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## Intra-household allocation of non-mandatory retirement savings

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## DISKUSSIONSBEITRÄGE DISCUSSION PAPERS

### Intra-household allocation of non-mandatory retirement savings

Christoph Metzger

No. 60 – February 2016



# Intra-household allocation of non-mandatory retirement savings

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Traditionally, households have been seen as acting as a single unit when it comes to savings. Although this might be correct for some parts of household savings, we question the correctness of the unitary model with respect to non-mandatory retirement savings. To answer this question we analyze the intra-household allocation of retirement savings between partners in Germany.

First, the decision to save at all is analyzed using a seemingly unrelated bivariate probit model, showing that the possession of retirement saving accounts among spouses is positively correlated, hinting at a “crowding-in” of saving accounts. However, this could be only due to some tax reasons. Thus, we analyze additionally the interaction of savings between spouses using three-stage least squares, allowing for endogeneity between the spouse’s savings. These results additionally show a “crowding-in” of total retirement saving amounts between spouses, probably due to some “recognition effect”. The unitary model of household decision making can thus be rejected with respect to retirement savings.

*JEL-Classification:* D14, D91, H31

*Keywords:* Savings, intra-household allocation, retirement, life-cycle, unitary model, household decision, three-stage least squares

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# 1. Introduction

Originally, households have been seen as acting economically as a single unit. This unitary model, implying a single decision making process among the individual household members, was applied for the analysis of household decisions ranging from labor supply to overall household savings. However, in the last years this simplifying approach has been questioned and disproved by many researchers (Vermeulen (2005), Attanasio and Lechene (2002) and Browning (1995)), because it neglects individual preferences almost completely. Alternative approaches have been proposed, recognizing household behavior as a result of a decision-making process reflecting different preferences among the household members. These collective approaches can be further divided into cooperative and non-cooperative models. In the first, spouses negotiate decisions taking each other's preferences into account. In the second, each household member takes the other members' behavior as given and maximizes his/her own utility.<sup>1</sup> While the collective model has been confirmed in a number of studies with respect to the labor supply decision at the extensive as well as the intensive margin,<sup>2</sup> evidence for the household decision-making process with respect to savings is scarce.<sup>3</sup> This may result from the fact that information on household savings largely originates from panel surveys, only measuring overall household savings. The question to be answered in this article is whether the unitary model holds for household retirement savings. More precisely, are retirement saving decisions made for the entire household or independently on an individual level? Given that some retirement savings are saved by the aggregate household by definition (e.g. real estate), we focus on saving accounts usually used to save for old-age reasons which can ultimately be attributed on an individual level to a specific household member. In order to study the

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<sup>1</sup> For a more detailed overview on the different household models see e.g. Garcia et al. (2010) and for an overview on different collective models see Vermeulen (2002).

<sup>2</sup> See e.g. Garcia et al (2010), Bloemen et al. (2008) or Aronsson et al. (2001).

<sup>3</sup> Browning (1995) found that with a higher share of the wife in household income the total household saving rate declines.

interaction between household members with regard to retirement savings, we use the Panel on Household Finances (PHF) provided by the Bundesbank. This data set allows us to analyzing individual savings and simultaneously considering the overall household situation as well as the partner's or spouse's retirement savings in Germany. The remainder of this article is structured as follows. After describing the dataset in section 3.1. and showing some descriptive statistics in section 3.2., the empirical strategy is outlined in section 3.3., followed by the presentation of the results in section 4. The article finishes summarizing the results and presenting implications for further research.

## 2. Data and empirical strategy

### 2.1. The PHF dataset

The following analysis is based on the newly introduced “Panel on Household finances” (PHF) in Germany.<sup>4</sup> The PHF, conducted by the Bundesbank, is part of the Eurosystem's “Household Finance and Consumption Survey” (HFCS). In addition to the common European-wide questionnaire covering questions on household finance, wealth and consumption, the PHF puts special emphasis on two further topics, namely savings and old-age provision. Therefore, detailed information on an individual level is collected through different types of saving vehicles, as well as financial assets. This information is of special interest as it enables the analysis of savings specially linked to old-age pension provision. Besides information about individual retirement savings, the PHF also includes detailed household characteristics e.g. household net income, children, etc. This rare combination allows us to analyze the interaction between the retirement savings of spouses within the household context. The survey is designed

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<sup>4</sup> For more detailed information about the PHF see [http://www.bundesbank.de/Navigation/EN/Bundesbank/Research\\_centre/Panel\\_on\\_household\\_finances/panel\\_on\\_household\\_finances.html](http://www.bundesbank.de/Navigation/EN/Bundesbank/Research_centre/Panel_on_household_finances/panel_on_household_finances.html)

to be a full panel with a survey frequency of three years. Up to now only the first wave was conducted in 2010 and 2011, enabling solely cross-sectional analysis so far.

The problem of missing data caused by item non-response, generally present with surveys about financial data, was coped with by using multiple imputation ( $m=5$ ) to fill these missing values and simultaneously considering the uncertainty of these imputations. Leading to five imputed datasets this has to be considered while analyzing the data.<sup>5</sup> However, for the purpose of analyzing the interaction between spouses, we refrain from using the imputed observations and stick to the original values, as the imputation procedure could eventually impose own assumptions about the correlation between the spouses' savings in retirement accounts.

## 2.2. Empirical Strategy

In general, all saving vehicles can be used to transfer present income to the own retirement period as e.g. saving accounts, private pension insurance, cash value life insurance, stocks, real estate etc. The reason for saving can, however, not always be clearly distinguished. As this article puts special emphasis on retirement savings, only vehicles, which are directly linked to retirement, are analyzed in the following sections. These vehicles consist of state-subsidized private pension contracts (Riester or Rürup pensions),<sup>6</sup> all kinds of voluntary occupational pension schemes, private non-subsidized pension insurances and cash value life insurance.<sup>7</sup> Occupational pensions of different types are summarized with the exception of direct pension insurances financed by the employer. As the decision for this type of occupational pension, as

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<sup>5</sup> For further information about the multiple imputation procedure in the PHF dataset and the appropriate analysis see Zhu and Eisele (2013).

<sup>6</sup> To facilitate the following sections, the term Riester pension will refer to both Riester as well as Rürup pension plans, because they are not further distinguished in the dataset. Rürup pension or 'Basis-Rente' refers to pension plans designed for self-employed individuals with tax-deductible contributions up to 22,172 Euros in 2015.

<sup>7</sup> This approach has the disadvantage of neglecting other saving instruments for retirement, especially investments in real estate, which constitutes a relevant part of private household wealth (see e.g. Grabka and Westermeier (2014), p. 159). However, with regard to the question of the interaction of individual retirement savings within a household, savings in real estate become irrelevant as these savings are usually determined only on the household level.

well as the contributions are made by the employer and not the employee, it can be regarded rather as employer saving than as individual rational decision.

The research question raised in this article is whether households act as a unit when it comes to retirement savings or whether these decisions are made independently on an individual level. If both partners jointly determine their retirement savings, as proposed by the unitary or collective models, one could expect that due to transaction costs retirement savings would not be split up between the spouses. More precisely, one spouse makes a saving contract for the total household, what could be the case for example for cash value life insurances. However, due to subsidies or tax exemptions for some contracts (Riester or occupational pension contracts), it could also be rationale to split the savings between both spouses in order to maximize overall public subsidies if the maximum subsidy or tax exemption is already reached by one spouse. In these cases both spouses' savings would act as close substitutes and hence one would expect the savings of one spouse to crowd out the savings of the other spouse holding all other factors constant.

On the contrary, one could also think of a “crowding-in” of retirement savings among both spouses due to the so called “recognition effect” introduced by Cagan (1965). The reasoning behind is an increasing awareness of the need for additional savings as one spouse starts to save for retirement.<sup>8</sup> This effect could further be enhanced by the fact that if one spouse decides to make a saving contract, the other spouse might get in touch with a financial advisor as well.<sup>9</sup> As mentioned earlier, the possession of retirement saving contracts of both spouses does however not necessarily mean a “crowding-in” of retirement savings, but could also be owed

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<sup>8</sup> For example Börsch-Supan et al. (2012) found a positive correlation between the possession of an occupational pension plan and a subsidized Riester or unsubsidized private pension plan for German households.

<sup>9</sup> Pfarr and Schneider (2011) show for Germany that being in contact with a financial advisor increases the probability to possess a Riester pension contract as a sort of supplier-induced demand.

to tax reasons. For a “crowding-in” to exist, we would additionally have to observe a positive correlation between each spouse’s savings.

Hence, we apply a two-stage estimation procedure in order to analyze the intra-household composition of voluntary retirement savings for both the extensive margin (decision to save) and the intensive margin (amount being saved) of retirement savings. In the first stage we analyze the saving decision measured by a dummy variable equaling one if the individual is saving for retirement. Considering the possibility of mutual dependence between each spouse’s decisions (correlated error terms), either positive in the case of a “crowding-in” of saving accounts or negative for a “crowding-out” as implied by the basic unitary model, we have to estimate both decisions simultaneously using a bivariate probit model. Both spouses share a common set of household variables (e.g. household income, children, real estate property) while they differ with respect to their individual educational and labor market characteristics. Thus, we estimate a seemingly unrelated bivariate probit model based on each spouses’ individual  $X_{ind}^i$  as well as common household socio-economic characteristics  $X_{HH}$  as shown in Equation 1.<sup>10</sup> The mutual dependence of the error terms is reflected by the coefficient of  $\rho$  (rho).

$$\begin{aligned}
 \text{Eq. 1} \quad y_A^* &= \alpha_0 + \alpha_1 * X_{ind}^A + \alpha_2 * X_{HH} + \varepsilon^A & y_A &= 1 \text{ if } y_A^* > 0 \\
 y_B^* &= \beta_0 + \beta_1 * X_{ind}^B + \beta_2 * X_{HH} + \varepsilon^B & y_B &= 1 \text{ if } y_B^* > 0 \\
 Cov(\varepsilon^A, \varepsilon^B) &= \rho
 \end{aligned}$$

The set of individual socio-demographic variables comprise a dummy for female, age, age squared, a dummy for Eastern Germany, a dummy for an immigrant background<sup>11</sup>, whether the individual is married or not and dummy variables covering various degrees of education. The set of labor market characteristics covers variables for gross income (gross income, gross

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<sup>10</sup> For an overview on the detailed methodology of bivariate probit models see Greene (2003), section 21.6.

<sup>11</sup> Individuals are defined as having an immigrant background if they either do not have a German citizenship or received it sometime after birth.



income squared), type of employment (e.g. unemployed, civil servant, self-employed with or without employees), employment situation (full-time, part-time, marginally or fixed-term employed etc.) and a set of dummies covering the sector of employment<sup>12</sup>.

Labor market characteristics first determine the need for additional retirement savings. For example civil-servants are members of a generous defined benefit system and thus do not need to save using retirement saving accounts but can also use other more flexible saving vehicles. On the contrary, for self-employed persons insurance in the statutory pension scheme is non-mandatory, hence they have an additional demand for retirement saving accounts.

Having analyzed whether the decision to save at all is influenced by the partner's decision, we turn our attention in the second stage to the question whether also the amount being saved is influenced by the spouse's savings or not. This question is equal to asking whether the unitary model is appropriate with regard to retirement savings or not. An observed "crowding-out" between the spouse's saving amounts could be interpreted in favor of the unitary model or at least the collective model, whereas an observed "crowding-in" would present weak evidence for a more or less individual decision-making process. Hence, we estimate the following set of equations (Eq. 2), where  $\log s^A$  denotes the logarithm of the yearly retirement savings of individual A,  $X_{ind}^A$  is representing a vector of socio-economic variables of the same individual as e.g. demographics, labor market characteristics etc. and  $X_{HH}$  is representing the common set of household characteristics. The respective error terms are denoted by  $\varepsilon^A$  and  $\varepsilon^B$  which are not restricted to be independent of each other.

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<sup>12</sup> The sector of employment probably plays a crucial role for the possession of an occupational pension plan as these pension plans are more commonly offered in some sectors than in others although every person has a legal entitlement at least for an occupational pension plan financed through deferred compensation.

$$\begin{aligned}\text{Eq. 2} \quad \log s^A &= \alpha_0 + X_{\text{ind}}^A * \alpha_1 + X_{\text{HH}} * \alpha_2 + \alpha_3 * \log s^B + \varepsilon^A \\ \log s^B &= \beta_0 + X_{\text{ind}}^B * \beta_1 + X_{\text{HH}} * \beta_2 + \beta_3 * \log s^A + \varepsilon^B\end{aligned}$$

These equations can be seen as being determined simultaneously and hence the partner's savings must be treated as endogenous variables. Considering this mutual endogeneity, we estimate the coefficients of this set of equations using three-stage least squares.<sup>13</sup>

Why to use the logarithm of savings and not nominal savings? Using the log of retirement savings has two relevant properties. Given the lognormal distribution of individual savings, coefficients are biased if we use the nominal values. Additionally, it restricts the analysis to households with both spouses saving. Analyzing the existence of either a “crowding-in” or a “crowding-out” of retirement savings between spouses, using observations with only one person saving would not be very useful.

### 3. Results

In this section, the empirical estimates are presented first for the intra-household allocation of voluntary retirement saving accounts as well as for the corresponding saving amounts. With the focus lying on saving for retirement, the further analysis is restricted to households with at least two individuals not receiving a pension yet, leaving us with 1523 households.<sup>14</sup> In order to analyze the allocation of saving amounts and whether a “crowding-in” of retirement savings, a “crowding-out” or none of both exists, we restrict the sample in the second step to 438 households with both partners saving privately for retirement.

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<sup>13</sup> For the exact properties of the three-stage least squares method see Wooldridge (2010), Chapter 8.

<sup>14</sup> This set of households includes married couples (about 88 percent) as well as unmarried partners. The results of the following multivariate analyses have been carried out for the subsample of married couples and have proven robust.

### 3.1. Descriptive Statistics

In the following, the first equation or column (individual A) always refers to the spouse who has been personally interviewed. This person usually represents the person most familiar with household financial issues and can thus be viewed as the head of household.<sup>15</sup> Table 1 presents some descriptive statistics for the intra-household allocation of retirement saving contracts.

**Table 1: Intra-household allocation of retirement saving accounts (in %)**

		Individual B saving		Total
		No	Yes	
Individual A saving	No	38.1	8.6	46.7
	Yes	24.4	28.8	53.3
	Total	62.6	37.4	100

*N=1523*

*Source: PHF 2011*

53.3 percent of heads of household possess a retirement saving contract whereas this fraction amounts to only 37.4 percent for the other partner. In 38 percent of all households, neither the head of household nor his/her partner is saving for retirement at all. In about a third of all households, at least one partner has a retirement saving account, whereof about 75 percent consist of households where only the head of household possesses a saving account. Finally, in 28.8 percent of households both partners have individual retirement saving contracts.

Looking at the annual household retirement savings, it becomes obvious that households where only the household head saves, are on average saving more than households where only the partner possesses a saving account. This can probably be explained by the fact that heads of

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<sup>15</sup> The interviewed person has additionally been asked three questions about general financial literacy (compound interest, inflation and diversification) which are included for this spouse only.

households earn a higher gross income than their partners, on average (see Table 5 in the Appendix for summary statistics of all other variables).

**Table 2: Average annual household retirement savings (in Euro)**

	<b>Individual B saving</b>		<b>Total</b>
	<b>No</b>	<b>Yes</b>	
<b>Individual A saving</b>	No	0      1255.4	231.2
	Yes	1825      3701.7	2841.2
Total	712.4	3139.4	1621.1

*Source: PHF 2011*

Households with both partners saving, save on average more than just the average sum of both cases where only one partner is saving. One might be tempted to conclude that this provides evidence for a “crowding-in” of retirement savings among spouses, however, it could be the case that households with both partners saving are earning a higher income and thus have higher saving amounts. To control for all other possible influences, the following sections present multivariate evidence. First for the extensive and then for the intensive margin of retirement saving.

### 3.2. Intra-household distribution of saving accounts

Estimating the intra-household allocation of retirement saving accounts as a first hint for the intra-household allocation of retirement savings, one has to consider the possibility of one spouse’s decision to save privately for retirement not being independent of the other spouse’s decision. Therefore we estimate a seemingly unrelated bivariate probit model for a dummy indicating the possession of retirement saving accounts, using individual socio-demographic and labor market variables as well as common household variables as explanatory variables.

With focus on the intra-household allocation of retirement savings, we are primarily interested in the estimated correlation of the error terms, represented by  $\rho$  (rho) in Equation 1.<sup>16</sup>

**Table 3: Seemingly unrelated bivariate probit estimation for possession of a retirement saving account**

Seemingly unrelated bivariate probit				
Dependent variable:				
Possession of saving account	Individual A		Individual B	
Monthly gross income (in 1000 Euro)	0.0343	(0.0278)	0.0640**	(0.0302)
Monthly gross income (in 1000 Euro) <sup>2</sup>	-0.000521	(0.000788)	-0.000698	(0.000830)
Female	-0.142	(0.112)	0.277***	(0.107)
Age	0.120***	(0.0317)	0.124***	(0.0318)
Age <sup>2</sup>	-0.00151***	(0.000340)	-0.00133***	(0.000342)
Eastern Germany	-0.0874	(0.119)	-0.318***	(0.118)
Migrant background	-0.493***	(0.171)	-0.558***	(0.187)
Married	-0.0767	(0.137)	0.187	(0.131)
Full-time	0.366	(0.278)	0.295	(0.253)
Part-time	0.567**	(0.277)	0.0971	(0.249)
Marginally employed	-0.165	(0.315)	-0.116	(0.289)
Fixed-term employment	-0.0393	(0.198)	-0.164	(0.192)
Temporary out of employment	0.501	(0.312)	0.412	(0.321)
Unemployed	-0.778***	(0.260)	0.141	(0.243)
Civil servant	0.226	(0.193)	0.0355	(0.194)
Self-employed	-0.0158	(0.185)	0.191	(0.206)
Self-employed (without employees)	0.0187	(0.148)	-0.0174	(0.155)
Secondary school	0.241	(0.151)	-0.0175	(0.159)
University qualification	-0.0834	(0.154)	0.159	(0.166)
Vocational training	0.252*	(0.145)	0.367**	(0.145)
University degree	0.350*	(0.180)	-0.113	(0.185)
FL interest rate	0.140	(0.131)	.	.
FL inflation	0.117	(0.171)	.	.
FL diversification	0.372***	(0.104)	.	.
HH equivalence net income (in 1000 €)	0.173***	(0.0651)	0.00964	(0.0357)
HH equivalence net income	-0.00000595*	(0.00000331)	0.000000378	(0.000000789)

<sup>16</sup> For a detailed discussion on factors influencing the possession of a retirement savings contract, see Metzger (2015).

(in 1000 €)^2				
Child in HH (Dummy)	0.0690	(0.104)	-0.0796	(0.0985)
Real estate possession	0.0390	(0.0977)	0.0532	(0.0939)
Received bequest (Dummy)	0.122	(0.0914)	0.155*	(0.0866)
Sectoral dummies	Yes		Yes	
rho	0.4951249	(0.04615)		
Wald test of rho=0	chi2(1) =	78.8319	Prob >chi2 = 0.0000	
N	1156			
AIC	2770.8			
BIC	3250.8			
chi2	362.2			

Standard errors in parentheses

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

*Source: Own estimations based on PHF 2011.*

Interestingly, for the head of household only the household equivalence net income<sup>17</sup> plays a significant role for the probability of possessing a saving account. For the other partner however, only his/her own gross income is significant and not household income. The positive and highly significant coefficient of rho provides evidence for the individual possession of a retirement saving account being strongly correlated among partners even if controlled for both household and individual labor market characteristics. This “crowding-in” of savings contracts among household members, also found by Börsch-Supan et al. (2012) for German households generally, is probably due to some recognition effect or peer effect as discussed in section 3.2. However, this positive correlation might only be due to tax reasons and does not have to increase household savings at all. For example Riester pension plans are subsidized via a basic

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<sup>17</sup> The disposable household equivalence income is constructed from the disposable household income using the new OECD scale of equivalence weights.

allowance of 154 Euro which is counted against the tax subsidy arising from the exemption of contributions to the Riester pension account. For a non-working spouse it might be rationale to open up an own account in order to get the basic allowance by just paying the minimum annual contribution of 60 Euro. Additionally, for occupational as well as Riester pension schemes there exists an upper ceiling of tax-deductible contributions. These ceilings might provide incentives to split the household retirement savings between two contracts, if the total saving amount exceeds this ceiling, and thus may lead to a “crowding-out” of the other spouse’s savings. Hence, in the next section we will turn our attention to the amount of retirement savings and whether there exists a “crowding-in” or “crowding-out” of retirement savings amounts among spouses.

### 3.3. Crowding-in or crowding-out of spouse’s retirement savings?

If saving amounts of the spouses and thus household retirement savings are simultaneously determined, both equations outlined in section 3.2. have to be estimated controlling for endogeneity. Thus we estimate the coefficients using the method of three-stage least squares.

Three-stage least squares (3SLS) presents an extension of two-stage least squares and allows for mutual dependence of the error terms between both equations. It combines two-stage least squares estimates with a correction for the mutual dependence. The first two steps consist of two-stage least squares estimations of each single equation and the estimation of the covariance matrix of the error terms in the system of equations. In the last stage these estimates are used to compute the Generalized least squares (GLS) estimator of the system.

Being interested in the effect of the spouse’s savings on own savings only, we need to control for all other possible influences carefully. Therefore, we include the same set of explanatory variables used in the previous estimation of the intra-household allocation of retirement saving contracts, as control variables. These control variables comprise of individual socio-demographic and labor market characteristics including sectoral dummies as well as household

characteristics, who all might have an influence on the savings amount. With the focus on studying the interaction between the spouses' savings, we use the logarithm of retirement savings, reducing the sample to 438 households with both spouses voluntarily saving for retirement.

**Table 4: Three-stage least squares estimates for log savings**

Three-stage least squares				
Dependent variable: log savings	Individual A		Individual B	
log savings partner	0.250***	(0.0960)	0.280***	(0.0904)
Monthly gross income (in 1000 Euro)	0.102***	(0.0261)	0.163**	(0.0646)
Monthly gross income (in 1000 Euro)^2	-0.00192***	(0.000663)	-0.0109**	(0.00514)
Female	-0.344***	(0.128)	-0.397***	(0.129)
Age	0.0353	(0.0464)	0.0311	(0.0452)
Age^2	-0.000327	(0.000492)	-0.000299	(0.000490)
Eastern Germany	-0.131	(0.142)	-0.372**	(0.145)
Migrant background	-0.199	(0.282)	-0.162	(0.239)
Married	0.102	(0.136)	0.0645	(0.142)
Full-time	0.0804	(0.313)	0.0142	(0.329)
Part-time	-0.0783	(0.305)	-0.166	(0.325)
Marginally employed	-1.203***	(0.367)	-0.294	(0.367)
Fixed-term employment	-0.103	(0.217)	-0.535**	(0.231)
Temporary out of employment	-0.160	(0.334)	0.0673	(0.398)
Unemployed	-0.654*	(0.386)	-1.127***	(0.360)
Civil servant	-0.430**	(0.187)	-0.132	(0.211)
Self-employed	0.253	(0.162)	0.708***	(0.178)
Self-employed (without employees)	0.267*	(0.153)	0.171	(0.176)
Secondary school	0.400**	(0.166)	-0.121	(0.174)
University qualification	0.548***	(0.164)	-0.115	(0.185)
Vocational training	0.0501	(0.189)	-0.0427	(0.192)
University degree	0.199	(0.210)	0.0716	(0.233)
FL interest rate	0.313**	(0.152)	.	.
FL inflation	0.360	(0.252)	.	.
FL diversification	0.155	(0.118)	.	.
HH equivalence net income (in 1000 €)	0.0796	(0.0663)	0.141**	(0.0658)



HH equivalence net income (in 1000 €) <sup>2</sup>	-0.00000580**	(0.00000264)	-0.00000309	(0.00000283)
Child in HH (Dummy)	-0.00684	(0.107)	-0.0240	(0.110)
Real estate possession	0.109	(0.0978)	-0.00412	(0.106)
Received bequest (Dummy)	0.157*	(0.0885)	-0.0840	(0.0896)
Sectoral dummies	Yes		Yes	
N	438		438	
R-sq	0.4926		0.4131	
chi2	404.18		286.26	

Standard errors in parentheses

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

*Source: Own estimations based on PHF 2011.*

The explanatory power of the model can be seen as sufficient high with an adjusted R-squared of 0.493 for the first equation and 0.413 for the second. Women seem to save significantly less than their male counterparts, the same is true for the head of household if he is living in the eastern part of Germany. The effect of gross income with respect to retirement savings is hump-shaped for both spouses. Self-employed seem to save more whereas unemployed persons and civil servants save less for retirement as one would have expected. Interestingly, education or especially schooling only seems to increase savings of the head of household, where no educational dummy is significant for the other spouse.

Controlling for all other variables potentially influencing the amount being saved, the coefficient of our variable of interest, the logarithm of the other spouse's savings, is significant for both spouses at the one percent significance level. For both equations the coefficients are almost equal, showing values of 0.25 and 0.28. With respect to the dependent variable, the logarithm of savings, this coefficient can be interpreted as the elasticity of retirement savings with respect to the savings of the partner. An additional increase of one percent in retirement savings of one spouse leads to an increase in savings of the other spouse of 0.25 or 0.28 percent

respectively. This finding provides strong evidence for a crowding-in of retirement savings among spouses not only with respect to possession of a saving account but also for the amount being saved.

#### 4. Concluding remarks

We examined the intra-household allocation of retirement savings in Germany. First, we looked at the allocation of retirement saving accounts within the household and found that, controlled for other factors, possession of a saving account is positively correlated between spouses, giving some evidence for a “crowding-in” of accounts. This might be due to some peer or recognition effect, where the need to save for retirement becomes obvious if one spouse starts saving or as a sort of supplier-induced demand because of the contact to an insurance agent. Furthermore, there might exist tax reasons inducing a splitting up of household retirement savings among spouses. Thus, a “crowding-in” of saving accounts does not necessarily provide evidence for a “crowding-in” of savings at all and does not reject the unitary or collective household model. Analyzing the interaction of saving amounts in households with both spouses saving and allowing for endogeneity, revealed also the existence of a “crowding-in” of saving amounts.

These findings give no evidence in support of the unitary household model with respect to retirement savings. Instead, retirement saving decisions seem to take place on an individual level, with a “crowding-in” by the partner’s savings, induced probably by updated information or preferences. However, the same could be true for the collective household model, where due to new information the optimal household saving amount may be altered leading to both spouses increasing their savings simultaneously. This gives evidence for a possible multiplier effect of fiscal incentives within households, to be considered analyzing public policy with respect to retirement savings.

One restriction of the presented results might be that they are based on cross-sectional data, which is unfortunately only available so far. Maybe the dynamics of the reaction of individual savings to some common household optimization process takes place with a lag and is therefore not observable in the cross-sectional data. This question could be further analyzed using panel data on individual savings. With the second wave of the PHF being currently underway, at least for Germany this will be soon possible.

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## Appendix

**Table 5: Descriptive statistics**

Variable	Individual A			Individual B		
	N	mean	sd	N	mean	sd
Married	1,523	0.873	0.333	1,523	0.873	0.334
Migrant background	1,523	0.0611	0.240	1,523	0.0558	0.230
Female	1,523	0.445	0.497	1,523	0.561	0.496
Age	1,523	47.48	11.04	1,523	46.98	11.23
Age^2	1,523	2,376	1,077	1,523	2,333	1,089
Eastern Germany	1,523	0.147	0.354	1,523	0.147	0.354
Secondary school	1,523	0.540	0.499	1,523	0.605	0.489
University qualification	1,523	0.364	0.481	1,523	0.318	0.466
Vocational training	1,523	0.594	0.491	1,523	0.619	0.486
University degree	1,523	0.303	0.460	1,523	0.274	0.446
Full-time	1,523	0.637	0.481	1,523	0.476	0.500
Part-time	1,523	0.150	0.358	1,523	0.149	0.356
Marginally employed	1,523	0.0466	0.211	1,523	0.0401	0.196
Temporary out of employment	1,523	0.0355	0.185	1,523	0.0250	0.156
Unemployed	1,523	0.0433	0.204	1,523	0.0355	0.185
Civil servant	1,523	0.0755	0.264	1,523	0.0512	0.221
Self-employed	1,523	0.0630	0.243	1,523	0.0361	0.187
Self-employed (without employees)	1,523	0.0952	0.294	1,523	0.0657	0.248
Fixed-term employment	1,523	0.0512	0.221	1,523	0.0374	0.190
FL interest rate	1,523	0.888	0.316	-	-	-
FL inflation	1,523	0.934	0.249	-	-	-
FL diversification	1,523	0.802	0.398	-	-	-
Gross income	1,506	3,341	5,084	1,459	2,207	2,804
HH equivalence net income	1,441	2,343	2,439	1,441	2,343	2,439
Received bequest (Dummy)	1,523	0.376	0.485	1,523	0.376	0.485
Real estate possession	1,523	0.647	0.478	1,523	0.647	0.478
Child in HH (Dummy)	1,523	0.253	0.435	1,523	0.253	0.435

*Source: Panel on Household Finance (PHF) 2011.*

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