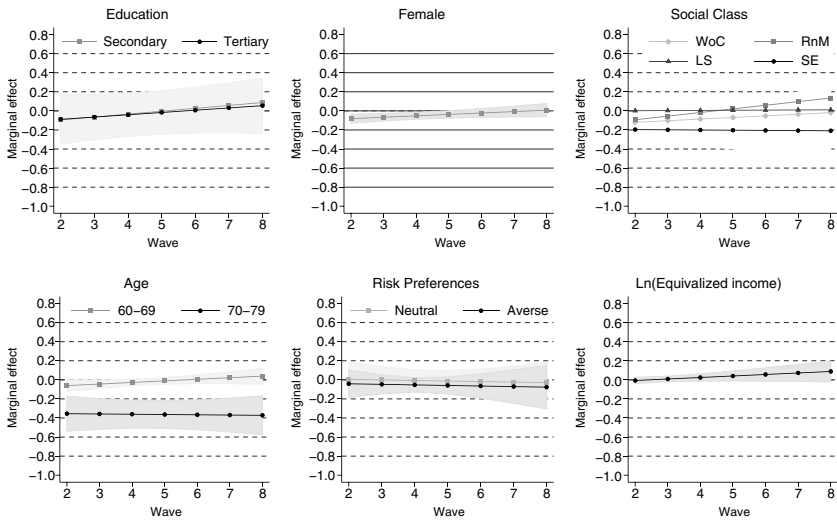


Figure A1. Marginal effects of education, gender, social class, age, risk preferences and income on the predicted probability of contributing to occupational plans at different waves.

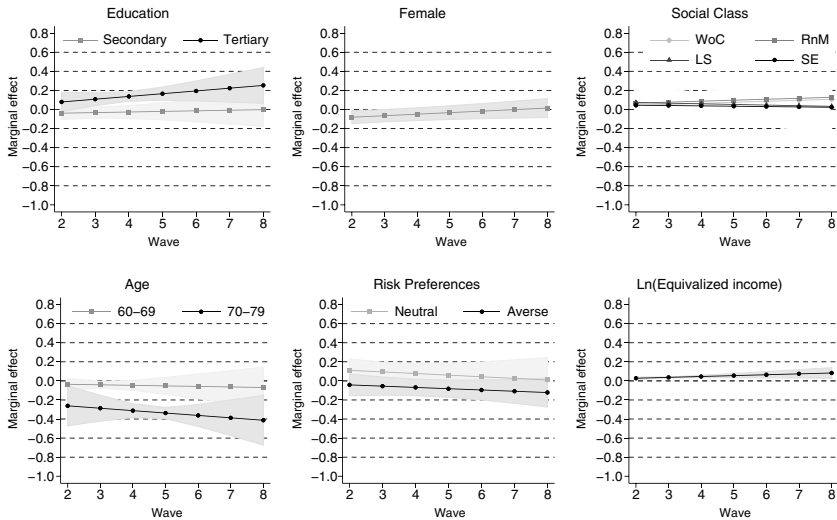


Figure A2. Marginal effects of education, gender, social class, age, risk preferences and income on the predicted probability of contributing to individual plans at different waves.

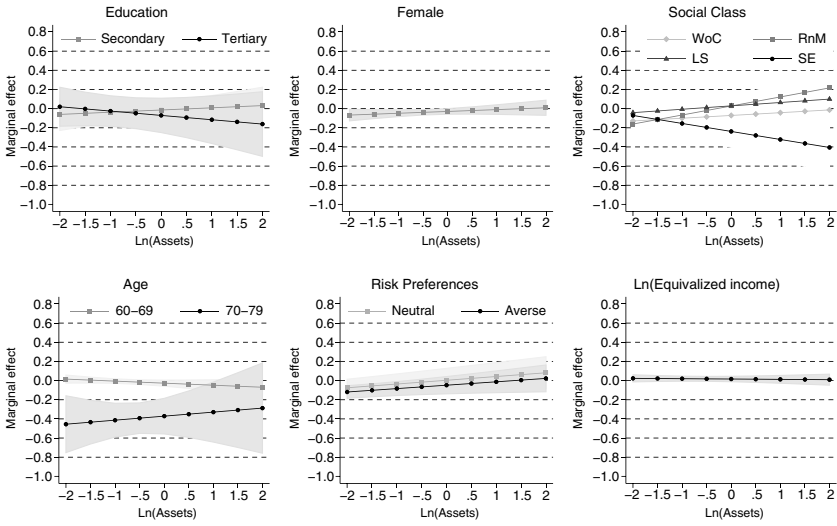


Figure A3. Marginal effects of education, gender, social class, age, risk preferences and income on the predicted probability of contributing to occupational plans at different levels of Ln(Assets).
 Note: “-2”: -2 SD from the mean; (...) “0”: Mean value in the macro-level factor; (...) “+2”: + SD from the mean.

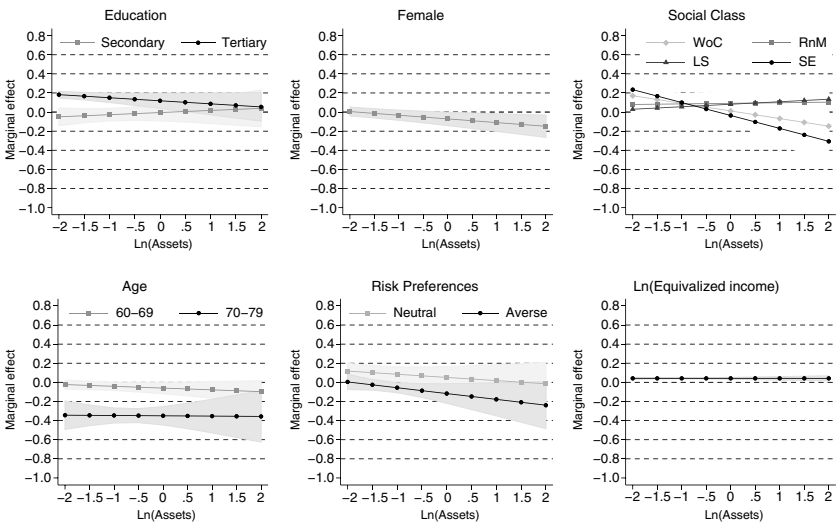


Figure A4. Marginal effects of education, gender, social class, age, risk preferences and income on the predicted probability of contributing to individual private plans at different levels of Ln(Assets).
 Note: “-2”: -2 SD from the mean; (...) “0”: Mean value in the macro-level factor; (...) “+2”: + SD from the mean.

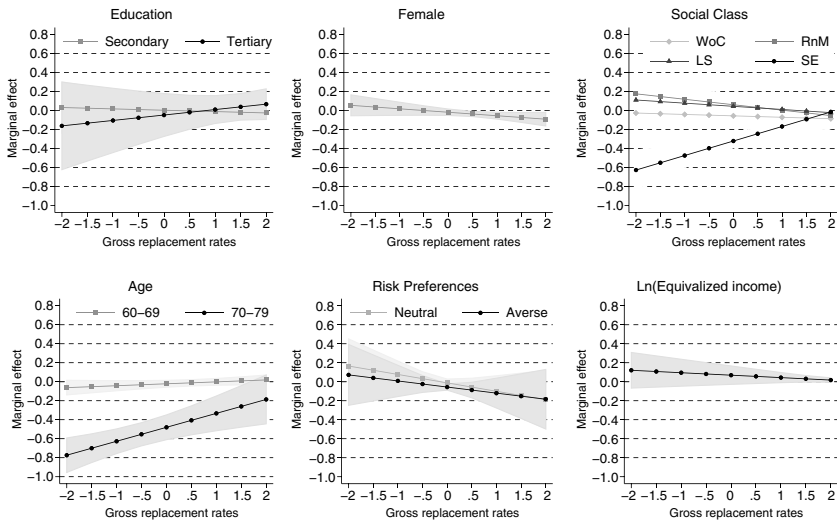


Figure A5. Marginal effects of education, gender, social class, age, risk preferences and income on the predicted probability of contributing to occupational plans at different levels of gross replacement rates. Note: “-2”: -2 SD from the mean; (...) “0”: Mean value in the macro-level factor; (...) “+2”: + SD from the mean.

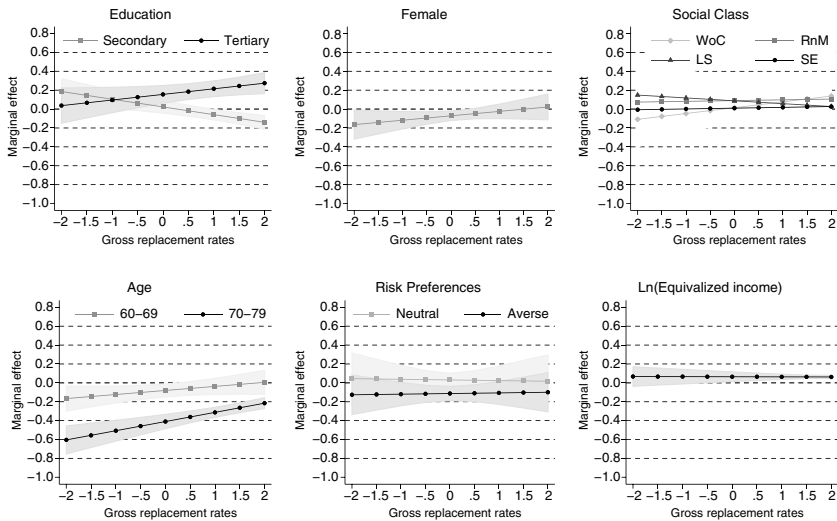


Figure A6. Marginal effects of education, gender, social class, age, risk preferences and income on the predicted probability of contributing to individual plans at different levels of gross replacement rates. Note: “-2”: -2 SD from the mean; (...) “0”: Mean value in the macro-level factor; (...) “+2”: + SD from the mean.

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