Family background, informal networks and the decision to provide for old age:  
A siblings approach

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Abstract

In order to encourage people to take out voluntary private pensions to supplement statutory provisions, Germany introduced the so-called Riester pensions. Existing evidence has not properly taken into account the search and decision costs related to Riester pensions, which might create entry barriers into the Riester market for certain groups. I use information on family background in order to give a reliable assessment of the determinants of Riester ownership and to capture the impact of information sharing within families. I find that family background significantly influences the likelihood of owning a Riester pension, in particular fathers’ education. Omission will give misleading results, especially regarding the importance of education and income. Contemporaneous as well as sequential correlations in Riester ownership between parents and their children as well as siblings are pronounced, even after controlling for other factors. While the former might be due to shared preferences, I take the latter as evidence for information sharing. Positive externalities help to overcome entry barriers in the Riester market by dispersing information on eligibility and the generosity of subsidies. Once a critical mass has been reached positive spillovers create a social multiplier which should result in dynamic demand for Riester contracts. The family as a source of information indeed seems to become less important with time.
1. Introduction

Innovations and in particular innovative financial products induce transaction costs. These costs might differ between individuals depending on their ability to acquire and process relevant information for a purchase decision.

Many people did not have to deal with the market for private old age provision products until recently. However, with global demographic change challenging public budgets, most western countries undertook dramatic pension reforms in the last years: Monolithic pension systems were reformed into multi-pillar systems, thereby shifting responsibility for retirement income from the state towards individuals. A fundamental prediction of standard economic theory is that a change to less generous public pensions would increase private savings due to a crowding-out effect. Ambiguities in the relationship between public pension wealth and private savings arise, however, depending on income effects, capital market conditions, and myopic behavior of individuals (Feldstein, 1974). With people being restricted in their ability to manage information (Delavande et al., 2008) this might result in less than optimal saving decisions and offset the governments’ policy.

Many countries have therefore tried to actively encourage people to take out voluntary private pensions to supplement statutory provisions. As part of the major pension reform in 2001 Germany introduced a new type of private old age provision scheme, the so-called Riester pensions. Riester pensions are state-subsidized private pensions. The ongoing discussion of why certain groups do not provide for old age and how successful subsidies are in targeting the population at risk of old age poverty has sparked controversies in the academic world for many years. By 2010, almost 10 years after its introduction, 40% of the eligible population is covered by a Riester contract (Coppola and Reil-Held, 2009; Geyer, 2011). Coverage rates vary across socio-economic strata: Especially low income and low educated individuals are hard to reach.

Existing evidence has not properly taken into account the search and decision costs related to Riester pensions. Individuals might face entry barriers, such as a simple lack in information, when joining the Riester market and differ in their ability to overcome these barriers. Peers can help as they disperse information thereby lower transaction costs.

The contribution exploits information on family background in order to give an assessment of the determinants of Riester ownership and to capture the relevance of families as a form of social network. Similarities in investment behavior are to a large extent due to genetic predisposal. In order to reduce omitted variables I control for family background in two ways: (1) by subtracting a family fixed effect and, (2) through the inclusion of proxy variables. Beyond genetic components and shared preferences, families can be considered a source for cost-effective and reliable information. In an attempt to establish the effect of social interactions I look at the contemporaneous correlations in Riester ownership as well as the sequence of Riester market entrance between siblings.
The rest of the paper is organized as follows. Section 2 presents some key features on Riester pensions and contains an overview of the relevant literature. The section ends with stating my hypotheses. Section 3 describes the identification strategy. Apart from the data and sample used, I present the model specifications. Section 4 reports the estimation results, and section 5 concludes.

2. Related literature and Hypotheses

2.1. Riester pensions: The key features

In order to encourage people to take out voluntary supplementary pension, Germany introduced the so called Riester pensions as part of the pension reform in 2001.¹ The aim of its introduction was to fill the emerging pension gap: Compared to a situation without reforms in 2001 and 2004, the public pension level will be lower by 14.4% in 2030 (Börsch-Supan and Gasche, 2010). Riester pensions are subsidized private saving plans. On basis of the SAVE survey and using official statistics from the Central Benefits Agency, Börsch-Supan et al. (2012) document a higher participation among younger cohorts, who were mainly affected by the pension reforms. Moreover, Riester contracts are widely spread among households with children. In the period between 2002 and 2009 demand for Riester pensions rose, especially after reforms in 2005, among all income groups. While the share of low-income households owning a Riester is still comparably low, this group shows dynamic demand measured as a percentage increase in uptake rates.

This contribution borrows from literature analyzing the variation in stock market participation and applies the insights to pension plans in general and Riester products in particular: It is commonly assumed that individuals face barriers when entering the stock market and differ in their ability to overcome these barriers (see e.g. Delavande et al.,2008; van Rooij et al.,2011). Given that the decision to buy a Riester is complex, individuals might face similar barriers:

First, an individual needs to identify the need to provide privately for old age. Empirical evidence finds that many people do not plan for old age as they consider it an unpleasant task (Lusardi, 2010). A vast amount of further explanations from behavioral economics such as myopic behavior or the lack of self-control can be named.²

Second, individuals need to gather information on relevant pension products. Riester subsidies are bound to eligibility criteria. Basically everyone who is affected by the decreasing statutory pensions is eligible for subsidies, yet the concrete eligibility rules are rather complex (Börsch-Supan et al., 2012, p.4): A distinction is made between direct and indirect eligibility. Directly eligible are employees paying mandatory contributions to social insurance, unemployed and recipients of other wage compensation benefits, self-employed, farmers as well as civil servants. Indirect eligibility is derived from eligibility of the spouse. Chan and Stevens (2008) show that

¹ see Börsch-Supan and Wilke, 2004 and Wilke, 2009 on the pension reform process in Germany.
² see Browning and Lusardi, 1998 for an overview on saving and saving behavior.
only those who are aware of incentives respond to them. Coppola and Gasche (2011) demonstrate that especially low-income households are ignorant of their eligibility for subsidies under the Riester scheme. The authors find that low knowledge of the pension system is correlated with a higher probability to misreport households’ eligibility for the Riester-subsidies.

Moreover Riester pension plans are sufficiently subtle that their advantages are not obvious to everyone: Riester contracts are offered mainly by insurance companies or banks and have to be certified. For certified pension products, subsidies exist in the form of a basic benefit matching the own contribution and a tax deduction. Families with children receive additional money for each child. Families receive 185 euro for each child. For children born after 2007 the additional subsidy amounts to 300 euro.

Low income individuals receive a relatively high subsidy due to the matching basic benefit, higher income individuals profit from the tax deductions. This generates a slight u shaped profile of subsidies (Börsch-Supan and Gasche, 2010). Hence, the subsidies are particularly generous for low income individuals and individuals with children, targeting groups with risk of old age poverty. However, there is widespread misperception of the generosity of the state-subsidy (Coppola and Gasche, 2011).

Third, given that an individual chooses to buy a contract, he/she might find it difficult to decide which Riester product to pick. Saving possibilities are diverse with more than 5000 different certified products (BzSt, 2011). Moreover, there is an ongoing public debate about the intransparency of costs related to the contracts. Hagen and Reisch (2010, p.5) point out the nature of Riester contracts as “trust-goods”, with consumers being unable to evaluate the value of the contract even after the purchase. In fact, miscounseling or bad products are among the main reasons why Riester contracts are terminated or decommissioned (Ziegelmeier and Nick, 2012).

The ongoing discussion of why certain groups do not provide for old age and how successful subsidies are in targeting the population at risk of old age poverty has sparked controversies in the academic world for many years (e.g. Venti and Wise (1990) and Gale and Scholz (1994) on Individual Retirement Accounts in the U.S.). More than ten years after its introduction, a vast amount of research has been undertaken on the topic “Riester pensions”.

The literature on Riester pensions in Germany (see e.g. Coppola and Reil-Held, 2009; Geyer, 2009; Pfarr and Schneider, 2010) has highlighted the following: Riester ownership is significantly influenced by age and income as well as gender. Moreover, individuals living in the east of Germany tend to buy Riester contracts more often. The same is true for individuals with children. Coppola and Reil-Held (2009) add saving motives to their regression and find that an increased importance of the old-age saving motive or saving due to subsidies raises the likelihood to own a Riester contract. The authors’ take this as a sign for the effectiveness of the incentives (Coppola and Reil-Held, 2009, p. 14). Pfarr and Schneider (2010) in turn stress the importance of complementary products in the form of life insurances which they interpret as an indicator for crowding-in, also found in Börsch-Supan et al. (2008). However, existing evidence has not

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3 Families receive 185 euro for each child. For children born after 2007 the additional subsidy amounts to 300 euro.

4 see Blank, 2011 for an overview.
properly taken into account the search and decision costs related to Riester pensions, which might create entry barriers into the Riester market for certain groups. Variables that are related to decision costs such as cognitive ability and the opportunities for learning such as the exposure to information through networks need to be considered (Lusardi et al., 2010).

2.2. Riester pensions and the role of families

By now there is broad consensus that financial literacy influences the decision to save for retirement. Studies of financial literacy find that in particular low income and low educated households as well as women often lack financial literacy and thus, accumulate insufficient retirement wealth. In a multivariate analysis Bucher-Koenen (2011) adds to the usual socio-demographic determinants for Riester ownership measures of financial literacy. The regression results reveal that financial literacy is positively related with any form of private old age provision. In her conclusion the author points out that there is the possibility of omitted variable bias due to missing information on, for example, cognitive abilities. Lusardi (2003) uses data from the Health and Retirement Study in the U.S., which includes direct measures of cognitive ability. She shows that overall people who have not thought about retirement receive worse ability scores.

A common approach to control for cognitive ability as well as preferences is to consider family background information (see Loehlin, 2005). Many individual characteristics related to financial decisions, such as stock market participation have a genetic component. Using a sample of identical and fraternal twins Barnea et al. (2010) decompose variance in investment behavior. The authors find that similarities in investment behavior are to a large extent due to genetic predisposal, even after controlling for a wide range of covariates and the frequency of interaction. Apart from transmission due to genes a number of reasons why members from one family are more alike than randomly selected individuals can be named, such as shared environment resulting in similar role models and peer groups, which in turn influence the taste for saving (Kimball et al., 2009).

Parental education is one way to control for family background. Lusardi et al. (2010) examine financial literacy among the young and find that financial literacy is strongly related to socio-demographics and mothers’ education, which is among other variables- interpreted as a proxy for family financial sophistication. Mothers’ educational attainment also proves to be an important determinant for thinking about retirement (Lusardi et al. 2010; Lusardi, 2003). These studies lack sufficient information on fathers’ educational attainment. Indeed, Loehlin (2005) finds that across studies the correlations between mothers and children are on average higher than the correlation between fathers and their children. However, the still prevalent male breadwinner model in Germany might make fathers the financial decision maker of the household and,

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5 see Lusardi and Mitchell, 2011 for an overview.
6 see Barnea et al. 2010 for an overview.
therefore role models in investment decisions. The fact that men are usually found be financially more literate than women, might reinforce their position (see Lusardi and Mitchell, 2008). It is a priori not clear whether the influence of the father exceeds the influence of mothers’ characteristics on Riester ownership or the other way around.

“Individuals do not instantly learn about economic opportunities, and their environment is a strong determinant of their economic decisions” (Duflo and Saez, 2002 p. 146). Many studies make peer groups the main source of financial advice and contributors to financial decisions (e.g. Brown et al, 2008). Hong et al. (2004) develop a theoretical model with two types of investors, non-social and social ones. Non-social and social investors face fixed participation costs when entering a market, but for the latter group these costs decrease when the participation rate among peers is higher. The model predicts a social multiplier effects due to positive externalities. Guiso et al. (2004) find that households living in high social capital areas, measured as participation rates in elections and blood donation, indeed tend to invest more in stocks. Hong et al. (2004) find that sociable households who interact more with neighbors or attend church are more likely to possess stocks. Using a sample of young Americans, Lusardi et al. (2010) reveal significant relations between peer characteristics and financial literacy.

The main identification problem in such studies is that households are not randomly assigned to peer groups. Sorting and matching is endogenous (Li, 2009). Manski (1993) demonstrates formally the considerations involved in identifying peer effects: First, group members share a common social environment. Second, people with similar preferences are members of the same group. Therefore, correlations between group and individual behavior might reflect other factors than learning (Duflo and Saez, 2002, p. 123). In order to overcome the endogeneity problem, Duflo and Saez (2003) analyze a randomized experiment. They study the role of peer effects in TDA (Tax Deferred Accounts) plan participation using data on employees at a university. The experiment encouraged randomly selected employees of certain departments to attend an information fair which promised rewards for attendance. The authors show that enrollment rates in TDA plans were similar between treated and untreated department a few months after the fair, which they take as evidence for social networks dispersing information.

Without a credible instrument or experiment at hand, an alternative solution to overcome the endogeneity problem is to study families as they are “connected for a purely exogenous reason” (Li et al., 2009, p.5). Prior work has shown that family and friends are of particular importance when it comes to financial advice. Especially in low social capital areas, narrow subgroups such families are considered a valuable and reliable source for information (see Guiso et al., 2004 and references therein). Lusardi (2003) uses a sample restricted to 50-61 year old Americans. She reports that individuals learn to plan for retirement from older siblings and from the experience of old parents. In her descriptive analysis she shows that respondents who do not think about retirement are less likely to have older siblings that could provide advice on preparation for retirement. Moreover, she uses the age difference to the oldest sibling as an instrument for planning in a savings regression. The author claims that this should capture “search and
psychological costs of planning” (Lusardi, 2003, p.8). If the older sibling can give guidance due to his/her own experience, this is considered a straightforward form of planning. It turns out that the age difference to the older siblings indeed is a good predictor for planning and it is significantly and positively related to wealth. Kimball et al. (2009) study the covariance in risk tolerance among siblings and find that it is even stronger than mother-child covariance. As siblings are in the same stage of the life cycle I expect their preferences for old age provision to be very similar. The inter-generational influence should therefore dominate intra-generational correlations in Riester ownership.

As pointed out earlier, the decision to buy a Riester contract is complex. Given that someone within the family has entered the Riester market, he/she can disperse knowledge on eligibility and other related questions and thus, help to overcome information barriers. Therefore I expect strong and positive correlations between Riester ownership of family members going beyond shared preferences. However, shared preferences cannot be disentangled from positive externalities due to information sharing when looking at contemporaneous correlations. Moreover, buying a Riester might be a coordinated family decision. Li (2009, p.5) claims that families are tied by exogenous biological relationships unlike households who are formed through e.g. marriage. However, there are possible scenarios in which investment decisions within families are coordinated. When parents buy a Riester they might give uniform advice to all of their children or children might want to mimic their parents.

In an attempt to solve the endogeneity problem when establishing the effect of social interactions, Li (2009) looks at the sequence of stock market entrance. He finds that the likelihood of entering the stock market within the next five years is higher if the respondents’ parents or children had entered the stock market during the previous five years. The author argues that these findings highlight the importance of information sharing: Stockmarket knowledge and experience acquired by extended family members in the past is assumed to influence ones’ own participation decision. Following this approach I expect not only contemporaneous but also sequential correlations to be pronounced. The likelihood of a family member entering the Riester market should be higher if someone within the family has bought a Riester contract in the previous period, other things held constant.

If positive externalities exist this might create a social multiplier once a critical mass has been reached (Becker and Murphy, 2000; Glaeser et al., 2003). In that case public policy will have a direct effect on individuals and an indirect effect through social interaction, leading to dynamic demand for Riester contracts and a better future coverage of the population with private pensions. When information on eligibility and subsidies is widely dispersed, the family as a source of information should become less important as soon as the group of Riester owners in the population is large enough.

Summing up, I claim that (1) family background is strongly correlated with costs and opportunities and therefore needs to be considered when assessing the determinants of Riester ownership. (2) The influence of mothers’ characteristics as opposed to fathers’ characteristics on
the likelihood to own a Riester contract remains an empirical matter. (3) Contemporaneous and sequential correlations in Riester ownership are pronounced among family members, even after controlling for other factors. While the latter might be due to shared preferences, the former should result from information sharing. (4) As siblings are in the same stage of the life cycle I expect their experiences with Riester contracts to be of key importance. And, (5) as information on eligibility criteria and subsidies are widely dispersed in the general population information sharing within the family should become a less important determinant for Riester ownership.

3. Identification strategy
   3.1. Data and sample

The German Socio-Economic Panel Study (GSOEP) is an annually conducted, representative household panel study. Starting in 1984 with Sample A for West Germany, several extensions have been added to the GSOEP, as for example a new sample consisting of households from the former German Democratic Republic after the reunification in 1990 (Sample C). The structure of the Panel is similar to the American Panel Study of Income Dynamics (PSID). The GSOEP provides information on all household members who reach the age of 17. All persons living in a GSOEP household are asked to fill out an individual questionnaire containing questions about e.g. education, occupation and earnings. Additionally each respondent fills out a biography questionnaire covering information on the life course (e.g. marital history, social background, employment biography etc.). Moreover, there is a questionnaire answered by only one person with questions on the situation of the household as a unit. A question on Riester ownership was part of the individual questionnaire in the years 2004, 2006, 2007 and 2010. The wording is as follows: “Did you subscribe a Riester contract since 31st December 2001?”. The GSOEP traces members of original sample households (see Schonlau et al., 2010 for a discussion on tracing rules). Persons leaving original sample households form new households, consisting of grown children and separated spouses. These households are added to the GSOEP population, including all non-original sample household members. Due to this feature I am able to construct a sample consisting of siblings. In principle, even richer family relationships could be established by matching grandparents and own children. However, the sample size would be rather small. By my definition all persons having the same biological mother are considered to be siblings. They are matched using her identification number. Half-siblings are included as well, as long as they share the same birth mother. Information on the father is associated with each sibling using his identification number.

In summary, individuals who have at least one sibling in the GSOEP and whose mother is already part of the GSOEP population are considered in the sample. Moreover, I restrict the sample to

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7 See Wagner, Frick and Schupp (2007) and Haisken-DeNew and Frick (2005) for a detailed description of the GSOEP.
8 Data was extracted using PanelWhiz (Haisken-DeNew and Hahn, 2010).
siblings aged between 18 and 50 years. As pointed out in section 2, in order to be eligible for subsidies certain criteria have to be fulfilled. As all persons in a household answer the individual questionnaire, I am able to account for eligibility of the spouse which in turn leads to indirect eligibility for the individual under observation. Eligible are all individuals where at least one spouse is an employee subject to social security contributions, pays voluntary social security contributions, is a civil servant or unemployed. For most of my analysis I need a cross section and use wave 2010, that is the latest publically available wave. Later on, when looking at sequential correlations I exploit the longitudinal character of GSOEP and use waves 2004, 2006, 2007 and 2010. The final sample size accounts to 1319 siblings in year 2010.

While the special tracing rules in combination with the length of the panel allow the construction of such a complex sample, attrition is a potential weakness⁹: If only certain siblings remain part of the GSOEP after moving out from their parents, the sample will suffer from sample selection. Because the sample requires the observation of at least two siblings as adults this adds to the extent of the attrition problem (Fitzgerald, 2011). Comparing original sample members and their descendants, Spiess et al. (2008) find no evidence that one group is more volatile in participation behaviour than the other.

Table 1 compares two samples, fulfilling the eligibility and age restrictions, in mean characteristics distinguished by whether an individual has a sibling under observation in year 2010. The left column therefore represents individuals in the sample used for analysis. Overall in both samples the coverage rate is lower than indicated by other studies with almost 32% individuals owning a Riester contract in the Siblings sample. Differences between samples, including the difference in the Riester participation rate of 3.6 percentage points, can be - at least partially- ascribed to the difference in age. While individuals in the siblings sample are on the average 30 years old, the non-sibling respondents are almost 10 years older. Significant differences in marital status and number of children should also be attributed to that. Moreover the age variation in the siblings sample is low by construction. Parents in the siblings sample are on the average better educated, especially the mothers.

Fitzgerald et al. (1998) find that intergenerational correlations in earnings, education and welfare participation are slightly stronger for a subsample of children who did drop out from the PSID and whose parents were already part of the PSID sample. If family ties are especially strong in samples of second generation respondents and the finding can be conferred on the GSOEP population this would imply the following: The inter-generational as well as intra-generational correlations found in my analysis should be understood as an upper bound. In addition the defined network in my analysis will be justified. The family indeed is a relevant peer group.

⁹see Kroh (2011) for an analysis of attrition in the GSOEP.
In this paper, I focus on the use of family information as one possibility of mitigating endogeneity problems when assessing the determinants of Riester ownership. I estimate a series of logistic and complementary loglog regressions\textsuperscript{10}, modeling the likelihood of having a Riester contract.

For reasons of comparison I first estimate a baseline model. The dependent binary variable indicates whether the individual owns a Riester contract. As explanatory variables, captured

\textsuperscript{10} See Wooldrige, 2002 for logistic regressions and Jenkins, 2005 for cloglog regressions.
under $X$, I include socio-economic characteristics that are usually found to be significantly correlated with the ownership of private pensions and in particular with Riester contracts. These controls contain the educational attainment, whether or not an individual has children, is married male, and is located in West Germany. Moreover, I include household net income divided into quintiles, age as well as age squared in order to account for non-linear effects due to affectedness of the pension reforms. $\varepsilon$ is a standard normal error. The reference period is 2010, the latest available wave.

$$\Pr(Riester) = \beta_0 + X\delta + \varepsilon$$

I expect the coefficients in the baseline specification to be biased upwards. As argued in section 2, family background should be highly correlated with the costs and opportunities for buying a Riester contract. For instance, inherited cognitive ability will not only correlate with educational attainment (Becker, 1964) but also influence how easily information regarding Riester contracts can be obtained and processed. In order to reduce the bias, I (1) estimate a family fixed effects model and, (2) include proxy variables for family background. Both strategies have its advantages and shortcomings and allow for different interpretations:

The first strategy exploits the idea that - at least part of - the unobserved heterogeneity is common to members of one family. Under this assumption the difference in unobserved characteristics should be lower within than between families. Index $s$ identifies a sibling while $f$ denotes the family. The error term is split into two components, $\alpha_f$ and $\varepsilon_{sf}$. Explanatory variables captured under $X_{sf}$ are assumed to be correlated with the family specific component $\alpha_f$, but not with the idiosyncratic error $\varepsilon_{sf}$. The idiosyncratic error needs to be strictly exogenous after taking out $\alpha_f$. This assumption must hold for all regressors included (Wooldridge, 2002, p. 421). The fixed effects transformation will eliminate all effects which do not vary within the same family by subtracting the family averages (eq. 3).

$$\Pr(Riester_{sf}) = \beta_0 + X_{sf}\delta + \alpha_f + \varepsilon_{sf}$$

$$\Pr(Riester_{sf} - Riester_s) = (X_{sf} - \overline{X}_s)\delta + \varepsilon_{sf} - \varepsilon_s$$

By taking differences measurement errors are amplified which might lead to attenuation bias (Grilliches, 1977). The bias resulting from comparison across siblings is nevertheless lower than comparing individuals across time (Schnabel and Schnabel, 2002, p. 9). Moreover standard errors are large due to the large number of parameters that have to be estimated (Schnabel and Schnabel, 2002, p.9). In addition the family-fixed effects model is applicable only if the outcome variable of interest varies across siblings. Under the assumption of shared preferences the dependent variable might lack variance. Nevertheless, the family-fixed effects model is valuable: It reflects pure individual decisions to buy a Riester contract as opposed to coordinated family decisions by disentangling genetic influences from individual characteristics.

11 Notation is analogous to Schnabel and Schnabel (2002).
In the model above the family fixed effect is treated as a nuisance parameter (Durlauf and Ioannides, 2010, p. 465). Yet, it is interesting to study the influence of the family in a more direct way in order to understand the influence of predisposal. In an attempt to partially capture unobserved components in the error term $\epsilon$ I extend the baseline model and include proxies for cognitive ability and preferences, namely the highest completed training of the mother and father respectively. As pointed out above, whose characteristics are more strongly correlated with the outcome variable remains unclear. More specifically I control for whether each parent has completed vocational training or a college degree. Parents with no degree or training constitute the reference group in Tables 2 and 3.

Information advantages might result in a higher likelihood to buy a Riester contract. In order to test that, I gradually add more variables to the previous model to see the individual contribution of each variable. First, I include a dummy indicating whether parents or siblings have a Riester contract. Then, in order to distinguish between inter-generational and intra-generational transmission, I differentiate between whether one of the parents or whether one of the siblings has a Riester contract. As siblings are in the same stage of the life cycle I expect the respective coefficient to exceed the estimated coefficients for parental Riester ownership in magnitude.

The added variables are endogenous to the model. It does not allow disentangling shared preferences from whether information sharing took place. In order to partially overcome the identification problem, I focus on sequential correlations. The underlying idea is that in $t=0$ no family member owns a Riester contract. For some exogenous reasons the first sibling buys a Riester contract in the period between $t=0$ and $t=1$. Then information sharing takes place during the next period, lowering the entry barrier for the other siblings. In $t=2$ the next sibling has bought a Riester contract until in infinity all siblings own such a private pension plan (Graph 1).

![Figure 1: Information sharing within the family over time](image)

If sequential correlations are only due to information sharing the identification assumption requires that the factors influencing the decision of the one sibling between $t$ and $t+1$ are not correlated with the decision of the other siblings made after $t+1$ (Li, 2009, p.8). Unless I am willing to make the assumption above, shared preferences might still play a role. As pointed out in Manski (1993) isolating social interaction parameters is almost impossible in the absence of full randomization. Even so the model gives strong suggestive evidence on network effects.
Equation 4 represents a piecewise constant hazard function which is estimated by complementary loglog regressions (see Singer and Willet, 1993; Jenkins, 2005). γ contains year dummies. A discrete-time hazard model consist of (a) a baseline risk profile over time and (b) shift parameters that capture the effect of the covariates on the baseline risk. The higher the hazard, the greater the risk to buy a Riester contract in a given year. In order to identify predictors for differences in hazard, I include further variables than time: The main variable of interest is the one-period lag of whether a sibling has bought a Riester contract. Variation in the covariates acts to vertically displace the entire baseline hazard function. Three assumptions must hold in a simple discrete-time hazard model (Singer and Willet, 1993): linearity, no frailty and proportionality. Proportionality assumes that the vertical shift in the hazard rate per unit difference in the predictor is the same in ever year (Singer and Willet, 1993). However I have reason to believe that the family as a source of information has a time-varying effect if a critical mass has been reached. Therefore interaction terms with time are included.

\[ \Pr(Riester) = \beta_0 + \beta_1 Riester_{-sibling_{t-1}} + X \delta + time \gamma + \epsilon \]

4. Results

I estimate a series of logistic and complementary loglog regressions, modeling the likelihood of having a Riester contract. Standard errors have been adjusted for heteroskedasticity, allowing for clustering at the level of the mother. Tables 2 and 3 report odd ratios. To gain further understanding of the economic significance of my findings, I report marginal effects in the Appendix.

Table 2 displays odd ratios for the baseline model (column 1), the family-fixed effects model (column 2) as well a model including parental education as proxies for family background (column 3). Columns 4 and 5 extend the latter model by controlling for contemporaneous correlations in Riester ownership between family members.

In order to estimate the family fixed effects model the sample size is decreased from 1319 to 451 observations. The observations had to be dropped because there is no variation in the outcome variable Riester across siblings, suggesting that shared preferences, coordinated decisions and information sharing do play a role: In 868 cases either every sibling owns a Riester by 2010 or no one does.

In contrast to other findings (Coppola and Reil-Held, 2009, Pfarr and Schneider, 2010) individuals who are married or have children are not more likely to buy a Riester contract in my sample. This might be due to the low average age of the sample population which also leads to a neglect of an age effect.

The family fixed effect model is in line with existing literature finding that people in the east of Germany are more likely to buy Riester pensions. One of the reasons named is the lower
coverage with occupational pensions in East Germany (Kriete Dodds, 2009). While the marginal effect is especially large in this model, it is not significant in the others. Evidence suggests that the precautionary saving motive is of great importance in the East (Fusch-Schündeln, 2009). The difference between models might reflect a self-selection process: Siblings choosing to live in the east given that their siblings do not might have a strong taste for saving for old age.

Education is an important determinant for Riester ownership: Especially individuals with a medium degree (Realschulabschluss) are more likely to buy a Riester contract in comparison to individuals without a schooling degree. The effects of education however turn insignificant in the family fixed effects model. This might be partially explained by a lack of variance in educational attainment between siblings. However, controlling for family background in the proxy model I also conclude that the effect of education on participation in the Riester market is lower than I would have concluded in the baseline model: Using a sample of twins, Barnea et al. (2010, p. 601) find that education is relevant for stock market participation, but it is mainly the genetic factor of education that is important.

Income is positively correlated with the likelihood owning a Riester pension. The coefficient is not significant for individuals in the 5th income quintile, probably, as they invest in other products generating higher returns. The significance of income on the likelihood to buy a Riester contract is most pronounced in the second column: Meaning that after controlling for effects that are fixed over siblings, such as cognitive ability and the social environment when being young, income is the main driver for an individual to buy a Riester pension, next to living in East Germany. Interestingly the coefficients do not differ much between the baseline and the proxy model which might indicate that parental occupational training only captures part of the unobserved heterogeneity.

Turning to the added explanatory variables in column 3, I find that mothers’ training is not a significant determinant for Riester ownership, while fathers’ is. Individuals’ whose father has completed vocational training or holds a college degree are more likely to buy Riester contracts. This is opposed to the usual finding that the characteristics of the mother are stronger determinants for the behavior of their children (Loehlin, 2005). However in investment decisions the fathers seem to be a stronger influence. As mentioned above, the fact that still fathers are the main earner in families might make fathers role models in financial decisions. In addition a common finding in financial literacy literature is that men have higher financial literacy than women (see e.g. Lusardi and Mitchell, 2008). This might strengthen their position as the person in charge of the households’ finances.

Extending the proxy model in column 4 by a further control variable, namely a dummy indicating whether or not someone within the family own a Riester contract, significantly improves the model fit as confirmed by a likelihood ratio test for nested models. The marginal effect of the added dummy even exceeds the influence of one’s own and fathers’ education. Even though siblings tend to be in the same stage of the life cycle and hence should have very similar preferences, the intra-generational contemporaneous correlations in Riester ownership are not
statistically significant different from the inter-generational correlations in column 5. The coefficient belonging to whether parents have a Riester is even slightly higher. This is in line with results by Li (2009) who finds that information sharing among siblings is less pronounced than between parents and their children. The purchase of Riester contracts might be coordinated within families with parents giving advice. Moreover the influence of parents on their children might be large in my sample as the individuals are rather young.
Table 2: Results after logistic regressions (odd ratios)

<table>
<thead>
<tr>
<th>Variable</th>
<th>baseline model</th>
<th>fixed effects</th>
<th>proxy 1</th>
<th>proxy 2</th>
<th>proxy 3</th>
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<tbody>
<tr>
<td>male</td>
<td>0.820</td>
<td>0.785</td>
<td>0.813</td>
<td>0.808</td>
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<tr>
<td></td>
<td>(0.103)</td>
<td>(0.170)</td>
<td>(0.103)</td>
<td>(0.103)</td>
<td>(0.104)</td>
</tr>
<tr>
<td>age</td>
<td>0.960</td>
<td>1.114</td>
<td>0.958</td>
<td>0.981</td>
<td>0.986</td>
</tr>
<tr>
<td></td>
<td>(0.060)</td>
<td>(0.173)</td>
<td>(0.061)</td>
<td>(0.062)</td>
<td>(0.063)</td>
</tr>
<tr>
<td>agesq</td>
<td>1.001</td>
<td>0.998</td>
<td>1.001</td>
<td>1.000</td>
<td>1.000</td>
</tr>
<tr>
<td></td>
<td>(0.001)</td>
<td>(0.002)</td>
<td>(0.001)</td>
<td>(0.001)</td>
<td>(0.001)</td>
</tr>
<tr>
<td>west</td>
<td>0.983</td>
<td>0.083*</td>
<td>1.084</td>
<td>1.059</td>
<td>1.084</td>
</tr>
<tr>
<td></td>
<td>(0.159)</td>
<td>(0.0956)</td>
<td>(0.182)</td>
<td>(0.170)</td>
<td>(0.169)</td>
</tr>
<tr>
<td>no degree</td>
<td>ref.</td>
<td>ref.</td>
<td>ref.</td>
<td>ref.</td>
<td>ref.</td>
</tr>
<tr>
<td>Hauptschule</td>
<td>1.715*</td>
<td>0.757</td>
<td>1.779*</td>
<td>1.682*</td>
<td>1.622*</td>
</tr>
<tr>
<td></td>
<td>(0.398)</td>
<td>(0.314)</td>
<td>(0.412)</td>
<td>(0.388)</td>
<td>(0.371)</td>
</tr>
<tr>
<td>Realschule</td>
<td>2.283***</td>
<td>1.648</td>
<td>2.128***</td>
<td>2.026**</td>
<td>1.965**</td>
</tr>
<tr>
<td></td>
<td>(0.496)</td>
<td>(0.687)</td>
<td>(0.465)</td>
<td>(0.440)</td>
<td>(0.428)</td>
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<tr>
<td>Abitur</td>
<td>1.929**</td>
<td>1.985</td>
<td>1.726*</td>
<td>1.689*</td>
<td>1.693*</td>
</tr>
<tr>
<td></td>
<td>(0.430)</td>
<td>(0.915)</td>
<td>(0.394)</td>
<td>(0.386)</td>
<td>(0.386)</td>
</tr>
<tr>
<td>married</td>
<td>1.318</td>
<td>1.485</td>
<td>1.333</td>
<td>1.299</td>
<td>1.291</td>
</tr>
<tr>
<td></td>
<td>(0.231)</td>
<td>(0.469)</td>
<td>(0.236)</td>
<td>(0.230)</td>
<td>(0.239)</td>
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<tr>
<td>child under 16</td>
<td>1.167</td>
<td>1.137</td>
<td>1.215</td>
<td>1.209</td>
<td>1.213</td>
</tr>
<tr>
<td></td>
<td>(0.180)</td>
<td>(0.337)</td>
<td>(0.191)</td>
<td>(0.189)</td>
<td>(0.190)</td>
</tr>
<tr>
<td>income q1</td>
<td>ref.</td>
<td>ref.</td>
<td>ref.</td>
<td>ref.</td>
<td>ref.</td>
</tr>
<tr>
<td>income q2</td>
<td>1.697*</td>
<td>1.716</td>
<td>1.714*</td>
<td>1.727*</td>
<td>1.666*</td>
</tr>
<tr>
<td></td>
<td>(0.369)</td>
<td>(0.633)</td>
<td>(0.372)</td>
<td>(0.377)</td>
<td>(0.365)</td>
</tr>
<tr>
<td>income q3</td>
<td>1.589*</td>
<td>2.294*</td>
<td>1.588*</td>
<td>1.609*</td>
<td>1.602*</td>
</tr>
<tr>
<td></td>
<td>(0.342)</td>
<td>(0.888)</td>
<td>(0.344)</td>
<td>(0.349)</td>
<td>(0.347)</td>
</tr>
<tr>
<td>income q4</td>
<td>1.927**</td>
<td>2.969*</td>
<td>1.899*</td>
<td>1.881**</td>
<td>1.858**</td>
</tr>
<tr>
<td></td>
<td>(0.389)</td>
<td>(1.265)</td>
<td>(0.383)</td>
<td>(0.378)</td>
<td>(0.375)</td>
</tr>
<tr>
<td>income q5</td>
<td>1.315</td>
<td>1.133</td>
<td>1.272</td>
<td>1.293</td>
<td>1.291</td>
</tr>
<tr>
<td></td>
<td>(0.278)</td>
<td>(0.476)</td>
<td>(0.270)</td>
<td>(0.272)</td>
<td>(0.272)</td>
</tr>
<tr>
<td>mother: no degree</td>
<td>ref.</td>
<td>ref.</td>
<td>ref.</td>
<td>ref.</td>
<td>ref.</td>
</tr>
<tr>
<td>mother: vocational training</td>
<td>1.196</td>
<td>1.173</td>
<td>1.152</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.202)</td>
<td>(0.185)</td>
<td>(0.180)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>mother: college degree</td>
<td>1.231</td>
<td>1.230</td>
<td>1.193</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.331)</td>
<td>(0.308)</td>
<td>(0.292)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>father: no degree</td>
<td>ref.</td>
<td>ref.</td>
<td>ref.</td>
<td>ref.</td>
<td>ref.</td>
</tr>
<tr>
<td>father: vocational training</td>
<td>1.635*</td>
<td>1.613*</td>
<td>1.619**</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.323)</td>
<td>(0.300)</td>
<td>(0.302)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>father: college degree</td>
<td>1.661</td>
<td>1.659*</td>
<td>1.636*</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.440)</td>
<td>(0.414)</td>
<td>(0.403)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Riester: in family</td>
<td>1.854***</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.293)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Riester: parents</td>
<td></td>
<td>1.829***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.292)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Riester: siblings</td>
<td></td>
<td>1.813***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.320)</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

N: 1319, 451, 1319, 1319, 1319

Exponentiated coefficients, cluster-robust standard errors in parentheses. * (**,***), Significant at 10% (5%, 1%).
As explained above contemporaneous correlations alone, even after controlling for all other covariates, do not allow disentangling shared preferences from information sharing which in turn should result in lower transaction costs. Table 3 therefore displays results after complementary loglog regressions, taking into account sequential correlations. The model in column 1 includes only time dummies. Column 2 and 3 extend the previous model by adding a lagged dummy for whether a sibling has bought a Riester contract in the previous period (column 2). As to account for non-proportionality in the effect of the main variable of interest over time, i.e. the lagged Riester contract dummy, I include interaction terms in column 3.

If the risk of event occurrence would be independent of time the hazard function would be flat (Singer and Willet, 1993). However, positive externalities in the form of information advantages should help to overcome entry barrier in the Riester market and create a social multiplier (Becker and Murphy, 2000; Glaeser et al., 2003) which should result in dynamic demand for Riester contracts. Indeed the hazard of buying a Riester contract significantly increases with time during the period 2004 and 2010. There is a large increase in the hazard rate between 2004 and 2006 which is probably the result of the simplification in course of the Riester reform in 2005 kicking in. The complexity of the eligibility rules and the subsidy design as well as the intransparency of the costs did constitute entry barriers. Official statistics confirm a dramatic increase after the legislative changes (BMAS, 2011).

Given that a sibling had bought a Riester contract in the previous period significantly elevates the likelihood of buying a Riester. Considering interaction terms with time however shows that information sharing within the family becomes less important over the years. Once a critical mass has been reached positive spillovers create a social multiplier (Glaeser et al., 2003). The family as a source of information becomes less important as soon as the group of Riester owners in the population is large enough. As a matter of fact the rate of increase in Riester uptakes flattened after 2008 and some socio-demographic strata may have reached saturation levels (Börsch-Supan et al., 2012).
Table 3: Results after cloglog regression

<table>
<thead>
<tr>
<th>Year</th>
<th>Column 1</th>
<th>Column 2</th>
<th>Column 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>0.0915***</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.008)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2006</td>
<td>0.162***</td>
<td>0.168***</td>
<td>0.161***</td>
</tr>
<tr>
<td></td>
<td>(0.011)</td>
<td>(0.012)</td>
<td>(0.013)</td>
</tr>
<tr>
<td>2007</td>
<td>0.223***</td>
<td>0.202***</td>
<td>0.191***</td>
</tr>
<tr>
<td></td>
<td>(0.014)</td>
<td>(0.013)</td>
<td>(0.014)</td>
</tr>
<tr>
<td>2010</td>
<td>0.382***</td>
<td>0.346***</td>
<td>0.379***</td>
</tr>
<tr>
<td></td>
<td>(0.020)</td>
<td>(0.024)</td>
<td>(0.027)</td>
</tr>
<tr>
<td>Riester: sibling (t-1)</td>
<td>2.074***</td>
<td>2.074***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.262)</td>
<td>(0.262)</td>
<td></td>
</tr>
<tr>
<td>Riester: sibling (t-1)* 2006</td>
<td></td>
<td>2.591***</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.515)</td>
<td></td>
</tr>
<tr>
<td>Riester: sibling (t-1)* 2007</td>
<td></td>
<td>2.536***</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.388)</td>
<td></td>
</tr>
<tr>
<td>Riester: sibling (t-1) *2010</td>
<td></td>
<td>1.538**</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.222)</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>6644</td>
<td>3595</td>
<td>3595</td>
</tr>
</tbody>
</table>

Exponentiated coefficients, cluster-robust standard errors in parentheses.
* (**,***), Significant at 10% (5%, 1%).

5. Conclusion

In this paper I use information on family background in order to give a reliable assessment of the determinants of Riester ownership and to capture the impact of information sharing within families. I find that family background significantly influences the likelihood of owning a Riester pension, in particular fathers’ education. Omission will give misleading results: The influence of educational attainment is overstated in the baseline results. Controlling for family background I also conclude that the effect of education on participation in the Riester market is lower than I would have concluded otherwise. Existing evidence confirms that it is mainly the genetic factor of education that is important (Barnea et al., 2010). Income and living in the east of Germany are the main drivers for an individual to buy a Riester pension, its importance is not probably reflected in the baseline model. Especially low income individuals are less likely to own a supplementary private pension.

Contemporaneous as well as sequential correlations in Riester ownership between parents and their children as well as siblings are pronounced, even after controlling for other factors. While the former might be due to shared preferences, I take the latter as evidence for information sharing. Positive externalities help to overcome entry barriers in the Riester market by dispersing information on eligibility and the generosity of subsidies. Once a critical mass has been reached
positive spillovers create a social multiplier (Glaeser et al., 2003) which should result in dynamic
demand for Riester contracts. The family as a source of information indeed seems to become less
important with time.

The findings suggest that positive externalities exist and might even create a social multiplier. An
optimistic interpretation is that the more time elapses since the pension reforms, the higher the
coverage with private old age provision. Combining the results however draws another picture: If
only certain groups get in touch with information on and, hence engage in voluntary old age
provision wealth inequality might rise. While lowering the entry barriers for Riester pensions
through further simplifications and more transparency is certainly a promising way in order to
avoid old age poverty, public policy needs to tie in with the first step in the decision to buy a
private pension: First people need to identify the need to provide for themselves. Raising
awareness through better information and educational programs is therefore of first priority.
References


Wilke, Christina B. 2009. “German Pension Reform”. Sozialökonomische Schriften, 34.
