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Financial Crisis, Confidence in Financial Markets and Participation in Private Pension Plans in Germany

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Abstract. The financial crisis of 2008/2009 has not only left its mark on the value of retirement savings, but also on savings and investment behaviour. It has led to a loss of confidence in financial markets and its main protagonists. However, trust is a key mechanism for savings and investment decisions. We illustrate the loss of trust by looking at the number of pension plans purchased in the years following the financial crisis.

The paper is based on data of the study on 'Life courses and old-age provisions' (LeA, Lebensverläufe und Altersvorsorge). The data was gathered in 2016 and provides information on the life histories of people living in Germany who were born between 1957 and 1976, as well as on pension entitlements in all three pillars of the German pension system. The analysis concentrates on so-called Riester pension plans, the most dynamic private pension scheme in Germany. We estimate a panel fixed-effects logit model to examine whether the financial crisis had an impact on the participation in Riester pension plans. Results show that instead of a shock effect relating to the crisis years, we see a negative linear effect following the crisis.

Keywords: old-age security, savings behaviour, financial crisis, confidence, private pensions

1. Introduction

Since almost two decades, the German pension system embraces a multi-pillar philosophy including substantial participation in the voluntary second and third pillar pension schemes. In this setting, the financial crisis of 2008/2009 can be seen as a major threat to future old-age security. Surprisingly, the effects on assets and pension savings were

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found to be less grave than expected (Börsch-Supan et al., 2009a). However, apart from the actual loss of savings there is a strong possibility that people change their savings behaviour after a major shock like the financial crisis of 2008/2009.

We argue that confidence in financial markets plays a major role in the decision process relating to voluntary pension plans. With this theoretical assumption we can use the trend in participation, or, more precisely, the number of voluntary pension plans purchased in the years after the financial crisis, as a proxy measure for confidence in financial markets. This leads us to formulate the broad research question: Did the financial crisis of 2008/2009 have an impact on the purchase of voluntary private pension plans? In our analysis we focus on so-called Riester pension plans, a special, subsidised form of voluntary private pension insurance in Germany. Riester pension plans were introduced in the reform process leading to the multi-pillar system, which is in place in Germany today, and since then have constituted the most dynamic form of voluntary private pension insurance in Germany.

The main focus in Riester pension plan research is the question who does or does not purchase Riester contracts and why these groups do not purchase any. Among others, reasons for not purchasing Riester contracts might be confusing administration, less financial literacy, a lack of market transparency and high closing costs (Börsch-Supan et al., 2016). We, however, emphasise the broader setting in which financial decisions are made and want to elaborate the idea how changed perceptions on how financial markets work, triggered by the financial crisis 2008/2009, shape a loss of confidence and influence savings behaviour.

2. Political background and institutional framework

Since the 1990s, there has been a political will to reform the statutory pension insurance (SPI) in Germany. A three-pillar system of old age security was introduced and the role of the financial markets in providing adequate standards of living in old age was expanded. The step was justified, among other things, by the expectation that the returns of the financial markets would be higher than those in the pay-as-you-go system (Lamping & Tepe, 2009; Wagner, 2012). Adequate standards of living in old age were now to be achieved through an interplay of the SPI with occupational pension plans and state subsidised private old-age pension provisions (Lamping & Tepe, 2009; Werding, 2015).

The so-called Riester pension scheme was introduced to compensate for a reduced level of benefits in the SPI. The participation in Riester pension plans is voluntary, and the clients can choose from many different plans and contract providers. State subsidies in the form of a set bonus or tax benefits are granted to people who are affected by the reform of the SPI. The set bonus, which also depends on the number of children, is meant to encourage and assist people who have a lower ability to save, e.g., families or people with low incomes (Börsch-Supan et al., 2016). In addition, the state regulates Riester pension plans by defining minimum requirements: for example, the provider has to guarantee a minimum return and life-long payments (Lamping & Tepe, 2009).

The participation in Riester pension plans started slowly after 2001 despite extensive funding, so subsequent reforms in 2004 and 2007 aimed to simplify certification and the application process for the state subsidies (Börsch-Supan et al., 2016). A dynamic spread of Riester pension plans could then be observed since mid-2005. The participation rate among eligible households was approximately one third just before the financial crisis at the end of 2007 (Gasche & Ziegelmeyer, 2010). The dynamic trend flattened in the years following the financial crisis and the total number of Riester contracts increased only slightly (Nullmeier, 2015). This stagnating trend might be interpreted as an indication of market saturation. However, we follow the argument of Gasche and Ziegelmeyer (2010), that saturation tendencies would be questionable with a participation rate of only one third. Since the stagnation occurs at the same time as the financial crisis, we rather assume that the crisis has interrupted the original momentum.

3. Theoretical considerations and related empirical literature

In general, the financial market-based pension provision schemes showed lower losses than expected. As an explanation, several authors offer the defensive investment structure with a low equity component in private pension provisions in Germany (Börsch-Supan et al., 2009a, b; Raffelhüschen & Vatter, 2010; Ehler & Haak, 2011). To give an illustration of the extent of losses, Börsch-Supan et al. (2009a) showed that the relative wealth loss of financial assets was 8.5% on average in 2008, when compared to a hypothetical situation without the financial crisis. Losses were higher when the proportion of shares in the portfolio was greater. Households with higher incomes and assets, and households with older people were affected by somewhat greater losses. The latter group might pose a problem, as retirees or people close to pension age have less time to compensate for their losses. However, the authors also claim that actual old-age provisions were only marginally affected with average losses of 3% (Börsch-Supan et al., 2009a). They list three reasons for this. Firstly, the share of equities in private old-age provisions in Germany was relatively low. Secondly, private old-age schemes have a long-term investment horizon and are mostly able to compensate for large, short-term shocks. And thirdly, there is additional smoothing through regular deposits and withdrawals over a long period of time for these schemes.[1]

Even though losses were relatively small, the financial crisis has made people aware of investment risks they previously turned a blind eye to: the possibility of losing accumulated savings as well as possible falls in returns due to a financial crisis. Investments in financial markets seemed more uncertain and complex than before. Knowledge about past losses or the expectation of possible future losses lead to an atmosphere of mistrust, and decisions to save would have been postponed (Benz et al., 2009; Beckert, 2010). Furthermore, perception and reality of these losses often diverged. Benz et al. (2009)

[1] Not only Börsch-Supan et al. (2009a) describe these arguments and results. Similar statements can be found in Raffelhüschen and Vatter (2010).

show that perceived losses were (much) larger than actual losses due to constant crisis reporting and a lack of individual financial literacy.

Postponing an investment decision can be termed a "wait-and-see approach" which is also supported by other findings (Börsch-Supan et al., 2009b): expectations about the general economic situation and about individual economic situations had deteriorated following the financial crisis. Nevertheless, a large proportion of households had not yet adjusted their savings behaviour in the early summer of 2009. The authors interpret this as indecisiveness and point to the particularly uncertain – for people at that time – future development. There might be other reasons why households had not taken action yet. Maybe they were not yet affected or did not yet notice that they were affected, or maybe they were generally unsettled by the circumstances and preferred to wait and see before acting (Börsch-Supan et al., 2009b).

The concept of trust received a lot of attention in the media and in academic debates covering the financial crisis. Often, its importance as a bonding element in financial markets and as a key mechanism for savings and investment decisions was pointed out (Beckert, 2006; Fleck & von Lüde, 2018). To provide a theoretical foundation and explain why people take a step back in the purchase of Riester pension schemes in the context of the financial crisis, we draw on Beckert's elaborations about confidence, trust, fictional expectations and the embeddedness of economic action (Beckert, 2005; 2006; 2010; 2013a; 2013b).

We understand 'trust' as a person's expectation towards another person that they will not disappoint by withdrawing their promised action, despite already having received an advance performance (Beckert, 2005; 2010). We use 'confidence' as a more general term to emphasise the uncertain future as a whole onto which peoples' expectations are projected. It signifies an interpersonal form of trust at the macro level, e.g., in institutions. Trust is considered as a specific form of confidence relating to social interactions on the micro level (Beckert, 2006; Fleck & von Lüde, 2018).[2] Confidence and trust reduce the complexity of a situation and open up room for (economic) cooperation.

Beckert argues that economic decisions are anchored in fictions which help to reduce uncertainty. The fictions refer to an imagined future, to how people believe the world might look like. In order to reduce uncertainty and take decisions, people pretend that this possible future will actually occur (Beckert, 2013b). Fictional expectations enable people to make decisions despite the unpredictability of the future and despite incompleteness of information: narrations like stories, theories or discourses help the individual by providing good reasons for a certain decision. They create future images of technical developments, consumer preferences, the trustworthiness of promises, political regulations and so on, and, of course, of possible interdependencies between such factors (Beckert, 2013b). An example of a narration might be a rating agency assessing the creditworthiness of a country. Narrations do not need to be empirically true or to predict the

[2] For further discussions on distinguishing between confidence and trust, see, e.g., Beckert (2005; 2006), Florian (2015), Fleck and von Lüde (2018).

future correctly, but they are perceived as being trustworthy in the present. Meanwhile they are open to manipulation by other actors. Despite this contradictory nature of narrations, people believe that their expectations will be rewarded or that (at least) their disappointment will be tolerable (Beckert, 2013a; 2013b).

Fictional expectations do not exist in a societal vacuum but are embedded in the social macrostructure of institutions, networks and cultural frameworks, which are sources of emergence as well as supporters of such narrations. Various actors, such as companies, government institutions, lobbying associations, or media influence expectations of the future on a daily basis and act as guides for action in the present (Beckert, 2010; 2013b). Financial markets and economic action are a particularly good example, since an investor's profit is directly related to their ability of shaping expectations or of convincing people of a certain fiction. At the same time – on the aggregate, macro level – fictional expectations and confidence will influence and (de-)stabilise economic processes, such as the trend in purchasing Riester pension schemes (Beckert, 2013b).

The original narrative of funded pensions before the financial crisis included a shared idea about profit growth and investments with good returns, and a sizeable bank going bankrupt was unthinkable. Even when there were indications of increasing risks, stories and discourses retained that certain banks were too big to fail, the state would stabilise the system, and investors would know when to stop (Priddat, 2010).

The introduction of the Riester pension scheme was entirely in line with this narrative and with predominant economic theories (Wagner, 2012). Confidence in the financial market was high, fictional expectations were built in a positive and promising atmosphere and everyone wanted to take part in it. This atmosphere spilled, for example, via bank advisors, institutions like consumer advice centres and media reports into the personal environment and encouraged people to purchase Riester pension plans. Events around the financial crisis have shaken the perceptions on how financial markets work and in the course of events fictional expectations have also changed. The financial crisis has challenged the widely accepted financial market theory and the efficient market hypothesis (Senge & Beyer, 2018). Previously trusted institutions, like the European Central Bank, have lost credibility and it is hard for financial advisors to build positive fictional expectations about these institutions again without major political regulation.[3] Furthermore, not only the general narrative of the economic system worsened, but also narrations about Riester pension plans in particular: critics felt that administrative costs were too high, prospects for returns were low and there was a lack of transparency (Börsch-Supan et al., 2016). These narrations shaped fictional expectations about Riester pension plans negatively in various ways: Public, political and academic discourse revolved around a modification of Riester pension plans or asked to abolish the scheme. Even if actual asset losses were small, the shock of the financial crisis has incurred a loss of con-

[3] There is empirical evidence that confidence in important European institutions deteriorated after the financial crisis (Roth, 2009; 2014).

fidence in the safety of savings as well as in expected returns, and therefore weakened participation intentions in financial market-based pension provisions. People re-evaluate their information in the light of the changed narrative and expect that their potential for disappointment might be higher than they are prepared to tolerate.

We argue that the financial crisis of 2008/2009 has not only left its mark on the value of (private) retirement savings, but also on savings and investment behaviour itself.[4] People take a step back, wait, and see before they cast a vote of confidence and purchase a Riester pension plan. We illustrate this loss of confidence by looking at the number of Riester pension plans purchased in the years following the financial crisis. Since changing narratives and new fictional expectations would need some time to evolve, we expect a time-delayed effect of the financial crisis.

4. Methods

4.1 Data and sample population

This paper is based on data from the study on 'Life courses and old-age provisions' (LeA, Lebensverläufe und Altersvorsorge). The study was commissioned by the German Federal Pensions Insurance and the Federal Ministry of Labour and Social Affairs. The LeA survey was based on a representative sample from the population register. The target population of LeA were people living in Germany of the birth cohorts of 1957 to 1976. The LeA data contains detailed information on their life histories and on pension entitlements in all three pillars of the German pension system. Additionally, the same information was collected for partners, irrespective of their age. Detailed information on the design and the main results of the LeA study can be found in Czaplicki et al. (2019).

In our analyses, we use monthly information on the employment status and on wages in the form of accrued pension points.[5] We aggregate the monthly data to a yearly level, as the survey only collected the year in which respondents purchased a new private pension plan. The analysis covers the time from the beginning of 2005 until the end of 2015. We reduced the sample to people who will be most affected by the pension reforms at the beginning of the 21st century. The people most affected are what we call the main clientele of the SPI: people who will receive a first pillar pension from the SPI and not from other first pillar schemes. We therefore excluded respondents who are members of other German first pillar pension schemes such as the civil servants pension scheme, special pension schemes for certain professions and the pension scheme for farmers. We also excluded respondents who receive an invalidity pension, as they will not have many possibilities to save for old age. After deleting cases with missing values, we are left with 4 893 respondents of whom 834 can be considered in the analysis because they

[4] This argument can also be found in Gasche and Ziegelmeyer (2010) or Ehler and Haak (2011).

[5] The information on wages is right censored, as wages are only subject to contributions up to a set maximum in the German statutory pension system (contribution ceiling in 2021 was 7 100 Euro per month).

have purchased at least one Riester pension plan in the time of interest to the analysis.[6] Our panel is unbalanced, the regression is based on 8.571 observations with an average number of 10.3 observations per person.

4.2. Variables

The dependent variable *Riester* is a binary indicator which is equal to one if a respondent purchased a Riester pension plan in that specific year. In our sample, the share of Riester contracts purchased in relation to the total number of voluntary third pillar contracts is approximately two thirds between the year 2002 and 2015. Multiple events can occur, which means the people can purchase more than one Riester pension plan. The maximum number of Riester pension plans purchased by an individual was three. Our main explanatory variables are *Crisis* and *Years after crisis. Crisis* is a binary indicator equal to one for 2008 and the following years, *Years after crisis* counts years after the crisis.[7] The combination of a binary and a continuous crisis variable allows us to separate the behavioural response after the crisis in an immediate, permanent one and a change in slope, which increases with time (Allison, 1994: 177-178).

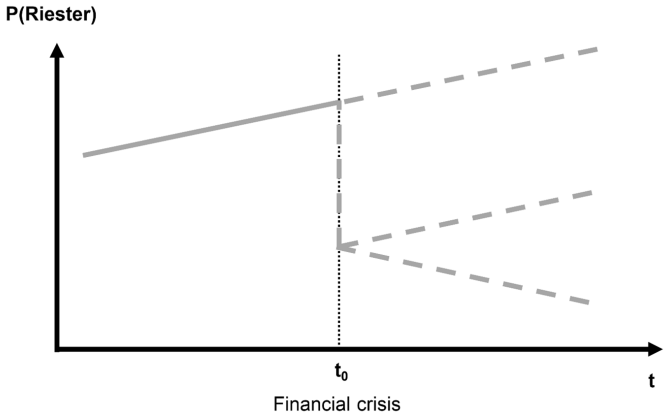

Figure 1. **Schematic illustration of the modelling of the crisis effect**

Source: Own diagram based on Allison (1994).

Age enters the model in a linear and a quadratic form in order to take into account a possible hill-shaped relationship derived from a life-cycle approach (Börsch-Supan,

[6] The conditional likelihood estimation (see chapter 4.3) drops observations without any within-person variation on the response variable because the conditional probability of these a priori certain events doesn't contribute to the likelihood function (Giesselmann & Windzio, 2012: 145).

[7] We choose 2008 as the beginning of the crisis, because there were repeated tensions on the financial markets caused by loan defaults at the American asset-backed security market, culminating in a dramatic fall in share prices on Black Monday, September 15, 2008. Germany's gross domestic product contracted by 1.6 percent in the 4th quarter of 2008 compared with the previous quarter (Destatis, 2021).

2001: 9-14). In order to control for the effect of the *Interest rate* we add the (official) maximum actuarial interest rate to our model (min: 1.25, max: 2.75).[8] We control for current income measured in *Pension points* per year as it constitutes the basis for savings (min: 0.0006, max: 2.4095).[9] We also control for a non-linear relationship because public Riester subsidies are especially beneficial for low-income earners and they showed slightly higher Riester participation rates in the past but there is also a trend for Riester participation to decrease over time among lower income earners and to increase slightly among higher income earners (Langelüddeke & Wilke, 2021). Administrative data contain income only up to the pension contribution limit. To take into account the right-censoring of the income data we include the binary variable *High Income* which is equal to one if a person earned an income equal or higher than the limit in that specific year. *Marriage* is a binary indicator which equals one if a person is married in the given year. We include this family formation indicator, because moving from one stage of life to another can trigger action in other life domains.

Regulatory changes is an indicator variable which is equal to one in the years 2005, 2006 and 2008 and it controls for time period effects due to major policy changes concerning Riester pension plans: In 2005, the DAV04R mortality tables with higher life expectancies were introduced and the regulations on the temporal distribution of the insurance agents' provisions were changed. Unisex Riester contracts were introduced in 2006. Since 2008, the Riester subsidy can also be used to finance owner-occupied residential property and the benefits for children were raised to 300 € per child and year.[10] *Number of children* is an ordinal variable which counts the number of children of a respondent. The third category of this variable is coded as an open upper marginal class and comprises three or more children. Households with children have strong financial incentives to purchase a Riester contract due to the state subsidies (Pfarr & Schneider, 2012: 83-85).[11] *2pillar* is an indicator variable which is equal to one if a person has entered an occupational pension scheme as a private sector employee or participated in supplementary benefits for public sector employees in the respective year. *3pillar without Riester* is an indicator variable which is equal to one if a person has purchased a private pension insurance which is not a Riester contract in the respective year. We use these measures on occupational and other private pension products in order to control for possible crowding-in effects among these products and Riester pension plans. For

[8] This interest rate applies to the savings portion of newly signed cash-value life insurances or private pension insurances and is set by the German Ministry of Finance.

[9] Income is measured as pension points which are calculated as the quotient of current individual gross labour income subject to social insurance contributions in relation to the average income. Pension points reflect one's relative wage position and work-time volume.

[10] In alternative model specifications, we also tested the amount of eligible Riester benefits and a hypothetical Riester subsidy rate with an assumed savings rate of 4% of gross income as explanatory variables. Neither regressor was statistically significant.

[11] Each additional child lowers the personal contribution which is necessary to get the (full) Riester subsidy. Child benefit is 185 € per child and year for children born before 2008 and 300 € per child and year for children born from 2008 onwards (Börsch-Supan et al., 2008).

example, Pfarr and Schneider (2012) find evidence that there are unobservable factors that positively influence the probability to purchase subsidised and unsubsidised private pension plans. Börsch-Supan et al. (2008) conclude that occupational and other private pension plans and Riester contracts are complements rather than substitutes'. *Socioeconomic state (SES)* is a categorical variable which indicates if a person is employed, unemployed/ill or has another status in a given year. It is meant to account for the employment-centeredness of the German pension system.

4.3 Model

Our research question investigates how participation in private pension plans has changed in the aftermath of the financial crisis. The study focuses on the effects of temporal variation (pre- and post-crisis) on a binary decision variable, rather than on determining the influence of time-invariant covariates. Out of these methodological considerations, we have chosen a fixed-effects estimation approach. Fixed-effects models have the advantage of controlling for selectivity, unobservable person-specific heterogeneity, and omitted-variable bias and have no restrictions on correlations between regressors and unobservable, time-constant, individual-specific effects (Allison, 2009; Collischon & Eberl, 2020). In our case, the decision to purchase a Riester contract might, for example, be related to unobserved characteristics such as financial literacy (Bucher-Koenen & Lusardi, 2011), which is also related to one's income (Bucher-Koenen, 2011).[12]

Our dependent variable is dichotomous, so the application of a non-linear model seems appropriate, as linear probability models with binary dependent variables can produce implausible predicted values and may have problems with heteroscedastic residuals (Giesselmann & Windzio, 2012). Because of the "incidental parameter problem" (Lancaster, 2000), the maximum likelihood estimator is not consistent for panel data. Therefore, we decided to estimate a panel logit model using the method of conditional maximum likelihood (Chamberlain, 1980). Because conditional likelihood estimates are "subject specific" (Allison, 2009) and intelligible effect sizes in terms of probability rely on the unknown, individual fixed effects, we only interpret the signs and statistical significance of the estimated coefficients.

5. Results

Figure 2 plots the number of Riester pension plans purchased per year in our sample and for the time period of our study. The maximum number of contracts was purchased in 2006 and we see a declining trend from then to the years 2014 and 2015, when the

[12] As we focus on temporal variation before and after a certain event, we have chosen a fixed-effects-conditional logit-model. This means further we are able to display and discuss time-variant covariates (e.g., age, number of children, etc.), but we are not able to display and discuss time-invariant covariates (e.g., gender, education status, etc.). However, given our chosen model, we are able to control for these time-invariant covariates and therefore they are not neglected, rather our results are interpreted against this background.

numbers are particularly low. Interestingly, we observe the second largest number in 2008, the year we mark as the beginning of the financial crisis. This could be due to the fact that the crisis only really registered with the general public in the last four months of 2008, and savings behaviour was influenced by Riester policy changes in that year, which made Riester pension plans more attractive to families and people planning to buy a home. We also see the decreasing momentum when we look at the overall participation rate, it stagnates at around 30 percent.

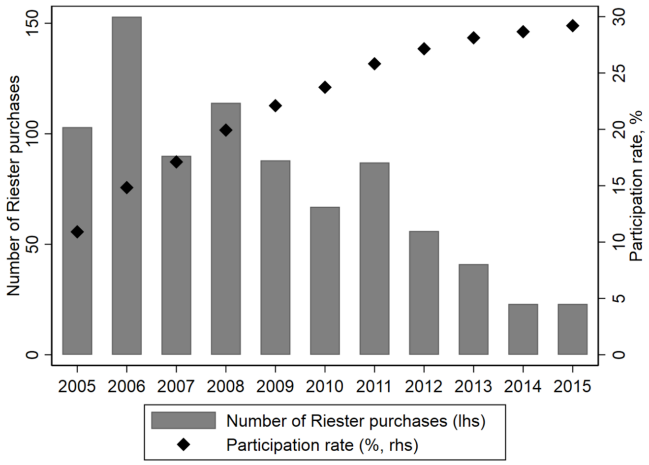

Figure 2. **Number of Riester pension plans purchased and Riester participation rate**

Notes: SPI main clientele without partners, approximation of the Riester participation rate = cumulative sum of purchased Riester contracts/persons, panel unbalanced N min: 3853, N max: 4316

Source: LeA, own calculations.

Table 1 shows the results of our panel fixed effects logit model for the purchase of Riester pension plans. We also tested and rejected other model specifications. For example, we did initially control for social economic state with a more detailed disaggregation including weekly working hours, or for status as a single parent and for the individual maximum amount of Riester subsidies. All of these determinants were not statistically significant and did not contribute to explain Riester participation, so that we decided for a slimmer version as the final model.

The binary crisis variable marking the post-crisis period does not show a statistically significant effect for the probability of purchasing a Riester contract. But the likelihood of signing a contract significantly decreases with each passing year after the crisis. We can therefore conclude that the shock of the financial crisis did not lead to an abrupt stop in the purchase of Riester pension plans, but that the probability of purchasing a Riester pension plan decreased gradually. Our empirical results show a significant positive relation with the actuarial maximum interest rate, which was lowered substantially by 1.5 percentage points in the low interest environment considered. Lower yields made Riester

savings less attractive.[13] And as age increases, so does the likelihood of signing a contract. There is a non-linear relationship between the pension points and the purchase of a Riester contract, so that the probability first decreases and then increases as the pension points increase. This can be explained by the fact that women in the lower two income quintiles in particular have purchased Riester contracts, whereas Riester participation among men rises sharply with increasing income. The period effects of the regulatory changes in Riester pension plans show an increased likelihood of signing a contract in these years, which indicates that the policy aim of making Riester pension plans more attractive was met to a certain degree.

Table 1. **Fixed-Effects-Conditional-Logit-model for purchases of Riester pension plans**

Riester	**Logit**	**t**
Crisis	−0.350	(−1.66)
Years after crisis	−0.363***	(−3.80)
Age	0.439**	(2.73)
Age, squared	−0.00200	(−1.47)
Interest rate	0.879***	(3.33)
Pension points	−2.392***	(−3.86)
Pension points, squared	0.995***	(3.66)
High income	0.294	(1.30)
Regulatory changes	0.304*	(2.54)
2nd pillar contract	0.837***	(4.62)
3rd pillar contract w/o Riester	1.152***	(5.42)
Marriage	−0.243	(−1.25)
Number of children		
1	0.613*	(2.02)
2	0.572	(1.43)
3	0.460	(0.79)
Socioeconomic status (SES)		
Unemployed/ill	−1.005*	(−2.26)
Other	−0.239	(−0.87)
Persons	834	
Observations	8571	

Notes: SPI main clientele without partners, reference group for SES is employed

Source: LeA, own calculations.

People who have purchased an occupational pension plan or another private pension product are more likely to have purchased a Riester contract as well. This fact points to substantial crowding-in effects between alternative investment options in the second and third pillars of old-age provision and Riester contracts.[14] Having the first child also

[13] Real interest rate expectations based on surveys of professional forecasters for 10-year German government bonds also turned negative from 2011 onwards. This narrative of a prolonged period of low interest rates may also have had a negative impact on Riester purchasing behaviour.

[14] It seems conceivable, for example, that the joining of an occupational pension scheme as a result of a change of employer will lead people to look into the subject of old-age provision in general and then decide to purchase a Riester pension plan.

increases the probability of purchasing a Riester contract. This may be due to the financial incentives of the generous Riester child subsidies or because new parents are more concerned with planning for the future and thus with the issue of old-age provision. In contrast, illness and unemployment are associated with a lower probability of signing a Riester contract.

6. Conclusions

Our results confirm our initial assumption that the financial crisis of 2008/2009 had an impact on confidence in financial markets, which we measured using the participation in voluntary Riester pension plans. We did not find an immediate change in the savings behaviour, which one might expect as a response to the shock, but a gradually declining trend in the purchase of Riester pension plans, supporting our assumption of a "wait and see" approach of potential buyers. It is important to note that this declining trend is independent of other (controlled for) determinants such as the actuarial interest rate. We therefore interpret the trend as a continuous and enduring lack of confidence in the financial markets and its players.

Although our main objective was to add to the Riester pension plan research debate the aspect of confidence which is rather important concerning the broader setting in which financial decisions are made, we did nonetheless find effects of other (socio-economic) determinants, independently from the crisis effect. These factors, which are already well known in Riester pension plan research, focus mainly on the individual level. Here, such time-variant determinants as stages of life (age, having the 1st child) increase the likelihood of purchasing a Riester pension plan while one's socio-economic state (being unemployed/ill) decreases it. Income measured in pension points first decreases and then increases the likelihood of purchasing as income rises. Especially noteworthy is the fact that the probability of purchasing a Riester pension plan is higher if one has purchased a contract in another second or third pillar pension scheme in the same year. We interpret this as an indication for a substantial crowding-in effect, which can eventually lead to a pension security gap between the haves and the have-nots.

The main limitation of our analysis is the lack of causal pinpointing. With our analytic set-up, we can only talk about the crisis effect on a descriptive level. But apart from lacking a control group, the analysis also suffers from other real life restrictions. We are looking at a rather long time period and the financial crisis is not the only event which happened in this time span. It is possible that the gradual crisis effect we found is not only the result of lacking confidence in financial markets but also related to other real or perceived insecurities. Furthermore, the effect was certainly enhanced by increased criticism concerning the complexity, the cost structure and the returns of Riester pension plans, which was not only raised in academic circles but also in the policy debate and distributed through different media outlets (see, e.g., papers in Hagen et al., 2012).

In addition, the financial crisis has triggered measures on the regulatory level, the effects of which we cannot disentangle from our crisis effect. As a reaction to the financi-

al crisis, financial regulations were tightened and central banks around the world lowered their base interest rates to the zero lower bound and also implemented quantitative easing programs. Hedging costs for money-back guarantees in a low interest environment are higher (Horneff et al., 2019: 7-8) and these long-term guarantee commitments require sufficient provisions to meet the capital requirements of the new Solvency II regulations. This led to a situation where banks and insurance companies "offering Riester pensions (…) question their ability to continue supplying the market" (Horneff et al., 2019: 7). The decreasing probability of signing a Riester contract in the post-crisis period may thus also have been influenced by simultaneous changes in the interest rate environment and insurance regulations, which reduced the supply side of the Riester market. All this makes it difficult to ascribe the declining trend solely to the loss of confidence in the aftermath of the financial crisis, but as we pointed out, confidence is based on fictional expectations which are also shaped by the surrounding institutions, regulations and narratives.

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