Choosing between subsidized or unsubsidized private pension schemes: a random parameters bivariate probit analysis[*]

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Abstract

In 2002, the German government tried to increase private old-age provisions by introducing incentives such as supplementary subsidies and tax credits. Since then, the so-called "Riester pension" has grown in popularity. Apart from subsidized pension plans, unsubsidized private pension insurances have been very important as an instrument for old-age for a long time. With data of the German SAVE study for the years 2005 to 2009, we analyze whether the decision for a "Riester pension" is independent of the decision for unsubsidized private pension insurance using methods for simultaneous equations. Our estimation results indicate that decisions on "Riester" and private pensions are not independent and the proposed random-parameters bivariate probit model results in efficiency gains compared to separate probit estimations. Regarding governmental subsidies, we find positive incentive effects of child subsidies whereas low income earners are not seen to increase their old-age provisions. Further, there is strong evidence for a "crowding-in" among alternative assets as well as a significant effect of demand inducement. Finally, when subsidies are given, these subsidies are a clearly stronger saving motive than the aim to make provisions for old age.

Keywords: subsidized pension, saving incentives, bivariate probit panel

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1 Introduction

Major financing problems of the public pay-as-you-go pension system are caused by the demographic change. Therefore, keeping up the PAYG system is contingent upon the development of the working to non-working or old-age dependency ratio. These ratios are influenced by the birth rate, life-expectancy as well as the level of migration. Decreasing birth-rates and an increasing life-span result in a larger proportion of elderly people in the population which has to be financed by a decreasing number of younger people. Hence, Germany among many other countries has implemented pension reforms reducing the overall pension level (reform in 2001) and raising the statutory retirement age (reform in 2005). Especially the first change will lead to significant lower old-age income which may not ensure the current standard of living. By introducing incentives the German government tried to increase private old-age provisions. In 2002, the so-called "Riester pension"[1] was introduced to foster the voluntary retirement arrangements by supplementary allowances and tax credits by the state. Since then the "Riester pension" has grown in popularity. Today, about 13 million contracts are registered. Many studies (e.g. Corneo et al. (2009) and (2010); Börsch-Supan et al. (2008b); Coppola and Reil-Held (2009)) analyze how these subsidies work. They focus on the determinants influencing the uptake of a "Riester pension". For example, do younger individuals join the subsidized new pension scheme more frequently than the elderly, or whether private savings are crowded out through the heavily subsidized "Riester pension". In contrast to the "Riester pension", traditional private pension insurance is less regulated by the government and hence offers higher flexibility concerning the payment of the insurance benefit.

The aim of this paper is to assess possible determinants of the uptake of private pensions. Therefore, we study the relation between subsidized "Riester pensions" and unsubsidized private pension schemes. The main research question addressed by this paper focuses on the governmental subsidies and whether these subsidies incentivize special forms of private pension schemes. More specifically, we consider if the determinants of the uptake of both forms of private pensions - e.g. socioeconomic and financial factors - point into the same direction. Moreover, we investigate whether the uptake of a private pension scheme is influenced by insurance agents. Finally, we analyze whether public allowance accelerates the signing of subsidized pension schemes. Subsequently, we investigate the effect of these subsidies on unsubsidized contracts.

Our paper contributes to the existing literature by revisiting the relationship between subsidized and unsubsidized pension schemes using German panel data (SAVE study). Thereby, we fill the gap of former studies that rely on cross-section data and thus neglect any time effects as well as the influence of unobserved heterogeneity. Using methods for simultaneous equations, we analyze

[1] The "Riester pension" was named after Walter Riester, the former federal minister of labor and social affairs.

whether the decision for a "Riester pension" is independent of the decision for unsubsidized private pension insurance. In addition to former studies also using the SAVE survey, we take advantage of a broader set of explanatory factors.

The remainder of the paper is organized as follows: Section two describes the German old-age pension scheme and gives a brief introduction into the subsidized private "Riester pension". The next section gives an overview of the related empirical literature dealing with the incentive effects of subsidized private pension schemes. In the following chapter, we describe the dataset and discuss the empirical methodology followed by the presentation of the results in chapter five. Section six finally concludes the findings.

2 The German pension scheme

Today, the old-age provision of German citizens usually consists of three independent pillars: the public pay-as-you-go system, occupational pension schemes and private old-age provision.[2] The public PAYG-system is still the most important institution to prevent poverty and ensure the standard of living after retiring. Today, 80 percent of the working population are covered by the statutory pension insurance and at the same time over 89 percent of the retirees receive such a pension (BMAS (2008), p. 12). However, the pay-as-you-go system is exposed to major financing problems caused by the demographic change. Two trends are the major causes of population ageing: first, increasing life expectancy and second, a decreasing fertility. Therefore, to stabilize the system and to keep it financeable for future generations the German government began to reform the public system. As a result the overall pension level will be reduced and the statutory retirement age will increase from 65 up to 67 years. The 2001 reform will lead to a significant lower old-age income in future which may not ensure the current standard of living. By introducing incentives the German government tried to increase old-age provisions to compensate for these future cuts in public pensions (Börsch-Supan and Wilke (2004)). First, individuals have the option to defer a part of their salary into contributions to pension plans (second pillar). This is promoted by the government through tax deferrals and exemption from social security contributions. Second, individuals may choose to invest in private old-age provision to close the pension gap.

2.1 Private old-age provision: subsidized and unsubsidized pension schemes

One of the major goals of the 2001 pension reform in Germany was to prompt especially low-income earners to make provision for old-age as they are extremely affected by the reduction of the overall pension level. "Riester pension" products are promoted through fixed supplements and tax advantages by the government (see BMAS (2009) and Börsch-Supan and Wilke (2004)).[3] People are

[2] While the first pillar is a pay-as-you-go system, the second and third pillar is capital funded.

[3] As from 2005, supplementary pension contributions have also received special tax concessions in the form of 'Basis' pension plans, also called 'Rürup' plans. This form of private pension provision is especially attractive for

entitled to subsidized "Riester pension plans" if they are directly affected by the 2001 pension reform and are still actively insured in the public pension scheme. Moreover, spouses without direct entitlement are indirectly entitled if their partner is direct eligible. Self-employed people who are not mandatorily insured in the public system, students as well as low-income earners (up to 400 € per month) are not eligible. To qualify for the maximum subsidies, the personal contribution including the governmental subsides must account for at least 4% of the individual's gross income of the previous year. If the contributions to a "Riester contract" are lower, the subsidies are reduced proportionally. Moreover, higher subsidies directly lower the personal net-contribution.[4] Since the introduction, financial support has been increased in four steps. From 2008 on, the "Riester pension" has reached its highest level of public assistance. The basic benefit is now € 154 and the child subsidy is € 185 per year for each child for whom the beneficiary receives child benefit. For children born from 2008 onwards, the child supplement is € 300. In addition, the retirement pension contributions (taking into account the supplement) up to € 2,100 can be offset as additional special expenditure against tax. By construction of the German income tax system, tax expenditures are favorable for higher incomes. Since a modification of the "Riester pension" in the year 2005 simplified the application procedure and reduced the complexity, demand for a subsidized old-age provision has increased. Overall, the official statistic of the Federal Ministry of Labour and Social Affairs (2010) suggest a strongly increasing uptake of subsidized "Riester pensions". Until the end of 2010 more than 13.6 million "Riester contracts" were signed.

For the political objective of the subsidized "Riester pension", it is highly important to obtain acceptance in wide parts of the population. To evaluate the success of the scheme two aspects are of high relevance. First, the total number of "Riester contracts" has to be set in relation to the number of all eligible individuals which amount to about 37 million (Börsch-Supan et al. (2007); Sommer (2007)). Therefore, by the end of 2010, a total of 13.6 million "Riester contracts" result in a diffusion rate of 36.7 percent. According to this, within the last eight years a broad coverage - at least of the eligible population – has not been achieved. Second, the characteristics of individuals that have taken up a "Riester pension" have to be considered. In 2010, the total sum of allowances - without tax deductibles - paid by the government amounts to 8.4 billion euros since the year of introduction (Stolz and Rieckhoff (2010)). In the contribution year 2008[5], the average personal contribution including the governmental subsidies amounts to 822 €. However, 4 % of the average wage of the PAYG-system would result in an average personal contribution of 1.200 € which is clearly above the

self-employed people, freelancers and business people who are not eligible for "Riester" support or occupational pension plans and must therefore make their own provision for retirement.

[4] If subsidies are equal to or higher than 4 % of individuals gross income of the previous year, the minimum personal contribution is set to 60 € per year.

[5] Final numbers of "Riester pensions" and the associate allowances paid are only available for the contribution year 2008.

822 € realized in 2008. This corresponds with the fact, than only 60 % of the eligible individuals received the full allowances in 2008. Looking at further characteristics, 56.7 % of the beneficiaries were women, 25.9 % lived in East Germany and about 41 % of the individuals receiving a basic allowance additionally get child allowances for at least one child (Stolz and Rieckhoff (2010)).
These figures show quite clearly, that the political goals have not yet been achieved. This makes further research on the determinants and the uptake behavior of "Riester pensions" even more important. Apart from subsidized pension plans, private pension insurances are popular instruments for old-age provision. In addition, cash-value life insurance as an instrument for old-age and survivor provision has been tremendously important for a long time. Both forms differ with respect to taxation of revenues and the inclusion of the event of death. For cash-value life insurance this means that the inclusion of the risk of death lead to a higher risk component in relation to the savings component. Thus, individuals have to fill out a health questionnaire prior to the signing to determine their relative risk.

Regarding the taxation of private old-age provision, revenues from a "Riester contract" are fully taxed whereas revenues from private pension insurance are only taxed up to 18 %. Therefore, private pension insurances are not directly subsidized by allowances but rather through tax concessions. As the personal tax rate is usually lower during retirement, the private pension insurance provides implicit tax deferrals. In addition, private pension insurances are more flexible during the saving as well as the payout phase and offer a more transparent choice between different products. To sum up, "Riester pensions" and traditional private pension schemes are comparable investments but differ with respect to subsidization, flexibility and taxation. Hence, it is interesting to analyze whether the demand for these two forms of old-age provisions differs with respect to socioeconomic characteristics.

3 Literature Review

For the purpose of this analysis the literature on the determinants of private old-age provision can be classified into two strands. One strand emphasizes the uptake of a subsidized "Riester pension". The focus of the other strand is on signing alternative unsubsidized private pension insurance.

The "Riester pension" is considered as publicly subsidized private old-age provision in the related literature. These subsidies trigger a substitution effect as well as an income effect in the way that the substitution effect deflects unsubsidized savings into subsidized ones.[6] By contrast, the income effect displaces private savings in the total amount of the public allowances (cf. Blankart (2008)). Thus, Prinz et al. (2003) focus on the effects induced by the public allowances on the choice behavior of

[6] This substitution effect is commonly referred to as "crowding in" (cf. Börsch-Supan et al. (2008b); Corneo et al. (2010)).

private households using a microeconomic analysis. They show that public subsidies – in a two period framework – increase the current consumption and therefore displace private savings.

Most common research concentrates on the substitution effect based on the "Riester pension". Corneo et al. (2009; 2010) analyze the propensity to save of low-income private households in Germany. The data used in their analysis are the German Socioeconomic Panel[7] as well as the German SAVE study.[8] The results of the first study indicate that governmental subsidies neither have a significant effect on the propensity to save of private households nor increase the proportion of saving households within low-income groups. Continuing research in their 2010 study focuses on a broader definition of the sample confirming their first findings. According to this, private households marginally react to the subsidy incentives of the "Riester pension" by increasing their private old-age provision. The authors conclude that taking up "Riester pension" substitutes other forms of savings.

Furthermore, Börsch-Supan et al. (2007) give additional evidence for the existence of a substitution effect. Using cross-section data from the German SAVE study for 2005 the authors investigate the determinants fostering the uptake of a subsidized "Riester pension". They find that public subsidies are a main reason for saving and therefore positively affect the uptake of a "Riester pension" significantly. Another result is rested on socioeconomic factors. Younger individuals and those with children sign a "Riester pension" more likely. In addition, the lowest income quintile has a significant negative effect on the probability to own a "Riester pension". The analysis of Coppola and Reil-Held (2009) provides related results using more recent data. The findings also substantiate the negative income effect. Thus, households of the lowest income quintile sign significantly less often a "Riester contract" than those of the middle income quintile.

Using data from the German Socioeconomic Panel for the year 2007, Geyer and Steiner (2009) analyze whether low-income households are more likely to sign a "Riester pension" than higher incomes. The results are in line with Börsch-Supan et al. (2007) and Coppola and Reil-Held (2009) suggesting that the political goal has not been achieved up to now. According to this, individuals with a yearly gross income less than 10,000 euro have less frequently a "Riester pension" available than higher incomes. Also using cross-section data from the German Socioeconomic Panel for the year 2007, Lampig and Tepe (2009) study the determinants of old-age provision taking alternative savings as explanatory factors into account. A first result is that individuals holding more than one investment have a significant higher probability to own a "Riester contract". In contrast to other

[7] The German Socioeconomic Panel (GSOEP) is an annual representative panel survey starting in 1984.
[8] The SAVE study started in 2001 and is a representative longitudinal household survey on households' financial behavior focusing on the saving decisions and old-age provisions. The survey is conducted by the Mannheim Research Institute for the Economics of Aging (MEA). For further information see Börsch-Supan et al. (2007; 2008a).

studies, the authors provide evidence that woman are likelier to take up a “Riester pension” than men.

In contrast to previous studies Pfarr and Schneider (2011) use panel data for the years 2004, 2006 and 2007 from the German Socioeconomic Panel to explore whether publicly subsidized savings are driven by the incentives of child benefits and if supplier induced demand is an important factor. The authors find evidence that individuals have a higher probability to sign a “Riester contract” if they are in a higher income quintile do have higher education and more children. They show that a contact with an insurance agent in the previous year is one major factor for the uptake of a “Riester pension”. Moreover, their results indicate differences regarding gender and socialization.

To sum up the findings of the first strand of literature concerning the uptake of a “Riester pension”, there exists evidence that subsidizing private old-age provision has lead low-income earner neither to prevent more for old-age nor to increase the propensity to save of private households. Moreover, individuals indicating public subsidies as a main reason for savings more often join a “Riester contract”. These results suggest, that private households substitute unsubsidized savings through subsidized ones. In addition, the studies suggest that the incentives of child-related benefits are an important factor.

The second strand of the literature intends to highlight determinants fostering the uptake of unsubsidized private pension insurance. Schulte and Zirpel (2010) concentrate on adverse selection in the determinants of private pension insurance uptake in Germany using data from the German SAVE study for the year 2005. The results show, that subjective life-expectancy is positively related to the probability of signing private pension insurance. Thus, individuals have rational expectations of their life-expectancy when deciding to make provisions for old-age in form of private pension insurance. In addition, the findings show a significant negative effect of the number of children which is interpreted as a form of altruism. In the second part of their study Börsch-Supan et al. (2007) investigate the factors of signing private pension insurance contracts. Also with data from the German SAVE study for the year 2005 they show that the number of children as well as to be in the two lowest income quintiles is negatively related with the probability of having a private pension insurance. Furthermore, a variable regarding old-age as a saving motive shows a significant positive coefficient. The authors summarize that the expressed attitudes correspond with current behavior.

Finally, there is one study similar to our approach. Börsch-Supan et al. (2008b) focus on the impact of household characteristics on the uptake of either subsidized “Riester pension” or unsubsidized

private pension insurance.[9] The decision to enroll in one of the both forms of old-age provision is modeled simultaneously. Using data for 2005 from the German SAVE study the results suggest that the most important factor determining the uptake of a "Riester pension" is the categorical variable number of children. However, this effect does not exist for taking up unsubsidized pension insurances. Furthermore, income is only relevant for the decision on private pension insurance. The authors also control for different saving motives. They find a significant positive coefficient for public subsidies as reason for saving. This effect cannot be found in the decision making process for an unsubsidized private pension insurance. Alternative forms of savings are captured in one variable containing for instance occupational pension schemes or life-insurance contracts". This variable has a highly significant positive effect on the probability of signing a "Riester contract" as well as private pension insurance. In both cases the magnitude of the effect is similar. The authors conclude that households use different approaches to make provisions for old-age resulting in a "crowding-in" among private pension products.

As a shortcoming, all the presented studies except of Pfarr and Schneider (2011) rely on cross-section data and therefore omit the possibility to control for time effects and unobserved heterogeneity through the application of panel data models. In addition, there is no study combining socioeconomic factors with saving motives, alternative investments, and the effect of demand inducement as well as adverse selection in one approach.

We aim at filling this gap by revisiting the relationship between subsidized and unsubsidized pension schemes using German panel data from the SAVE study. Using a simultaneous equations approach, we analyze the dependency of the decisions for a "Riester pension" and for unsubsidized private pension insurance. Our main advantage to former studies also using the SAVE survey is that we take advantage of a broader set of explanatory factors and use data for several years to capture effects over time.

4 Data and Methods

For the following analysis, we use data from the representative German SAVE study, which is conducted by the Mannheim Research Institute for the Economics of Aging (MEA) and started in 2001 (Börsch-Supan et al. (2008a)). The longitudinal study on households' financial behavior focuses on savings and old-age provisions. As is observable in other survey studies, item non-response can lead to problems for the analysis of those variables with non-responses as well as for the estimation results and covariance structures. This is frequently for variables covering income, assets or old-age

[9] Börsch-Supan et al. use a bivariate probit model for analyzing the dependency between the uptake of "Riester pensions" and private pension insurance. Nevertheless, the correlation between the simultaneously modeled probit regressions is not statistically significant.

provisions. One possibility to deal with this problem is to delete all observations with non-responses which reduces sample size and goes along with a loss of statistical efficiency. In the SAVE data, missing values are estimated using a variant of the iterative multiple imputation procedure (cf. Little and Rubin (2002)). Hence, instead of one original data set containing missing values, we work with five completely imputed datasets for each observation year (2005-2009), where all missings are replaced by imputed values.[10] These datasets differ slightly with respect to the imputed variables and reflect the uncertainty about the true values of the missing attributes. For all datasets, five repetitions are used to generate each imputed dataset.

For the study at hand, we restrict our dataset to those individuals eligible for a "Riester pension". We run a regression for two binary dependent variables *Riester* and *private pension* on socioeconomic, financial and saving motives variables using an unbalanced panel structure. A full description of the variables is presented in table 5.

Table 1: Variable description

<insert table 1 around here>

To cover nonlinear age effects and to avoid an arbitrary definition of age categories, we apply age quintiles for our analysis. The reference is age quintile 1 consisting of those individuals aged 31 or younger. To control for adverse selection in the private annuity market we additionally take the subjective life-expectancy into account. The reason behind this is the presence of information asymmetries between insurers and the insured. In the light of a private pension insurance, information asymmetries are present if individuals can predict their length of life more precisely than the insurer. Given that individuals - who expect to life relatively long - systematically take up a "Riester pension" or private pension insurance more often, this would result in adverse selection in the respectively market. The variable *Rest life* reflects the years between the stated life-expectancy in the survey and the current age. The interpretation is as follows: a higher value of *Rest life* indicates a considerable time to life. Thus, if individuals take their life-expectancy into account in the decision making process, the variable *Rest life* should have a positive coefficient. The group of socioeconomic factors further covers gender effects, the influence of education, whether the respondent lives in East or West Germany as well as family and labor force status. Especially in terms of the subsidized "Riester pension" the child-related subsidies should positively affect the probability to sign a "Riester contract". In contrast, the literature indicates that the number of children has a negative impact on owning private pension insurance. Income is included as five income categories using the equivalent monthly net household income. The reference category is the 100 to 150 % interval of median income. With respect to the literature, we predict a negative impact of the lowest income category

[10] Only variables on age and gender contain no missing values.

on the uptake of a “Riester pension”. The same is true for private pension insurance. Moreover, the effects of income on taking up a subsidized or unsubsidized old-age provision are highly relevant.

Figure 1 reflects the development of the uptake of “Riester contracts” and private pension insurance in the German population separated by the five income categories. There exist wide differences in the level and development over the categories. In 2009, merely 25 percent of the relative poor households hold a “Riester pension” but only a small fraction of this group owns private pension insurance. Whereas almost 50 percent of the higher incomes have taken up a “Riester contract”. The highest proportion of pension insurance occurs as expected in the highest income category. It should be noted, that the presented development of holding private pension insurance may underestimate the true value since we constrain our dataset to those, eligible for a subsidized “Riester pension” and therefore exclude self-employed.

Figure 1: Percentage of „Riester pension“ and private pension insurance in the population by income categories

<insert figure 1 around here>

To assess the impact of alternative savings, in a second specification, additional information on building loan contracts, cash-value life insurances, accumulation plans, real estate ownership and stock ownership are included. We assume that individuals or households use several instruments to provide for old-age. Therefore, the coefficient of these alternative savings should have a positive sign.

Moreover, demand for financial advice and strength of financial compliance are considered as explanatory factors. We hypothesize that individuals visiting an advisor are more likely to sign a “Riester contract” or private pension insurance than others. In addition, we also take into account an interaction between financial advice and the strength of financial compliance to control for a possible demand inducement. The appeal of “Riester products” for the financial industry in Germany is obvious. Through the complexity of “Riester pension” products competition between various providers is minimized. Thus, the insurance commissions as well as the marketing costs for “Riester products” are relatively high. As a result, the active marketing of “Riester pensions” may result in demand inducement.

Finally, saving motives are covered through two binary variables. The first, *Saving motive: old age* is assumed to positively influence the probability of both, “Riester pension” and private pension insurance. The second, *Saving motive: subsidies* is included to check whether respondents confirm with their behavior.

The summary statistics are presented in table 6[11]. Overall, the unbalanced panel dataset consists of 6,824 individuals. Besides the variable *rest life*, all other explanatory variables are binary. Averaged over the five observation years 26.5 % of the respondents own a "Riester pension" and 19.2 % private pension insurance. For the age quintiles, the panel summary statistics shows a deviation of 20 %. This is because we use an unbalanced panel and average thresholds vary between observation years. The mean of expected years to live is approximately 35. About 53 % of the respondents state to have one or two children, circa 60 % to be married. The most common income category is *precarious wealth* covering about 38 % of the respondents. In addition, one can gather the typical right- skewed income distribution from the mean of income variables. With a look at financial assets, the percentage of individuals holding alternative investments such as building loan contracts, cash-value life insurances or accumulation plans is relative high. While a large proportion in our dataset holds diverse assets, it is interesting that only 16.6 % of the respondents' state to visit an advisor once per year, more less more than four times a year. Moreover, the compliance is relatively low. Only up to 4 % of those with one visit claim to be compliant with the advice. The demand for insurance may also depend on the risk aversion of the respondent. In our data, more than 78 % are not willing to take financial risks. The major reason for saving is to provide for old-age, whereas state subsidies are only relevant for about 26 % of the respondents.

Table 1: Summary statistics

<insert table 2 around here>

4.1 Estimation approach

To analyze the decision about subsidized and unsubsidized private pensions, we use an empirical model for simultaneous equations. The advantage of this procedure is that we are able to estimate two equations that seem to be independent at first view. Moreover, there might be a correlation between them due to the structure of the errors. Firstly, to examine the relationship between the two binary variables *Riester* and *private pension*, table 2 present the cross tabulation as well as the tetrachoric correlation. Thus, 446 people owning a "Riester pension" already are holding private pension insurance whereas 4,150 people have neither.

Table 2: Cross-tabulation and tetrachoric correlation

<insert table 3 around here>

[11] The table contains information on the first imputation. The four other imputed data sets differ only slightly and are available upon request.

The tetrachoric correlation measures the correlation between two binary variables since the common Pearson Product Moment correlation is inapplicable and rather been used for continuous variables (Greene and Hensher (2010)). In other words, the tetrachoric correlation corresponds to the bivariate probit model without explanatory variables (constant only model). In our case, the correlation is 0.155 which is relatively small but highly significant differing from zero. According to this, the proposed bivariate model for simultaneous equation seems adequate to analyze the decisions on "Riester" and private pension insurance.

First of all, because we use binary dependent variables as proxy for owning a „Riester pension" and private pension insurance we need an estimation technique for qualitative dependent variables. For cross-section data, the general specification for a two-equation model would be (cf. Maddala (1983) or Greene (2008)):

$$\begin{aligned} y_1^* &= x_1'\beta_1 + \varepsilon_1, \quad y_1 = 1\ (y_1^* > 0), \\ y_2^* &= x_2'\beta_2 + \varepsilon_2, \quad y_2 = 1\ (y_2^* > 0), \end{aligned} \tag{4.1}$$

$$\begin{aligned} &\mathrm{E}\left[\varepsilon_1 \mid x_1, x_2\right] = \mathrm{E}\left[\varepsilon_2 \mid x_1, x_2\right] = 0 \\ &\mathrm{Var}\left[\varepsilon_1 \mid x_1, x_2\right] = \mathrm{Var}\left[\varepsilon_2 \mid x_1, x_2\right] = 1 \\ &\mathrm{Cov}\left[\varepsilon_1, \varepsilon_2 \mid x_1, x_2\right] = \rho, \quad -1 < \rho < 1 \end{aligned}$$

Here y_1 and y_2 are binary dependent variables and y^* their latent counterpart. The parameter ρ reflects the covariance between the two error terms. In other words, ρ measures the impact of unobserved factors on the probability to own a "Riester pension" or private pension insurance. Both equations (4.1) can be estimated consistently as single equation probit models. However, this might be inefficient as it ignores the correlation between the disturbances (cf. Greene and Hensher (2010)). Therefore, the correlation coefficient might be of interest. If ρ is statistically different from zero - that means that the error terms ε_1 and ε_2 are not independent – then the above model should not be estimated as two independent equations (cf. Maddala (1983), p. 123). Thus, equation (4.1) forms a simultaneous equation system.[12] We apply a bivariate probit model to estimate the equations above. To start with, the joint probability of an outcome $y_1 = y_2 = 1$ can be written in terms of the conditional and marginal probabilities as:

$$\begin{aligned} \mathrm{Prob}\left[y_1 = 1, y_2 = 1\right] &= \mathrm{Prob}\left[y_2 = 1 \mid y_1 = 1\right] \times \mathrm{Prob}\left[y_1 = 1\right] \\ &= \Phi_2\left(y_1 = 1, y_2 = 1\right) / \mathrm{Prob}\left[y_1 = 1\right] \times \mathrm{Prob}\left[y_1 = 1\right]. \end{aligned} \tag{4.2}$$

[12] It is also possible to consider a potential endogeneity of the dependent variables. If we specify the model with a mutual influence of both dependent variables, Maddala (1983, p. 117 f.) shows that this model would not be consistent or estimable. One solution would be to calculate the probabilities for two binary dependent variables where only one dependent variable enters the second equation as explanatory factor resulting in a recursive bivariate probit model (cf. Maddala (1983)). Nevertheless, this would require some theoretical advice on the dependency of each decision to take up a "Riester pension" or a private pension insurance.

Here, Φ_2 is the cumulative distribution function of the bivariate normal distribution. Together with the variables and parameters of the model in (4.1) on gets:

$$\text{Prob}\left[y_1 = 1, y_2 = 1\right] = \Phi_2\left(x_1'\beta_1, x_2'\beta_2, \rho\right) / \Phi\left(x_1'\beta_1\right) \times \Phi\left(x_1'\beta_1\right) \tag{4.3}$$

This results in the following bivariate probability:

$$\text{Prob}\left[y_1 = 1, y_2 = 1\right] = \Phi_2\left(x_1'\beta_1, x_2'\beta_2, \rho\right) \tag{4.4}$$

The remaining probabilities are then:

$$\begin{aligned} \text{Prob}\left[y_1 = 1, y_2 = 0\right] &= \Phi_2\left(x_1'\beta_1, -x_2'\beta_2, \rho\right) \\ \text{Prob}\left[y_1 = 0, y_2 = 1\right] &= \Phi_2\left(-x_1'\beta_1, x_2'\beta_2, \rho\right) \\ \text{Prob}\left[y_1 = 0, y_2 = 0\right] &= \Phi_2\left(-x_1'\beta_1, -x_2'\beta_2, \rho\right) \end{aligned} \tag{4.5}$$

These are the probabilities that enter the likelihood function for the bivariate probit model (cf. Greene (1998), p. 295).

With respect to the panel structure, it is important how to deal with unobserved heterogeneity. For the bivariate probit model for panel data, we use a generalization of a random effects model proposed by Greene. Since the implementation of random effects for a bivariate probit model is nontrivial, our approach applies to a random parameters method (Greene (2001)). According to this approach, the advantage is that all variables – including the constant term – can be treated as random. In our specific case, we use a specification where only the constant terms of the two equations are assumed to be randomly distributed. In effect, this implementation of a random parameters model is equivalent to a random effects bivariate probit model for panel data.

The general specification of a random parameters model for binary choice rests upon the following conditional probability:

$$\text{Prob}\left[y_{it} = 1 \mid x_{it}, \beta_i\right] = F\left(\beta_i' x_{it}\right), \quad i = 1, \ldots, N, t = 1, \ldots, T, \tag{4.6}$$

with $F(\cdot)$ as the normal distribution. The underlying specification of the vector of coefficients is:

$$\beta_i = \beta + \Delta z_i + \Gamma v_i, \tag{4.7}$$

where β is the vector of unconditional means. Furthermore, Δ is a matrix of unknown location parameters, z_i is a vector of individual characteristics (heterogeneity term), Γ a matrix of unknown variance parameters and v_i the vector of random latent individual effects, with zero mean. In the

general random parameters model, it is assumed parameters are randomly distributed across individuals with possibly heterogeneous mean and variance:

$$\begin{aligned} \mathrm{E} &= \left[\beta_i \mid z_i\right] = \beta + \Delta z_i \\ \mathrm{Var} &= \left[\beta_i \mid z_i\right] = \sum . \end{aligned} \tag{4.8}$$

The second term is optional meaning that the parameter matrix $\Delta = 0$. In this case and conditional that the coefficient β_i is constant, the parameter in view is non-random. In our application of a bivariate probit model, we assume that all parameters other than the constant terms in both equations are non-random. According to this, the random parameters model is equivalent to the following random effects specification:

$$\begin{aligned} &y_{it1} = x_{it1}\beta_1 + \alpha_{i1} + \varepsilon_{it1} \quad \forall i,t, \\ &y_{it2} = x_{it2}\beta_2 + \alpha_{i2} + \varepsilon_{it2} \quad \forall i,t \\ &\left[\varepsilon_{it1}, \varepsilon_{it2}\right] \sim \Phi_2 \left[0,0,1,1,\rho\right], -1 < \rho < 1 \\ &\left[\alpha_{i1}, \alpha_{i2}\right] \sim \Phi_2 \left[0,0,1,1,\theta\right], -1 < \theta < 1 \end{aligned} \tag{4.9}$$

y_{it1} is the binary dependent variable of equation *j*. The vector β_j is the coefficient vector that is constant over individuals and time. The heterogeneity has two components: first, heterogeneity between individuals represented by the time invariant parameter α_{ij} that is random over individuals. Second, heterogeneity between the true disturbances ε_{itj}. In our case, a random effects model is applied using Limdep. Instead of random draws we use the Halton sequence for the simulated maximum likelihood to reduce the number of draws and computation time.

4.2 Obtaining results from multiple imputed datasets

The estimation with different imputations requires some caution with respect to the 'averaging' of the results (see Little and Rubin (2002), p. 86). Let $\hat{b}_k$ be the estimated regression coefficient in sample *k* of the *M* samples from the random parameters bivariate probit regressions. Then it follows that the coefficient vector of the multiple imputation analysis is given by the mean of the single estimations

$$\bar{b}_M = \frac{1}{M}\sum_{k=1}^{M} \hat{b}_k; \quad k = 1,2,\ldots,M \tag{4.10}$$

The five imputation datasets are conditional draws rather than conditional means. Thus, under a good imputation model they provide valid estimates. The standard error $\bar{s}_M$ has two components: the average within- and the between imputation variance. The within-imputation variance $\hat{s}_k^2$ is the mean of the estimated standard errors of the responding imputation *M* ($\hat{s}_k$) whereas the between-

imputation variance depends on the difference between the estimated coefficients and the corresponding estimate for all imputed datasets $\left(b_k - \bar{b}_M\right)$. Hence, the standard error is calculated by taking the square root of the sum of the average of the sampling variance and the variance of the estimated coefficients that is multiplied by a correction factor 1+1/M.

$$\bar{s}_M = \sqrt{\frac{1}{M}\sum_{k=1}^{M}\hat{s}_k^2 + \left(1+\frac{1}{M}\right)\left(\frac{1}{M-1}\right)\sum_k\left(b_k - \bar{b}_M\right)^2} \tag{4.11}$$

One shortcoming of the estimation of multiple imputed datasets is the specification test like a likelihood ratio test are not obtainable because it is not possible to average the likelihood values across the different imputations.

5 Results

Our estimation results for both restricted and full specification indicate that decisions on "Riester pensions" and private pensions are not independent and the proposed random-parameters bivariate probit model results in efficiency gains compared to separate probit estimations. The correlation of the residuals ρ is significantly positive meaning that unobservable factors have a positive influence on the likelihood to sign subsidized and unsubsidized private pensions.

In detail, we observe differences in the magnitude of the coefficient and the corresponding level of significance between both equations. For the restricted model (see table 8) - which does not incorporate financial variables - we find a highly significant and positive time gradient for *Riester* whereas only one year is relevant for *private pension insurance*. Further differences occur regarding age quintiles and the number of children. The probability for a "Riester contract" increases for the second and third age quintile but decreases for the highest quintile. For private pensions, only the second quintile shows a significantly positive effect. According to this, younger individuals are aware of future cuts of public pensions and have begun to make private provisions for old-age. Subjective years to life (*Rest life*) show a significant and positive effect only for "Riester pensions". The interpretation is as follows: individuals reporting a higher rest-life span tend to sign a subsidized pension more likely. In contrast to the literature, where Schulte and Zirpel (2010) find evidence of adverse selection in the decision making process for private pension insurance, our results suggest that adverse selection is only relevant for the uptake of "Riester".

As the subsidies rise with the number of children, we find a strong and positive gradient for the "Riester pension". Thus, the public incentives to take up a subsidized pension are working well. On contrary, the impact of the number of children is insignificant or even negative for the probability of a private pension. These reverse effects can be explained by recalling how the subsidies work. The

combination of subsidy and personal contribution must account for at least 4 % of the individual's yearly gross income to be eligible for the subsidies in the first place; the higher the subsidies the lower the personal contribution. This means that each additional child helps to reduce the personal contribution down to the lower limit of 60 € per year. Once the minimum personal contribution of 60 € is reached, any additional subsidy increases the personal saving rate. This results in a considerable "leverage effect". The observed results for children regarding subsidized "Riester pension" are consistent with these incentives. On the other side, an unsubsidized pension, which does not provide an additional child benefit, is chosen less often by households with more than one child.

With a look at income variables, we find a significantly negative coefficient for relatively poor people in both equations. Instead, *higher income* and *relative wealth* positively influence the take up only for private pension schemes; for "Riester contracts", no significant effects can be found. These findings indicate that political aims to induce higher old-age provisions of low income earners are not achieved. Subsidization thus has no effect and the incentives for low income groups failed to work. The employment effects are as expected: those full employed have a significantly higher likelihood to own a private pension while those in part-time employment use public subsidies and tend to have "Riester pensions".

Table 3: Estimation results bivariate probit model - restricted

<insert table 4 around here>

Regarding our full model (see table 9), the inclusion of financial variables changes the effects of children and education. While in the restricted model, some of the educational variables show a significantly positive impact this effect cannot be found in the full specification. This result emphasizes the role of financial literacy. In the restricted model, these effects are possibly covered by the educational variables whereas in the full specification, financial assets and financial behavior have a higher relevance for the addressed question. The number of children has now a more negative impact on traditional private pensions. The magnitude of income effects decreased and for private pension insurance, higher income is now insignificant. The reason behind this can be seen in the inclusion of various financial variables. While in the restricted model income is the only indicator regarding earnings and wealth, assets are explicitly included in the full model.

Alternative investments positively affect the uptake of both forms of provisions. It is interesting that other government-promoted investments (such as building loan contracts) are only relevant for the "Riester" decision indicating an affinity to state allowances. With exemption of home ownership, the positive effects of other assets can be viewed as "crowding in" among alternative investments. Hence, individuals use various forms of assets to make provisions for old-age. Those individuals who

make use of financial advice are more likely to sign either form of pension. More interestingly, the interaction between advice and strong financial compliance is only relevant for “Riester”. It seems that financial intermediates have an incentive to promote the highly regulated “Riester pension”. The complexity of these products limits competition between various providers. High insurance commissions and marketing costs strengthen the incentives resulting in active marketing of “Riester pensions”. This indicates that financial consultants play an important role in the decision making process that may result in a significant demand inducement.

The advantageous tax rules for private pension schemes are present by the significant positive coefficient of *tax advisor*. On contrary, tax expenditures for “Riester pensions” are limited and only favorable for high income groups. Saving motives play an important role for the old-age provision. Respondents stating to save for old age significantly own both forms of pensions. However, a closer look shows that the effect for private pension insurance is twice the effect for “Riester”. While the reason for this is unclear at first, taking into account subsidies as a saving motive sheds light on the investment decision. As expected, we find no effect of this motive for private pensions. Instead, the highly significant effect for “Riester pensions” indicates the importance of public subsidies. Comparing the magnitude of the saving motives’ coefficients lets us conclude that the subsidies motive dominates the old-age motive. Thus, people do not only take up a “Riester pension” because of securing pension payments but also to pick up granted subsidies.

Finally, concerning our estimation approach, the correlation between the error terms of the two equations is highly significantly positive. This means that the decisions on “Riester” and private pension insurance are not independent and therefore, separate estimations lead to a loss in efficiency. However, the correlation decreases by including financial variables but remains significant.

Our findings relate to the literature as follows: Our results confirm the findings of Corneo et al. (2009; 2010), Coppola and Reil-Held (2009), Geyer and Steiner (2009) as well as Börsch-Supan et al. (2007) with respect to a negative income effect of the lowest income category on the likelihood to take up a “Riester pension”. Furthermore, we also find a positive effect of the number of children in line with Börsch-Supan et al. (2007), and Coppola and Reil-Held (2009). Contrary to Lampig and Tepe (2009), we use separate variables for alternative investments. Doing so, our results offer a more accurate view on the effects of investments that influence the decisions. We provide evidence that individuals who are covered by alternative investments do more frequently sign a “Riester contract” or private pension insurance. Nevertheless, the magnitudes differ between the decision on “Riester” and private pension insurance. In comparison to the only study using panel data (Pfarr and Schneider 2011), we also find a positive effect of the number of children as well as a significant demand inducement. In contrast to Pfarr and Schneider, we are able to emphasize the role of financial

intermediates even better. Nevertheless, while Pfarr and Schneider give evidence for positive effects of education, our results do not indicate such effects.

Looking at the literature on the determinants of private pension insurance, we cannot affirm the effects of adverse selection within the private pension insurance market which is suggested by the work of Schulte and Zirpel (2010). Our results suggest that this effect is only present for "Riester". In addition, our results substantiate the findings of Börsch-Supan et al. (2007), as we also find that individuals at the bottom of the income distribution sign private pension insurance less often. .

In contrast to Börsch-Supan et al. (2008b), with the use of panel data, our results suggest that the decisions on "Riester" and private pension insurance are not independent. We are able to validate the findings of Börsch-Supan et al. regarding the effects of children. Additionally, we provide evidence of a negative income effect of the lowest income category on the probability to own a "Riester pension".

To sum up, we are among the first providing evidence of the dependency of decisions on subsidized and unsubsidized private pension schemes. While our results are in line with the literature in the many cases, we present evidence for income effects and the influence of the number of children. Further results confirm the hypothesized behavior of financial intermediates as well as the existence of a "crowding in" of alternative investments.

Table 4: Estimation results bivariate probit model – full specification

<insert table 5 around here>

6 Summary

Regarding our research questions, our results confirm that governmental subsidies have positive incentive effects for private pension schemes. This is evident for the child allowances for the "Riester pension". This means that each additional child helps to reduce the personal contribution down to the lower limit. On contrary, the effect of children is negative for private pension insurance. Income effects are broadly discussed in the literature - with mixed results. For both forms of provision, we find a negative effect for those relatively poor. According to this the political aims to induce higher old-age provisions of low income earners have not yet been achieved. Subsidization thus has no effect and the incentives for low income groups failed to work. On the other side, alternative investments seem to have an important impact on old-age provision. Thus, individuals use various forms of assets to ensure their current standard of living in future. These effects can be interpreted as "crowding in" among alternative investments. This does also mean that financial literacy is highly important. As we find disappearing effects of education among our restricted and full model, this

result implies the minor relevance of education upon the decision to make provisions for old-age. To conclude, a primary objective for policy makers would be to enhance the financial literacy of individuals.

The question whether the uptake of private pensions is influenced by insurance agents can be confirmed. Indeed, demand inducement can be found for the subsidized “Riester pension” but not for traditional private pensions. Financial intermediates then have an incentive to promote the highly regulated “Riester pension”. If we observe demand inducement for the uptake of subsidized private pension, simplifying the complex set of regulations would not be a primary goal as long as the financial intermediates act as perfect agents.

In addition, saving motives play an important role for the old-age provision. In the decision making process to take up a “Riester pension”, granting subsidies dominate the old-age motive.

Generally, regarding the future gap in the public pension system, any increase in private old-age arrangements seems to be positive. But it remains unclear whether the higher demand for “Riester pensions” in fact increases the private savings rate or whether we observe a substitution of unsubsidized through subsidized products. Finally, our empirical findings emphasize the relationship between different forms of private provision for old-age. Further research should analyze if individuals take the full choice set of different investments into account or if governmental subsidies distort competition between these alternatives.

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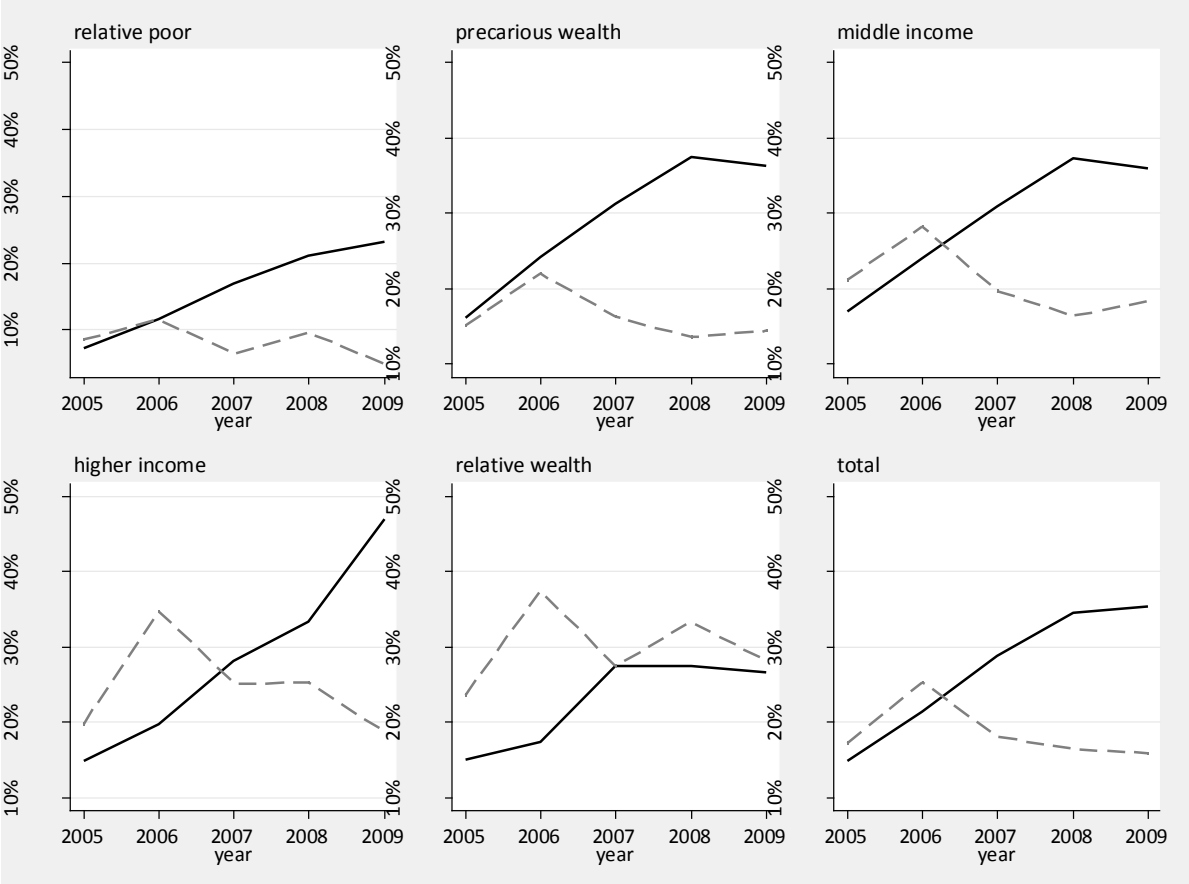
Tables and figures

Table 5: Variable description

variable name	label
Time fixed effects	
D2006	dummy year = 2006
D2007	dummy year = 2007
D2008	dummy year = 2008
D2009	dummy year = 2009
Socioeconomic variables	
East German	Living in East Germany
Female	1=female, 0=male
Age quintile 2	age >31 and <=41
Age quintile 3	age >41 and <=47
Age quintile 4	age >47 and <=53
Age quintile 5	age >53
Rest life	subjective expected years to life
Number children 1	1 or 2 children
Number children 2	3 or 4 children
Number children 3	at least 5 children
Married	1, if married
Widowed	1, if widowed
Divorced	1, if divorced
O-Level	first public examination in secondary school yes/no
High school	general qualification for university entrance yes/no
University	university degree yes/no
relative poor	less than 50 % of the median of equivalent household net income
precarious wealth	50-100 % of the median of equivalent household net income
higher income	150-200 % of the median of equivalent household net income
relative wealth	more than 200 % of the median of equivalent household net income
Full time	full time employed (at least 35 h) yes /no
Part time	part time employed (15 to 34 h) yes/no
Financial variables	
building loan contract	1= holding a building loan contract, 0=not
Cash-value life insurance	1= holding a cash-value life insurance, 0=not
Accumulation plan	1= holding an accumulation plan, 0=not
Stocks	1= stock holding, 0=not
Investment bonds	1= holding investment bonds, 0=not
Home owner	1= real estate property, 0=not
Financial advice 1	1 counseling interview per year
Financial advice 2	more than 4 counseling interviews per year
Financial advice 1 * strong compliance	Interaction Financial advice 1 and strong compliance to the advice
Financial advice 2 * strong compliance	Interaction Financial advice 2 and strong compliance to the advice
Tax advisor	contact with a tax advisor
Risk aversion	1, if not willing to take financial risks
Saving motive: old age	1, if saving motive is old age provision

Saving motive: subsidies	1, if saving motive are state subsidies

Figure 2: Percentage of „Riester pension“ and private pension insurance in the population by income categories



Notice: The solid line indicates the mean of “Riester pension” in the respective year whereas the dashed line resembles the mean of private pension insurance.

Source: SAVE (2010).

Table 6: Summary statistics

	N = 6,824	
	Mean	*SD*
Dependent variables		
Riester	0.265	0.441
Private Pension	0.192	0.394
Time fixed effects		
D2006	0.268	0.443
D2007	0.217	0.412
D2008	0.188	0.391
D2009	0.154	0.361
Socioeconomic variables		
East German	0.273	0.446
Female	0.532	0.499
Age quintile 2	0.213	0.410
Age quintile 3	0.226	0.418
Age quintile 4	0.200	0.400
Age quintile 5	0.190	0.392
Rest life	35.761	13.515
Number children 1	0.538	0.499
Number children 2	0.176	0.381
Number children 3	0.025	0.157
Married	0.596	0.491
Widowed	0.158	0.365
Divorced	0.014	0.119
O-Level	0.429	0.495
High school	0.313	0.464
University	0.165	0.371
relative poor	0.120	0.325
precarious wealth	0.382	0.486
higher income	0.115	0.320
relative wealth	0.076	0.266
Full time	0.573	0.495
Part time	0.161	0.368
Financial variables		
building loan contract	0.407	0.491
Cash-value life insurance	0.409	0.492
Accumulation plan	0.566	0.496
Stocks	0.268	0.443
Investment bonds	0.081	0.272
Home owner	0.492	0.500
Financial advice 1	0.166	0.372
Financial advice 2	0.071	0.257
Financial advice 1 * strong compliance	0.039	0.194
Financial advice 2 * strong compliance	0.022	0.148
Tax advisor	0.315	0.465
Risk aversion	0.784	0.411
Saving motive: old age	0.646	0.478
Saving motive: subsidies	0.265	0.441

Table 7: Cross-tabulation and tetrachoric correlation

	Riester Pension		
Private pension insurance	No	Yes	**Total**
No	4,150	1,364	5,514
Yes	864	446	1,310
Total	5,014	1,810	**6,824**
Tetrachoric		0.155	
Wald test ρ=0 (χ^2)		0.000	

Table 8: Estimation results bivariate probit model - restricted

	Riester pension		Private Pension Insurance	
	Coefficient	$\|z\|$-value	Coefficient	$\|z\|$-value
Time fixed effects				
D2006	0.2847	4.05***	0.2871	4.95***
D2007	0.5683	7.67***	0.0207	0.31
D2008	0.7475	8.77***	-0.0198	0.28
D2009	0.7793	8.66***	-0.0486	0.68
Socioeconomic variables				
East German	0.1518	3.47***	0.1440	3.00***
Female	-0.0965	2.17**	0.1285	2.86***
Age quintile 2	0.2089	2.37**	0.1618	2.38**
Age quintile 3	0.1770	2.17**	0.0936	1.28
Age quintile 4	-0.1084	1.13	-0.1123	1.16
Age quintile 5	-0.4494	4.52***	-0.0705	0.72
Rest life	0.0073	3.32***	0.0017	0.74
Number children 1	0.2393	4.45***	-0.0652	1.19
Number children 2	0.4297	6.48***	-0.1897	2.71***
Number children 3	0.4502	3.17***	-0.1512	1.15
Married	0.2297	3.70***	0.0446	0.72
Widowed	-0.2338	1.07	0.0229	0.11
Divorced	0.0664	0.97	0.0097	0.12
O-Level	0.0485	1.03	-0.0033	0.04
High school	0.1182	2.04**	0.1744	2.30**
University	-0.0190	0.30	0.1059	1.84*
relative poor	-0.3926	4.77***	-0.4541	5.22***
precarious wealth	-0.0400	0.74	-0.0792	1.45
higher income	0.0647	1.03	0.1508	2.34**
relative wealth	-0.0586	0.64	0.3045	4.00***
Full time	0.0173	0.32	0.3358	6.08***
Part time	0.1452	2.47**	0.0942	1.37
ρ	0.173	Wald test $\rho=0$ (χ^2)		48.95***
McFadden R^2	0.076	AIC		13,611.62
McFadden R^2 adj.	0.069	BIC		13,988.85
N	6.824			

*p<0.1, **p<0.05, ***p<0.01

Table 9: Estimation results bivariate probit model – full specification

	Riester pension		Private Pension Insurance	
	Coefficient	$\|z\|$-value	Coefficient	$\|z\|$-value
Time fixed effects				
D2006	0.2711	3.74***	0.2786	4.32***
D2007	0.5187	7.21***	-0.0658	1.06
D2008	0.7167	8.78***	-0.1006	1.49
D2009	0.7499	7.79***	-0.1166	1.68
Socioeconomic variables				
East German	0.2132	4.06***	0.1775	3.63***
Female	-0.0912	1.79*	0.1287	2.59***
Age quintile 2	0.2235	3.07***	0.1333	1.78*
Age quintile 3	0.1542	1.99**	0.0448	0.56
Age quintile 4	-0.1096	1.32	-0.1713	1.625
Age quintile 5	-0.5334	5.34***	-0.1379	1.13
Rest life	0.0049	2.12**	-0.0006	0.24
Number children 1	0.1698	2.90***	-0.1092	1.92**
Number children 2	0.3665	5.23***	-0.2182	2.57***
Number children 3	0.4968	4.11***	-0.1773	1.22
Married	0.1733	2.94***	-0.0105	0.17
Widowed	-0.1489	0.67	0.1357	0.60
Divorced	0.1541	2.17**	0.0638	0.86
O-Level	0.0081	0.16	-0.0366	0.55
High school	0.0822	1.35	0.0971	1.28
University	-0.0470	0.78	0.0795	1.28
relative poor	-0.1528	2.00**	-0.3014	3.47***
precarious wealth	0.0563	1.06	-0.0199	0.42
higher income	0.0126	0.19	0.0890	1.39
relative wealth	-0.1226	1.09	0.1665	2.00**
Full time	-0.0345	0.56	0.3173	5.29***
Part time	0.1075	1.80*	0.0895	1.34
Financial variables				
building loan contract	0.2531	5.80***	0.0448	0.95
Cash-value life insurance	0.1448	2.50**	0.1773	4.22***
Accumulation plan	0.1650	3.37***	0.1287	2.85***
Stocks	0.1470	2.42**	0.2617	5.26***
Investment bonds	0.1889	2.79***	0.2927	4.37***
Home owner	0.0231	0.58	-0.0300	0.52
Financial advice 1	0.1907	3.53***	0.2016	2.53**
Financial advice 2	0.2394	2.72***	0.1760	1.78*
Financial advice 1 * strong compliance	0.3748	3.50***	-0.0205	0.17
Financial advice 2 * strong compliance	0.2667	1.97**	-0.0167	0.09
Tax advisor	-0.0187	0.30	0.1239	2.96***
Risk aversion	0.0052	0.09	-0.0075	0.16
Saving motive: old age	0.1796	4.28***	0.3422	7.41***
Saving motive: subsidies	0.3091	4.60***	0.0314	0.64

ρ	0.098	Wald test ρ=0 ( )	14.46***
McFadden R^2	0.122	AIC	13,008.59
McFadden R^2 adj.	0.111	BIC	13,581.43
N	6.824		

*p<0.1, **p<0.05, ***p<0.01