The influence of personality traits on private retirement savings in Germany

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Abstract

This paper analyzes private retirement savings, the amount for German individuals and how these savings are influenced by personality traits. With the 2002 to 2009 cross section of the Socio-Economic Panel for Germany (SOEP), it is investigated how the Big-Five and the locus of control influence the decision to have private retirement savings, and the estimated amount of these savings. Results indicate a positive effect for extraversion and a negative effect for agreeableness on the probability to have such savings. Extraversion also positively effects the size of retirement related savings as does having an more internal locus of control. Similar to the probability to have retirement savings agreeableness also reduces the expected amount of such savings. Personality traits only seem to influence the retirement savings if the individual has scores further away from the average of the specific trait. Additionally regressions are implemented that include the personality measures as dummies to allow for non-linear effects. Furthermore, other types of wealth accumulation such as house related savings are investigated to study how the effects might differ for different types of wealth accumulation.

Keywords: Non-cognitive skills, Big-Five, locus of control, retirement

JEL classification: C34, C35, J26, J32

PsycINFO classification: 2223, 3120

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1 Introduction

This paper investigates the effect of personality traits on the savings behavior of German individuals. The focus is on private retirement savings while different types of savings are also considered that could be relevant for retirement. The 2002, 2004, 2005, 2007 and 2009 cross sections of the Socio-Economic Panel for Germany (SOEP), are used to investigate how personality traits, income, education, and other characteristics influence the decision to save for retirement. The focus on the private retirement savings is due to the demographic change and the decrease in the demographic dividend over the last decade (Góra, 2014), which is one reason for the small increases in the public pensions, which fell short behind inflation (Linderkamp and Zuchandke, 2012). This results in a change in Germany's public pension system and attendant changes in old age provision. Although the Germany's public pension system offers almost everybody a sizable retirement income, private savings for retirement or retirement insurance have increased in their significance over the past years.

Personality traits have been proven to significantly effect economic decision making. They are well established in the psychological literature and are slowly being recognized as a factor in the economic literature, especially in behavioral economics (Borghans et al., 2008, p.1035). Wichert and Pohlmeier (2010) have investigated female labor force participation in relation to the Big-Five. They have shown that personality traits play an important role in the labor force participation decision. Not only the participation decision but also career paths and earnings are influenced by personality traits with gender specific effects (Judge et al., 1999; Duckworth and Seligman, 2005; Mueller and Plug, 2006). Another potential area of economic decision making, which is likely to be influenced by personality traits, are decisions related to retirement, including everything from the allocation of assets to the amount one saves for retirement as well as the timing of retirement itself (Hershey and Mowen, 2000; Robinson et al., 2010; Sunden and Surette, 1998). Wang and Shi (2014, p. 14) review evidence that the Big-Five influence the timing of retirement behavior and the type of retirement. A study by Blekesaune and Skirbekk (2012) shows a gender difference in a Norwegian register sample for the likelihood of disability-related retirement based on neuroticism. Brown and Taylor (2011) find effects of

extraversion and openness to experience on the amount of debt as well as large inverse effects of extraversion on the amount of financial assets held. Furthermore, they do not find effects of conscientiousness and neuroticism on either debt or asset holdings. Duckworth and Weir (2010) find positive effects for conscientiousness on the amount of retirement savings by 14% per standard deviation for people living as couples with equal effects for both partners. Their estimate is in the same range as the husband's numeric ability which they identify as the largest cognitive effect. This puts the estimated effect in the same range as effects for cognitive skills that are mainly used in the investigation of retirement savings indicating the importance the non-cognitive skills can have. Going beyond the Big-Five, Cobb-Clark et al. (2013) investigate how another personality traits, the locus of control, influences the household saving behavior, which in essence relates to the ability to finance retirement consumption. They also include the personality traits and find positive effects on pension savings for agreeableness and openness to experience while the partner's measures do not seem to have an influence. Therefore, the question needs to be answered if the exclusion of the personality traits from regressions on retirement savings induces an omitted variable bias on the other coefficients implemented in the model or if they can be ignored.

This empirical analysis focuses on life and retirement savings and also investigates the effect on different savings type and net wealth. It concentrates on the retirement planing phase with individuals between 30 and 55 years of age. The main focus of this study is to adopt the models used to investigate personality in relationship to retirement savings to a German setting. By using the Big-Five personality traits and the locus of control it is investigate how the traits influence the likelihood to have private retirement savings and their influence on the size of theses savings.

The SOEP includes information on savings as well as several commonly used control variables. This data is used to estimate two regression models, one predicting the participation decision and the other estimating the effect of personality on the amount saved. The analysis also includes control variables for other saving types collected in the SOEP like house ownership or other financial assets. Probit estimations for the participation decision and tobit estimations are implemented to analyze the estimated amounts in a limited dependent variable framework.

The paper is structured as followes. Section 2 will discusses the general determinants for retirement savings. Section 3 introduces the personality traits and will give an overview over the effects on the economic domain. Section 4 describes the data and gives an overview over the model specification while Section 5 will discusses the results of the analysis. Finally, Section 6 will conclude the paper.

2 General Determinants of Retirement Savings

Besides the compulsory public pension, the German pension system has two additional pillars: the company and the private pension. The main goal of the additional pillars is to complement to the public pension which has come under increasing financial pressure due to the change in Germany's demographic structure. Caused by a high life expectancy and a low birth rate, the relation of contributors to receivers in the public pension system has deteriorated and has thereby increased the required amount of additional funds from the government. In order to balance this effect the legal retirement age and the contribution rate of the public pension system can and hase been raised. Both measures can be controlled and adjusted by the government via legislation. Other measures like increasing the labor force participation or an increase in private old age provision can only be encouraged but are not directly controllable. The labor force participation mainly depends on the world economy in general and on the German economy in particular. Hence, even the best policy can fall short of influencing the labor force participation rate. Old age provision by individuals is similarly difficult to influence by politics, since it has to change the mind-set and behavior of the individual from depending on the government for old age provision to additionally acquiring private savings for the retirement.

So far the implicit assumption has been that people put money into a fund, that is especially dedicated to retirement, on which they earn interest. Yet, there are also several other ways to ensure that a certain living standard for the retirement is accomplished. Some people may not even have special accounts that are solely dedicated to retirement but instead just have their general checking and savings accounts in which they might build up their wealth. Building and owning a house can act as a substitute for retirement savings in order to save rent. Also owning

other real estates that can be rented out, can serve as a steady stream of income.

There are four general savings motives in life-cycle theory which mainly captures the old-age provision model (Modigliani, 1988). Based on this framework Carroll et al. (1992) enhance the model to include precautionary saving motives that can exist if individuals face a risky labor income path. Yet, there is mixed evidence for this extension in the literature (Caballero (1991); Carroll (1997); Gourinchas and Parker (2002); Skinner (1988); Guiso et al. (1992); Bartzsch (2008)). Fuchs-Schündeln and Schündeln (2005) consider precautionary savings in Germany arguing that former studies fail to adress self-selection problems and risk attitudes. Another extension to the basic life-cycle model tries to incorporate the housing motive into the model. This extension has been analyzed by Artle and Varaiya (1978) and by Hayashi et al. (1988) who bring up the theory that in a world with down payment restraints the housing motive leads to increased savings. Empirical findings for Italian, Japanese and German data show an impact of the housing motive on the general savings and consumption pattern of younger households (Schunk, 2007). The last of the main savings motives is the bequest motive in which parents not only care about their own well being but also about that of their offspring (Hurd, 1987). Again Schunk (2007) points out that there is mixed evidence in the literature. There are difficulties discriminating between accidental and intentional bequest motives as it remains uncertain weather assets were saved for later consumption or for the offspring's benefit.

Most likely multiple of the saving motives may manifest simultaneously, making it necessary to control for possible other types of saving using multivariate regressions. The present paper uses a classical reduced form, derived from the life-cycle model. Investigating the different potential saving types present in the data set and using different specifications considering the possible sensitivity of the model in relation to possible endogeneity of measures for household wealth is considered.

3 Personality Traits

The following analysis will use the psychological five factor model of personality, to account for the differences in personality of the individuals and to identify the influence of certain personality traits on the private retirement savings. In their article McCrae and Costa (1987) present a validation of the five factors which serve as one of the foundations for the application in psychological as well as economic research. The general Big-Five model postulates that the personality of an individual can be mapped onto five dimensions where each dimension contains six facets that shape each dimension. Table 1 gives a short overview over the Big-Five personality traits and their respective facets.

Table 1: Description of the BIG-5 personality traits

Big 5	Facets
Conscientiousness:	Self-Efficacy, Orderliness, Dutifulness
	Achievement-Striving, Self-Discipline, Cautiousness
Openness:	Imagination, Artistic Interest, Emotionality
	Adventurousness, Intellect, Liberalism
Extraversion:	Friendliness, Gregariousness, Assertiveness
	Activity Level, Excitement-Seeking, Cheerfulness
Agreeableness:	Trust, Morality, Altruism, Cooperation
	Modesty, Sympathy
Neuroticism/	Anxiety, Anger, Depression, Self-Consciousness
Emotional Stability:	Immoderation, Vulnerability

Source: Wichert and Pohlmeier (2010)

Wichert and Pohlmeier (2010) generally distinguish two types of traits: "Extraversion and Agreeableness describe the inter-individual behavior, meaning that these traits describe how an individual interacts with others. On the other hand, Conscientiousness, Neuroticism, and Openness to Experience deal with the intra-individual habitude of a person. These traits characterize how an individual deals with intellectual and emotional tasks" (p. 3).

Conscientiousness "[...] represents the drive to accomplish something, and it contains the characteristics necessary in such a pursuit: being organized, systematic, efficient, practical, and

steady" (Fernández-Ballesteros, 2002, p. 139). Duckworth and Weir (2010) find a positive effect of conscientiousness on pension savings for both husband and wife while Brown and Taylor (2011) find no evidence for an effect of conscientiousness on assets held or dept. Cobb-Clark et al. (2013) find evidence that conscientiousness positively effects financial wealth in general and negative effects on the real estate value and no effect on pensions. They also estimate negative effects of the partner's conscientiousness on the households net wealth at the mean and the 75th quantile. Conscientiousness shows a large overlap with general measurements of IQ, which is also suggested by the fact that Duckworth and Weir (2010) find similar effect sizes for numeracy and conscientiousness. In general we would therefore expect a positive effect on retirement savings through higher intelligence and likely a positive correlation with numeracy.

Openness to experience seems to be ambiguous and it is difficult to make an educated guess on how it might effect retirement savings. Cobb-Clark et al. (2013) find a positive effect on pension savings but at the same time a negative effect on the real estate holdings. They also observe a negative effect of the partner's openness on the vehicle value of the household. Furthermore, they show ambiguous results for openness depending on the quantile under investigation, with negative effects for the 25th quantile and positive effects for the 75th quantile. Duckworth and Weir (2010) find positive effects of openness on both the amount of debt and asset holdings, although the effects vary somewhat by age group and change for specific saving types. Individuals attracted by constant novelty might have less clear career paths and therefore might frequently switch jobs and relocate. If they are driven and have a greater goal, this could enhance their career and also their potential earnings, but there is also the possibility that these changes are inconsequential and harmful, leaving less money to save.

"Extraversion is denoted by habitual outgoingness, venturing forth with careless confidence into the unknown, and being particularly interested in people and events in the external world. Introversion is reflected by a keen interest in one's own psyche, and often preferring to be alone" (Fernández-Ballesteros, 2002, p. 139). Brown and Taylor (2011) find positive effects of extraversion on the amount of unsecured debt and negative effects on financial asset accumulation. On the other hand neither Cobb-Clark et al. (2013) nor Duckworth and Weir (2010) find any effects for extraversion on pension savings. Yet, Cobb-Clark et al. (2013) find a neg-

ative effect on financial wealth and positive effect on real estate value. Therefore, effects for the net wealth in the mentioned direction can assumed to be found. Given the different savings investigated mixed effects with a tendencies to decrease the overall savings might be observed.

Agreeableness can be defined as "[...] constructs as love and hate, solidarity, conflict, co-operation, kindness.[...] [The desire of] being part of a spiritual or social community" (Fernández-Ballesteros, 2002, p. 139). Cobb-Clark et al. (2013) find positive effect of agreeableness on pensions but not on other wealth types. They find strong negative effects of the partner's Agreeableness on the overall financial wealth. Duckworth and Weir (2010) find that agreeableness of both husband and wife tend to lower savings and attribute this to the softhearted aspect of more agreeable people. Therefore, agreeableness could have positive effects on retirement savings on both ends of the scale: on the higher end through the bequest motive and on the lower end through egoistic motives. Given the effect at the extreme values of agreeableness there can be a u-shaped relationship for this trait. If there is an effect in the linear implementation, it might only be due to that fact, that the positive effect at one end of the scale is even larger than the one on the other end.

Neuroticism sometimes referred to as Anxiety or its counterpart emotional stability describe the way individuals are able to handle stress in general, how likely they are prone to depression or anxiety and anger as well as general vulnerability. Cobb-Clark et al. (2013) invert the scale of neuroticism to get the measure of emotional stability. The only effect that Cobb-Clark et al. (2013) find for emotional stability is a slightly positive effect on the savings rate. Besides emotional stability seems to only play a small role in household finances. If there was an effect, it could have been expected to go along the line of that the more emotionally stable a person is, the better she is likely to be prepared for retirement in the economic domain and beyond, which in turn would result in higher accumulated savings.

Beyond the Big-Five there is also the locus of control (LoC) scale that describes how people react or interact with their environment. The LoC scale also shows some correlation with the Big-Five traits and is found to have a significant effect on saving decisions (Cobb-Clark et al., 2013) which is why the LoC is included in this paper.

The concept was first developed by Rotter (1966) and is widely applied within psychological research. Individuals are characterized depending on how they personally judge how much that they are in control of their life and the events that happen around them. On the one end of the scale there are individuals who believe their influence on their own life is limited and that what happens to them is not caused by their decisions but is mainly the result of faith or luck. They are characterized as having an external LoC. The opposite is defined as an internal LoC. Individuals strongly believe that the events in their life are due to their own actions and their behavior. The differentiation between thinking one is in control of the circumstances versus them being predetermined is likely to have a significant effect for an individual's decision-making and saving behavior.

Schnitzlein and Stephani (2013) find that a more internal LoC leads to a significantly higher probability of being in a high wage compared to a low wage job and individuals with a more internal LoC also have a higher probability to move to a higher paid job. Caliendo et al. (2010) analyze the role of the LoC for the job search behavior of unemployed individuals. They find that having a more internal LoC is associated with higher search intensity, a higher job offer rate and a higher reservation wage. In addition, Caliendo et al. (2010) note that it is plausible that an internal LoC is related to positive labor market outcomes and economic success in general. Therefore, it would be expected to result in positive effects on retirement savings for individuals with a more internal LoC.

4 Methods and Data

4.1 Data

The SOEP, which is a representative sample of the German population collected since 1984 is the data source of this paper (Wagner et al., 2007). The SOEP includes information on the estimated surrender value of the retirement policies as well as several other saving types. The SOEP also includes a generated variable for net wealth, combining all savings and debt information gathered in the questionnaire. The individual saving information are all collected

in the following manner within the SOEP: first, "Do you have a life insurance policy or private retirement insurance policy, purchased either by you or by your employer for you?" as the binary dependent variable and second, "How high do you estimate the current cash surrender value of these policies to be?" as the continuous dependent variable. For all saving types it is first asked if an individual has assets in that category and in a follow up how high the estimated value of theses assets are.

In order to obtain a larger sample for the tobit estimation (Section 4.2) missing values of the estimated surrender value are coded as zeros if the previous question was answered with no. The estimated surrender value serves as a proxy for the amount actually saved. Recoding the missing values as zeros acknowledges the fact that there are no specific savings in that category given that the individual answered with no in the previous question.

The way the questions are phrased poses two limitations to the investigation. The question for the binary variable does not allow to distinguish between the employer pension and private pension schemes. It also relates to both life insurance and retirement insurances. Although both can be used for general retirement savings, the motivation for a life insurance can also be non-retirement related. It is therefore not possible to state that all savings, bundled under the question, are fully retirement related. Furthermore, asked for the surrender value, some may report the amount of savings already accumulated and others might also consider the costs related to prematurely terminating the policy.

For the first time the 2005 wave and later on the 2009 wave of the SOEP has included information on the Big-Five personality traits. In 2005 and 2009 the SOEP has administered a self-completion questionnaire of the Big-Five personality inventory. Instead of applying the Revised NEO Personality Inventory[1] ($NEOPI-R$) used in psychology, with 240 items, the SOEP administered a short version of the original long questionnaire for the elicitation of the Big-Five. The Big-Five Inventory Short ($BFI-S$) is a short item scale with 15 instead of 44 items using the original BFI-scale developed by Gerlitz and Schupp (2005). The 15 questions

[1]For further information see McCrae and Costa Jr (2010).

are phrased like “I am somebody, who ...” and can be answered on a 7 item Likert-scale with 1 as “does not apply at all” and 7 as “totally applies”. Before the addition to the SOEP questionnaire, the pretests conducted with the $BFI-S$ have shown a high middle inter-item correlation between 0.28 and 0.40 and fairly high Cronbach's α coefficients[2] ranging between 0.51 and 0.66. Despite being below the threshold of 0.7 for being seen as sufficient, and the low number of items and the high item heterogeneity given, the BFI-S can be considered as being reliable nonetheless (Dehne and Schupp, 2007, p. 33). Unfortunately, the SOEP has collected the Big-Five in a 5 year interval. This paper use the average of the 2005 and 2009 Big-Five values to construct an averaged Big-Five measure that is used to analyze the 2007 cross-section wealth information of the SOEP.

Additionally, a measure for the locus of control is also included. It came into the focus as a psychological factor impacting economic decision making in a paper by Cobb-Clark and Tan (2011). Similar to the Big-Five the question pertaining to locus of control is also measured on a 7 item Likert-scale. This paper applies the coding suggested by Schnitzlein and Stephani (2013) who use the SOEP data as well. They implement a measure of 3 internal locus of control questions and 4 external locus of control questions that are combined in a single index from 1 to 7, with 1 indicating a more external locus and 7 as indicating a more internal locus[3].

The final sample has 2760 observations. For the sample individuals who work as farmers, participating in military service or alternative military service, people in apprenticeship training, attend school or pensioners have been excluded. Besides that, the sample is limited to individuals between 30 and 55 years of age. This is done to avoid changing personality traits for younger and older individuals as found by Specht et al. (2011) and Cobb-Clark and Schurer (2012). Additionally the age span starts when individuals are most likely to start planing for retirement and ends before the major part of the population might start cashing in their retirement savings. As mentioned above there are several ways to save for retirement. Therefore,

[2]Cronbach's α is a coefficient of internal consistency of a scale and it is commonly used as an estimate of the reliability of psychometric tests.

[3]A list with the questions can be found in Table 10 in the appendix.

control variables for other investment objects like housing related savings which includes owing a house or having a building loan contract have been included. Additionally, a control for other savings which includes, having other tangible assets, owning other real estates or having other types of savings not directly dedicated to retirement has been implemented. Similar to the retirement savings variables there is a binary and a continuous variable reporting the individual participation decision and the estimated values of the savings for the other saving types. All of these continuous variables face the problem that their question in the questionnaire asks for the estimated amount of these savings, i.e. the values are not the precise asset values.

For the model central controls discussed in Lusardi (1998) like gender, age, schooling, the number of kids, being a state employee, being self employed, dummy for former east and west Germany, being a couple, migration background, cumulative work experience as well as unemployment and income on the individual and household level are used. The control variables are included in the estimation as follows. The logarithms of the individual net income and the combined net household income are included to control for income effects. Education is included as a continuous variable counting the years of education the person has acquired. The number of kids per individual which could effect savings through the bequest motive are also added. Moreover, work experience is included as a combination of years of part time work multiplied by 0.5 and full time work. Unemployment is coded in a similar way with the total number of months a person has experienced unemployment until 2007. Both variables influence the amount an individual receives from the public pension scheme. This in return influences the necessity to acquire private pension savings but also reduces the possibility of the individual to acquire such savings. The relationship indicator "couple" takes the value of 1 for individuals who are either married or have a partner and zero otherwise. Additional controls include variables that might indicate the attitude towards retirement. Smoking is included since the risks of smoking are well known and therefore it can be assume that the choice to smoke indicates time preference with a present day orientation putting a higher value on present consumption than on future risks, like an early death. The variable for the responsibility of old age provision is based on the question: "Who do you think has to take care of the financial provision during retirement?" with a scale from one to five. One indicates that the government should provide all of the funds, while five

indicates that the individual has to take care of it on her own. Additionally, a dummy coded variable is included which indicates if the individuals expects possible future inheritance taking the value one if that is the case and zero otherwise. Henceforth, if people expect future windfall gains they might save less than optimal due to their expectations. The question here is not if the windfall gains are later realized because the pure expectation is likely to change the savings behavior. As the last variable that might have an influence on the attitude towards retirement a measure for financial risk aversion is included. It is based on the question of how risk averse the individual judges herself to be on scale from zero to ten with zero indicating high risk aversion and ten as being fully prepared to take risks. The interested reader is referred to the appendix for the table with the descriptive statistics of the control variables.

4.2 Method

The econometric analysis is stared by estimating a standard ordinary least squares regression for net wealth as the dependent variable of the form,

$$y_i = P_i'\beta + x_i'\beta + u_i \qquad i = 1,\ldots,N$$

where $u_i = N(0,\sigma^2)$, and P_i denotes the $(J \times 1)$ vector of the personality traits and x_i the $(K \times 1)$ vector for exogenous and fully observed regressors.

Furthermore, two other types of dependent variables are considered. The first dependent variable is binary with a value of one if an individual has a certain type of savings and zero otherwise. The second dependent variable is the estimated surrender or resale value of a certain savings type. This second variable is censored at zero, since the estimated surrender or resale value cannot be negative. This paper uses a probit model for the binary dependent variable and a tobit model for the censored dependent variable. Both the probit and tobit model can be represented in a latent dependent variable framework.

Following Cameron and Trivedi (2009) I assume the following underlying latent variable model,

with y^* being the probability to have a certain savings type, determined by

$$y_i^* = P_i'\beta + x_i'\beta + u_i, \qquad i = 1,\ldots,N$$

Although y^* is not observed the date gives

$$y = \begin{cases} 1 & if \quad y^* > 0 \\ 0 & if \quad y^* \leq 0 \end{cases}$$

Given the models specified above, there is

$$\begin{aligned} Pr(y=1) &= Pr(P'\beta + x'\beta + u > 0) \\ &= Pr(-u < P'\beta + x'\beta) \\ &= F(P'\beta + x'\beta + u) \end{aligned}$$

where $F(\cdot)$ is the c.d.f. of $-u$. In the probit case u is standard normally distributed. For the identification of the latent-variable model its scale is fixed by placing a restriction on the variance of u. Therefore, β/σ can only identify, where σ is the standard deviation for u.

Based on Cameron and Trivedi (2009) the tobit model regression of interest is also specified as an unobserved latent variable y^*. The estimated surrender value is given by

$$y_i^* = P_i'\beta + x_i'\beta + u_i, \qquad i = 1,\ldots,N$$

As in the probit case the observed variable y_i is related to the latent variable y_i^* through the observation rule with the lower bound L

$$y = \begin{cases} 1 & if \quad y^* > L \\ 0 & if \quad y^* \leq L \end{cases}$$

The censored mean is determined by

$$E(y_i|x_i, y_i > L) = x'\beta + \sigma \frac{\phi\{(x_i'\beta - L)\sigma\}}{\Phi\{(L - x_i'\beta)/\sigma\}}.$$

$x_i'\beta$ now includes the personality traits to simplify the notation, $\phi(\cdot)$ is the standard normal density function and $\Phi(\cdot)$ is the cumulative distribution function. The parameters of both models can be conveniently estimated by maximum likelihood, with log-likelihood functions given by

$$logL^1_{probit} = \sum_{i=1}^{n} y_i log\Phi(x_i'\beta) + (1 - y_i) log(1 - \Phi(x_i'\beta))$$

and

$$logL^2_{Tobit} = \sum_{y_i=0} log\left[1 - \Phi\left(\frac{x_i'\beta}{\sigma}\right)\right] + \sum_{y_i>0} log\left[\frac{1}{\sigma}\phi\left(\frac{y_i - x_i'\beta}{\sigma}\right)\right]$$

where $\Phi(\cdot)$ is the cumulative distribution function of the standard normal distribution, $\phi(\cdot)$ is the corresponding standard normal density function, and $x_i'\beta$ denoting all explanatory variables. After the estimation average marginal effects are calculated for the probit and tobit model which are reported in the tables below.

5 Results

5.1 Descriptive Statistics

Table 2 shows the mean, standard deviation, median as well as the minimum and maximum values. The average individual in our sample has a net wealth of € 74,378. The gross wealth is split into € 105,454 of house related savings, the second place takes other savings with an average value of € 39,271 followed by the surrender value for the life and retirement policy with € 9,847. All reported values are the sample averages also including the zeros in each category. All the reported dependent variables show a high variance as can be seen from the minimum and maximum values. The standard deviations are larger than the sample averages for all dependent variables.

Table 2: Descriptive Statistics for Net Wealth and Savings Types

	Mean	SD	Median	Min	Max
House	105,474.93	(142,171.09)	11,000	0	1,500,000
Other Savings	39,270.56	(157,089.89)	2,000	0	3,150,000
Life/ Retirement Policy	9,846.53	(22,202.87)	2,000	0	350,000
Net Wealth	74,377.90	(160,849.60)	30000	-1,000,000	3,221,500

Note: Numbers of observation: 2760. House: Surrender value of a building loan contract and the estimate value of owner occupied housing. Other savings: Business ventures, tangible assets, other housing/property and other savings. Life/ Retirement Policy: Estimated surrender value of the policy held privately or by the employer. Source: *SOEP* 2007

Figure 1 offers a quick view of the participation rates.

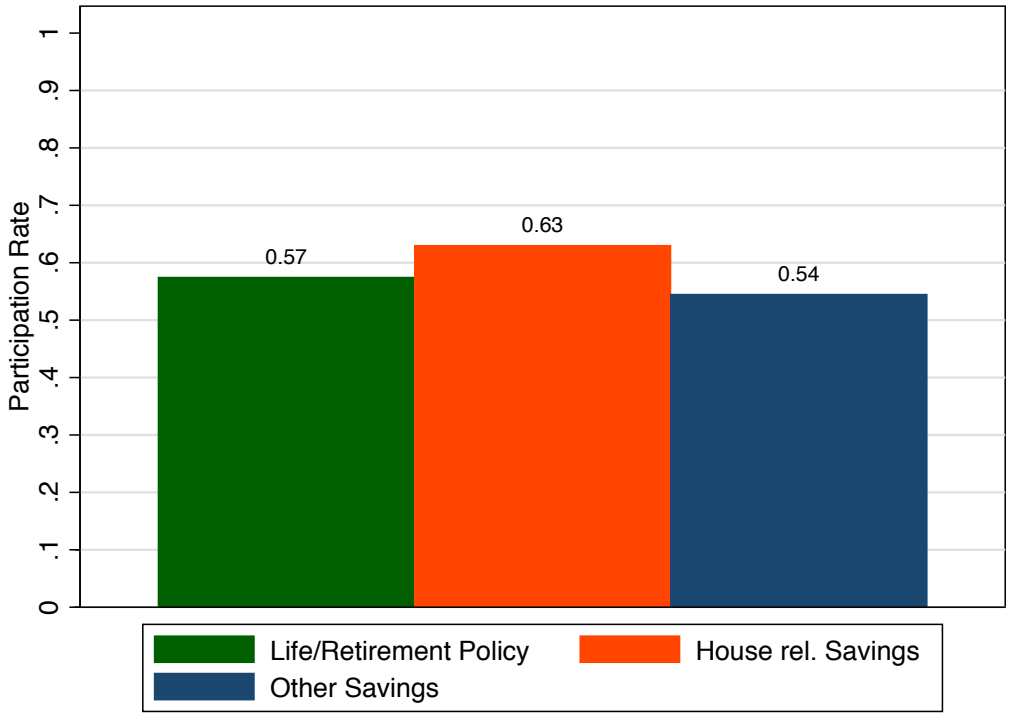


Figure 1: Participation rate for the different saving types
Source: SOEP 2007 with 2,760 numbers of observation

The most common type are the house related savings. 63 % of the individuals have either a building loan contract or own a house. Interesting to note is a switch related to housing and building loan contracts between the young and old individuals. A building loan contract is a more common savings type for young adults followed by house ownership. This relationship turns around for older adults when house ownership overtakes building loan contracts, indicating that the contracts used as savings vehicles are later converted to actually build or buy a house. The second most common type of savings are life and retirement polices with 57 % of

the individuals reporting to have a private or employer based life and retirement policy. 54% of the individuals report to have other types of savings.

The savings decision over the different personality traits are similar for the higher trait values and the ones close to the mean. Larger deviations form the overall mean can only be observed for the lower values of the personality traits (Figure 4 in the appendix). This is most likely due to the low number of observations in these categories. The distribution of observations over the different categories of the personality traits is mostly skewed to the right for all traits. This is most pronounced for conscientiousness which has the highest number of observations in the last category and no observations in the first and only two observations the second category. This changes for agreeableness and extraversion with the most observations in category 5, while openness to experience and emotional stability show a bell shaped distribution with the largest numbers of observation split between 3 and 4. All a measures have a tendency for higher scores. Note that emotional stability is the inverted scale of neuroticism.

Table 3 displays the mean and standard deviations for the averaged personality traits of the 2005 and 2009 waves. The regression analyses use the standardized values with a mean of zero and a standard deviation of one. The standard deviations for the non-standardized trait measures range between 0.7 and 1. This means a one standard deviation change approximately results in a change of one on the actual trait scale.

Table 3: Descriptive Statistics for the Personality Traits

	Mean	SD	Min	Max
Conscentiousness	5.992	(0.729)	2.833	7
Openness	4.430	(1.034)	1.000	7
Extraversion	4.810	(1.000)	1.167	7
Agreeableness	5.356	(0.847)	1.667	7
Emotional Stability	4.176	(1.060)	1.000	7
Locus of Control	4.792	(0.744)	1.000	6.857

Note: Numbers of observation: 2760. Individual Big 5 measures are the average of the 3 question per trait included in the *SOEP* averaged over the wave 2005 and 2009. Individual Locus of Control measures are the average of 7 questions included in the *SOEP* in 2007 following Schnitzlein and Stephani (2013). Source: *SOEP* 2005,2007 and 2009

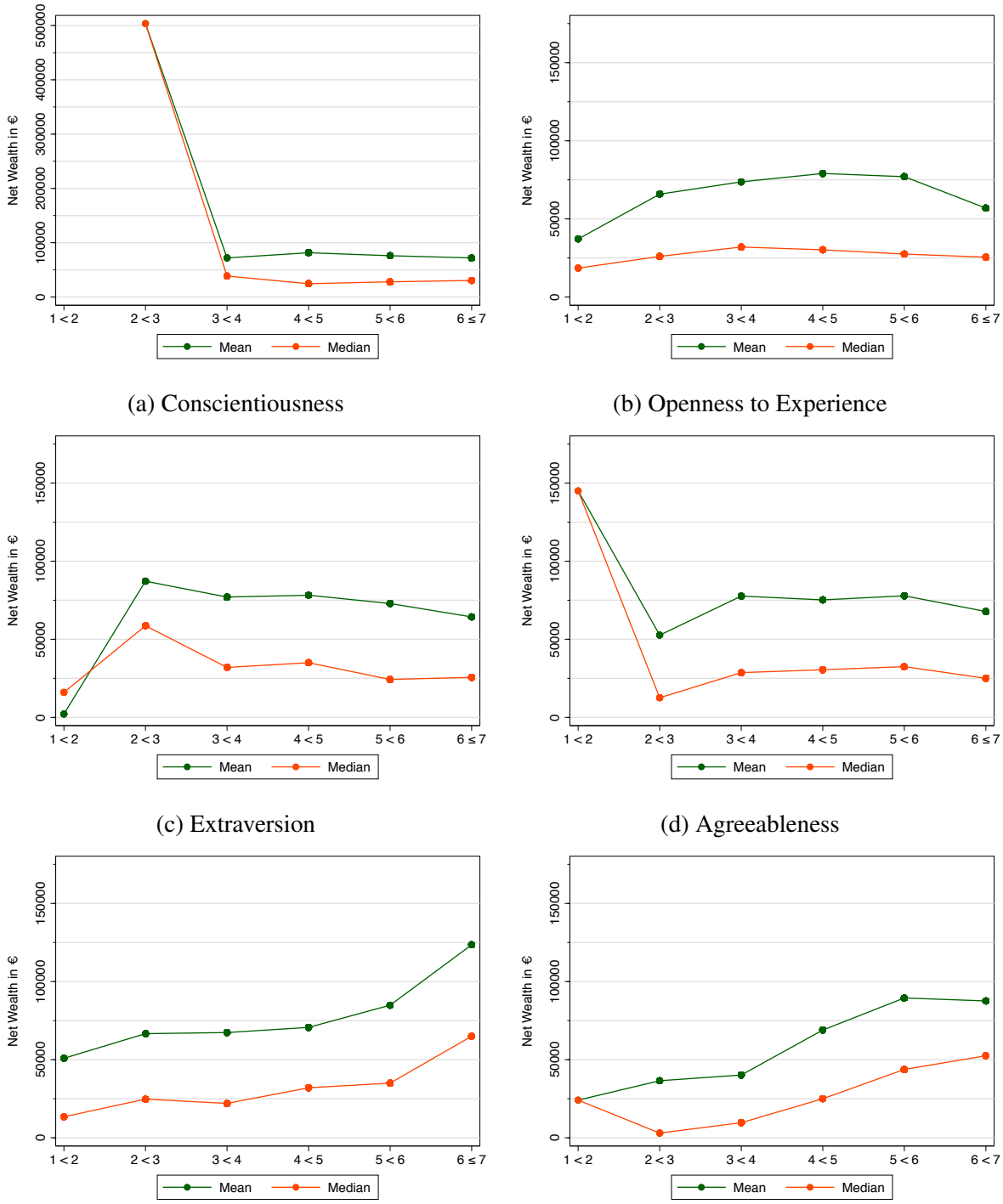
The descriptive statistics for the control variables can be found in Table 9 in the appendix.

5.2 Net Wealth and Saving Types over Personality Traits

Figure 2 shows an increase in net wealth for emotional stability and locus of control while there seems to be an inverted u-shape pattern in the openness to experience categories. In Figure 3b the inverted u-shape relationship observed for net-wealth and openness to experience is prevalent for the three types of savings, although less pronounced for the surrender value of the life and retirement policies. The increasing relationship for emotional stability and locus of control can also be observed for the saving types. There are no clear trends or patterns for conscientiousness, extraversion and agreeableness. Figure 2 shows the mean values of net wealth for the different categories of the personality traits.

In case of conscientiousness there are no observations in the lowest category and only 2 in the second lowest. The fact that one of the two observations in this category is an relative outlier results in a different scale for Figure 2a and all following sub figures of conscientiousness. Within each category over all traits there is a left skewed distribution for net wealth indicated by the fact that the median is always below the mean. This mirrors the distribution of incomes usually observed for the general population. Although there is some variation over the different traits only three seem to indicate some kind of pattern. For openness to experience the net wealth is highest for moderate values and seems to fall at the upper and lower end of the scale, while an increasing pattern for emotional stability and locus of control can be observed. The more emotional stable an individual is or the more she feels she has control over her live, the higher the net wealth. The other traits show no clear pattern besides some large deviations from the norm in the lower categories which is due to the low number of observations in these categories.

For emotional stability it makes sense that a more settled and stable person is able to acquire more wealth than a neurotic person who is less self-conscious, more prone to depressions and might have anxieties. All of facets that characterize emotional stability have a negative loading. Therefore, having less of everything is better in this case. It is also sensible that individuals who feel more in control of their live have a higher net wealth compared to individuals who think that everything is predetermined or beyond their control. Looking at the facets for openness to



(a) Conscientiousness

(b) Openness to Experience

(c) Extraversion

(d) Agreeableness

(e) Emotional Stability

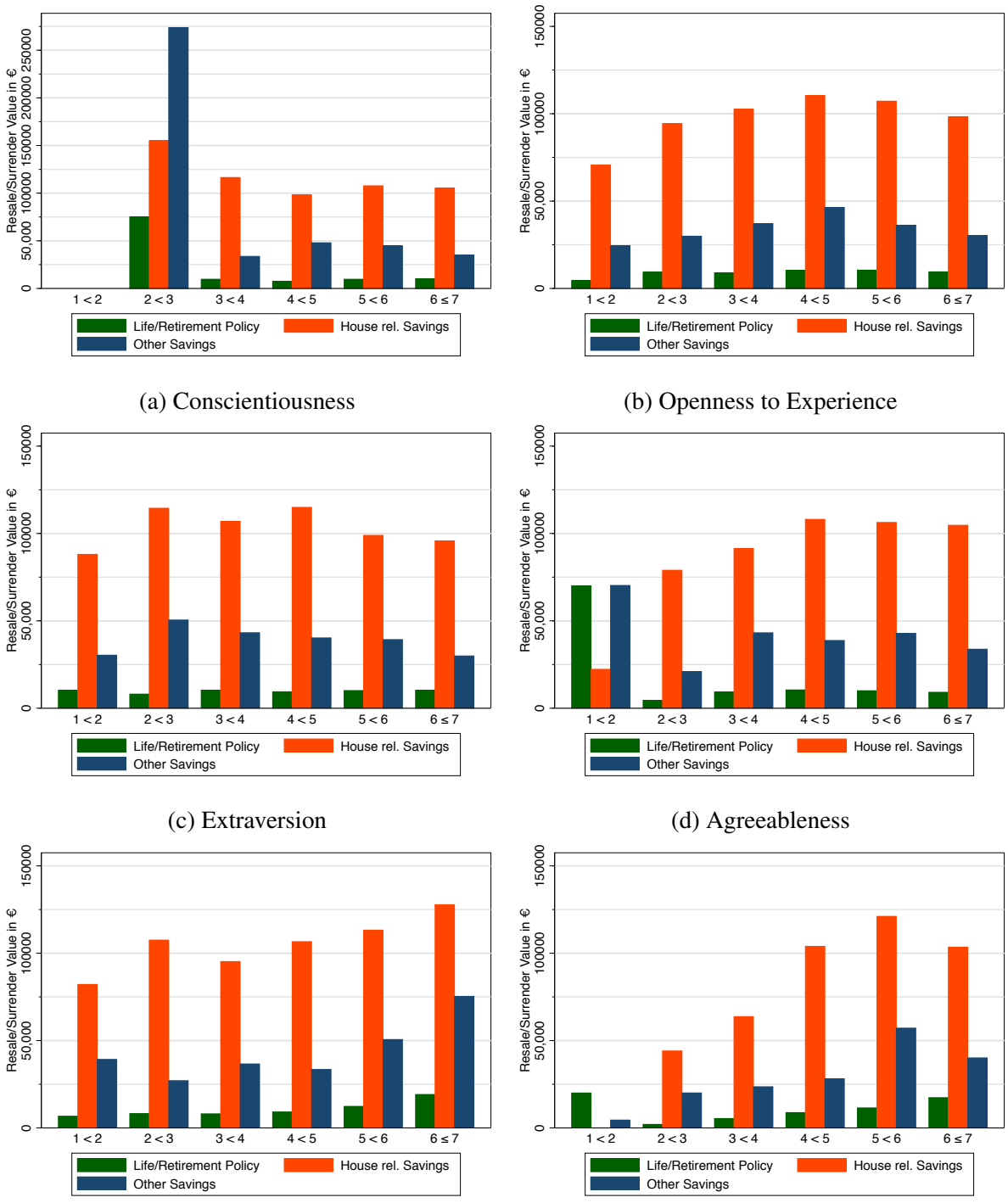
(f) Locus of Control

Note: The x-axis has 6 categories which are coded for one equals everything from 1 to below 2, two from 2 to below 3, and so forth for the other categories while six as the last category is coded as 6 and above including 7.
Source: SOEP 2007 with 2760 observations.

Figure 2: Mean net wealth over the personality traits

experience the picture looks different. Besides intellect for which one would assume more is better all facets are likely to be most desirable on a middle level. Both for a general career path perspective as well as for regular social interactions the total lack of emotions or imagination is

just as undesirable as the opposite. There are likely to be exceptions at the extremes but over the full population a good mixture of the facets seems to optimize net wealth. The mean values for the different saving types over trait categories are shown in Figure 3.



(a) Conscientiousness

(b) Openness to Experience

(c) Extraversion

(d) Agreeableness

(e) Emotional Stability

(f) Locus of Control

Note: The x-axis has 6 categories which are coded for one equals everything from 1 to below 2, two from 2 to below 3, and so forth for the other categories while six as the last category is coded as 6 and above including 7. Source: SOEP 2007 with 2760 observations.

Figure 3: Surrender Value of the Saving Types over Personality Traits

Conscientiousness, agreeableness and extraversion show no clear pattern. Only for extraversion and house related saving an increase over the first four categories with an approximately similar value for the last two categories can be observed. The saving types and openness to experience although less pronounced for the surrender value of the life and retirement policies have a similar u-shape relationship. There is an increasing trend for the mean values and the level of emotional stability. Although the trend is not monotone it could be argue that more stable individuals also have more assets. In case of locus of control there is also a similar increasing trend. For highly internal locus of control values the levels of house related savings and other savings show a lower value. It is also notable that individuals with an external locus of control have hardly any assets. The assets they do have are attributable to life and retirement policies which have a similar level as for the individuals with an internal locus of control. Due to a drastic change from category one to two this can also be a small sample issue like in the other low categories. Figure 5 in the appendix shows stacked bar graphs to give an overview over all savings confirming the discussed patterns. Figure 6 in the appendix only plots the life and retirement values for a closer inspection.

The patterns seem to fit the results discussed in the literature. For instance the consistent pattern for emotional stability and locus of control indicate that there might be a significant effect on the saving decision. To see if these patterns translate into statistically significant effects a probit regression to investigate the participation decision for the different savings types is estimated before using a tobit regression to estimate the effects of the personality traits on the amount of savings.

5.3 Allocation of Savings - Probit Estimates

Given the patterns observed in the figures and the significant estimated effects differentiated effects of personality on the allocation of savings can be observed. The effects vary with each savings type, indicating that there are different mechanisms at play for each type of savings. Taken the effects found and focusing on the life and retirement policies individuals that score on the upper end of the scale of extraversion have a higher probability to have such a policy. Yet

it reduce the likelihood to have house related savings. At the same time there is a negative effect of agreeableness on the likelihood to have a life and retirement policy while conscientiousness increases likelihood to have other savings.

For the probit model the response to the question: "Do you have a [insert savings type]?" is used. The individuals had the possibility to answer with either yes or no. The binary response variable is used as the dependent variable in the following models. Table 4 shows the average marginal effects for the probit model for the different saving types[4]. Given the small variation observed for the participation rates based on the graphs rather small effects if some at all can be expected. The F-Test for the joint significance of the personality traits does not reject the null hypothesis of all traits being equal to zero. The only significant effects on having a life and retirement policy can be found for extraversion and agreeableness. Having a higher level of extraversion increases the likelihood to have such a policy by 1.9 percentage points per standard deviation. Therefore, the difference is around 11.1 percentage points from the lowest trait score to the highest[5]. Being more agreeable decreases the likelihood to have a policy by 1.6 percentage points per standard deviation amounting to a total difference of around 10.6 percentage points.

For house related savings higher levels of extraversion decrease the likelihood to have such savings by 1.8 percentage points (10.7 in total). No other trait seems to have a significant impact on house related savings. The only trait that has an impact on other savings is conscientiousness with higher levels of this trait increasing the likelihood to have other savings by 2.4 percentage points for each standard deviation. Therefore, the total difference from the lowest trait score to the highest is around 13.9 percentage points.

It could be the case that the more extroverted individuals talk more about money and in return might also get or seek better financial advice. This could lead to the fact that they decrease their house related savings, which might yield lower returns, and invest instead into better saving types like life and retirement policies. Although there is an increasing trend for almost all

[4]The full regression results can be found in the appendix in Table 11.

[5]The total difference in calculated by the difference between the maximum and minimum values for each trait divided by the standard deviation times the average marginal effect.

Table 4: Average Marginal Effects for the Probit Regression

Variable	RS	HS	OS
Conscientiousness	0.0014	0.0066	0.0243***
	(0.0098)	(0.0094)	(0.0093)
Openness	-0.0081	0.0077	-0.0048
	(0.0098)	(0.0095)	(0.0095)
Extraversion	0.0191*	-0.0185*	-0.0126
	(0.0098)	(0.0095)	(0.0096)
Agreeableness	-0.0168*	0.0096	-0.0101
	(0.0097)	(0.0093)	(0.0091)
Emotional stability	-0.0014	-0.0043	-0.0042
	(0.0096)	(0.0093)	(0.0093)
LoC	0.0095	0.0066	-0.0004
	(0.0096)	(0.0094)	(0.0090)
N	2760	2760	2760
F-test (p-value)	0.24	0.36	0.16

Note: RS: Life/retirement policies; HS: House related savings; OS: Other savings. Standard errors appear in parentheses. ***, ** and * denote significance at the 1%, 5% and 10% level, respectively. F-test (p-value) denotes the p-value associated with an F-test of joint significance of the personality traits. Source: Based on *SOEP* 2002, 2004, 2005, 2007 and 2009

saving types, there are no significantly estimated effects for emotional stability and locus of control. The general positive effect of conscientiousness on having other savings aligns with the findings by Duckworth and Seligman (2005) and Cobb-Clark et al. (2013).

5.4 Effects on the Amount of Savings - Tobit Estimates

There are positive effects of extraversion and locus of control and negative effects of agreeableness on retirement related savings. As people get more extroverted they also decrease their house related savings. Locus of control also has a positive impact on net wealth with and in contrast openness to experience which decreases net wealth. These results indicate that the personality traits effect the amount of savings and the allocation to certain saving types.

For the tobit model the followup question to the one used for the probit model is used. Therefore, after the individuals have been asked about their ownership of certain kinds of savings they

are asked about the estimated amount or surrender value of the savings they own. One issue is that some answer the first question with no and still answer the followup question reporting a zero. Others skipped the estimated value question leaving a missing value in the data. I coded everyone who answers the first question with no as having a value of zero for the estimated amount of that savings type. In doing so the available information which is carried by the answer no is used. The individual has no investments or savings in that category and instead of dropping the observation due to the "does not apply"-value in the data the zero coding preserves that information. In order to handle the large amount of zero records in the data a left censored tobit model is used for the estimation. Furthermore, the same model specifications for the probit model are applied. The average marginal effects for the tobit estimations are reported in Table 5. Additionally to the tobit estimations for the saving types a standard ordinary least squares regression for net wealth as dependent variable permits negative values and thereby does not suffer from the truncation restrictions.

Table 5: Average Marginal Effects for the Tobit Regression

	Tobit			OLS
Variable	RS	HS	OS	NW
Conscientiousness	398.02	1718.89	481.92	-1599.02
	(329.80)	(2438.62)	(1976.29)	(3662.51)
Openness	-210.77	1176.50	-1799.18	-5956.50**
	(334.82)	(2471.66)	(2013.20)	(2838.17)
Extraversion	580.60*	-5259.64**	-2270.41	-787.25
	(333.53)	(2464.14)	(1995.22)	(3267.68)
Agreeableness	-692.95**	2632.36	-1087.53	-1742.96
	(324.77)	(2411.50)	(1961.01)	(3115.80)
Emotional stability	323.46	-388.28	-248.77	1441.01
	(327.39)	(2413.64)	(1976.22)	(3515.87)
LoC	808.85**	2003.25	1305.59	3900.45*
	(330.43)	(2458.30)	(1993.08)	(2316.59)
N	2760	2760	2760	2760
F-test (p-value)	0.00	0.29	0.68	0.05

Note: RS: Life/retirement policies; HS: House related savings; OS: Other savings. Standard errors appear in parentheses. ***, ** and * denote significance at the 1%, 5% and 10% level, respectively. F-test (p-value) denotes the p-value associated with an F-test of joint significance of the personality traits. Source: Based on *SOEP* 2002, 2004, 2005, 2007 and 2009

Looking at the average marginal effects for the tobit estimates one can see that all significant estimates show the same direction as in the probit model. Furthermore, the personality variables are jointly significant for the estimates on the surrender value of the life and retirement policies and for the net wealth estimates. A one standard deviation increase in extraversion raises the estimated surrender value by € 580.60 and a one standard deviation increase in agreeableness decreases the estimated surrender value by € 692.95. The total differences over the full trait scales are € 3,386.64 for extraversion and € 4,363.05 for agreeableness. Additional to the significant estimates in the probit model there is also a significant effect of locus of control on the estimated surrender value of the life and retirement policies. An increase of one standard deviation on the locus of control scale increases the estimated value by € 808.85 indicating a total difference between an individual with an external locus of control and an internal locus of control of € 6,367.52.

As in the probit model extraversion is estimated to have an negative impact on house related savings decreasing the estimated value by € 5,259.64 with each standard deviation increase up to a total difference of € 30,679.48. Therefore, as one move along the extraversion scale the individuals seem to substitute house related savings with life and retirement policies although on different levels. Again, if more extroverted individuals get more into contact with other people they also might be aware of different investment decisions. In this case investing more money in specific old age provision. There seems to be no significant effect of personality on other savings but openness to experience and locus of control significantly effect net wealth. Openness decreases the net wealth by € 5,956.50 for each standard deviation increase and locus of control increases the net wealth by € 3,900.45 for each standard deviation move from an external focus to an internal focus. The total difference amounts to € 52,433.33 and € 30,705.56 respectively. Given that openness to experience has no impact on the saving types and given the negative effect on net wealth the effect is most likely related to its effect on debt as discussed by Brown and Taylor (2011).

5.5 Non-Linear Effects

In order to also check for possible non-linear effects of the personality traits additional dummy variables have been generated for each trait. This is done by splitting the full scale into three different parts based on the mean values and standard deviations for each trait. The base or middle category is then defined via as mean +/- one standard deviation. The low category includes everything below the threshold and the higher category includes everything above the threshold of the base category. The results for the probit estimates are presented in Table 6

To indicate non-linear relationships in a u-shape or inverted u-shape, the included low and high category dummies would need to be simultaneously significant in the estimation. Table 6 shows no instance of such a relationship for the participation decision. For the retirement savings only the low dummy for agreeableness is estimated to be significant with an average marginal effect of 6.38 percentage points increase in the likelihood to have such a policy if one falls into that low category. For the other saving types there are negative effects of low openness to experience and an external locus of control, and a positive effect for low emotional stability on house related savings. Additionally there is a positive effect of high conscientiousness on other savings. Table 7 reports the average marginal effects for the tobit estimations.

Again there is no instance where both dummy variables are jointly significant but there are some interesting results. First of all there is a negative effect of low values of conscientiousness and a positive effect of high values of emotional stability on the estimated surrender value of the life and retirement policy. This confirms the trends which can be observed in Figure 3e. Both traits are not estimated to have a significant impact in the continuous implementation of the traits indicating a larger effect as one deviates further from the average. The positive effect of a low agreeableness and the negative effect of an external locus of control confirm the effects estimated above. Only extraversion which is significant in the continuous implementation shows no effect for the dummy implementation.

For house related savings the estimates confirm a negative effect of high values of extraversion. Additionally, the positive effect found for low values of emotional stability on the likelihood to have house related savings also positively affects the estimated amount of theses savings.

Table 6: Average Marginal Effects for the Probit Regression - Dummies

Variable	RS	HS	OS
Low Conscientiousness	-0.0324	0.0236	-0.0210
	(0.0250)	(0.0244)	(0.0243)
High Conscientiousness	-0.0286	0.0041	0.0409*
	(0.0254)	(0.0247)	(0.0243)
Low Openness	-0.0116	-0.0444*	0.0146
	(0.0244)	(0.0239)	(0.0235)
High Openness	-0.0020	-0.0186	-0.0117
	(0.0246)	(0.0238)	(0.0244)
Low Extraversion	-0.0278	0.0308	0.0280
	(0.0259)	(0.0258)	(0.0251)
High Extraversion	0.0146	-0.0196	0.0044
	(0.0238)	(0.0227)	(0.0235)
Low Agreeableness	0.0638***	-0.0177	-0.0214
	(0.0235)	(0.0228)	(0.0222)
High Agreeableness	-0.0087	0.0321	-0.0278
	(0.0262)	(0.0258)	(0.0254)
Low Emotional stability	0.0049	0.0437*	-0.0013
	(0.0252)	(0.0245)	(0.0246)
High Emotional stability	0.0146	0.0214	-0.0067
	(0.0258)	(0.0251)	(0.0246)
External LoC	-0.0378	-0.0391*	0.0228
	(0.0243)	(0.0237)	(0.0237)
Internal LoC	-0.0027	-0.0128	0.0085
	(0.0242)	(0.0233)	(0.0228)
N	2760	2760	2760
F-test (p-value)	0.27	0.21	0.78

Note: RS: Life/retirement policies; HS: House related savings; OS: Other savings. Standard errors appear in parentheses. ***, ** and * denote significance at the 1%, 5% and 10% level, respectively. F-test (p-value) denotes the p-value associated with an F-test of joint significance of the personality traits. Source: Based on *SOEP* 2002, 2004, 2005, 2007 and 2009

Table 7: Average Marginal Effects for the Tobit Regression - Dummies

	Tobit			OLS
Variable	RS	HS	OS	NW
Low Conscientiousness	-2004.74**	232.14	-7043.97	-5819.05
	(849.96)	(6258.90)	(5093.44)	(8811.03)
High Conscientiousness	-702.86	396.62	-2883.09	-5547.76
	(884.28)	(6498.47)	(5308.94)	(6237.69)
Low Openness	-445.86	-7733.98	4729.41	7624.01
	(844.65)	(6242.72)	(5112.05)	(8029.47)
High Openness	-283.80	-5784.00	-3334.47	-12600.16
	(832.06)	(6199.55)	(4948.33)	(8485.35)
Low Extraversion	-1179.95	666.22	2008.18	-7567.27
	(889.30)	(6509.06)	(5272.91)	(7474.94)
High Extraversion	633.51	-10779.92*	-398.59	-2255.37
	(808.51)	(6054.76)	(4885.82)	(9120.10)
Low Agreeableness	1831.11**	-1408.69	-1231.18	6603.64
	(781.03)	(5880.53)	(4786.64)	(9278.42)
High Agreeableness	-812.09	4646.69	-5841.81	-7487.49
	(918.24)	(6655.22)	(5516.00)	(6403.63)
Low Emotional stability	989.63	10721.63*	6133.33	14335.23
	(873.52)	(6375.60)	(5238.93)	(9010.09)
High Emotional stability	2620.00***	5297.88	3508.60	14261.18
	(844.24)	(6331.42)	(5108.23)	(9230.64)
External LoC	-2259.21**	-15016.03**	1665.00	-12035.03**
	(883.26)	(6471.03)	(5313.45)	(5328.90)
Internal LoC	-383.74	-4507.74	-1452.97	-5390.52
	(797.88)	(5957.59)	(4795.20)	(8236.40)
N	2760	2760	2760	2760
F-test (p-value)	0.00	0.27	0.86	0.18

Note: RS: Life/retirement policies; HS: House related savings; OS: Other savings. Standard errors appear in parentheses. ***, ** and * denote significance at the 1%, 5% and 10% level, respectively. F-test (p-value) denotes the p-value associated with an F-test of joint significance of the personality traits. Source: Based on *SOEP* 2002, 2004, 2005, 2007 and 2009

Furthermore, there is a negative effect of an external locus of control on the estimated amount of house related savings. Again there are no significant estimates for other savings and for net wealth only an external locus of control has an negative impact.

5.6 Robustnes Check

In order to check how sensitive the estimates are to different specifications Table 8 reports the average marginal effects for the personality traits with variations in the added control variables. The full results can be found in the appendix.

Table 8: Model Selection based on Life/Retirement as Dependent Variable

	M1	M2	M3	M4	M5	M6
Conscentiousness	190.57	593.30*	410.37	531.64	398.02	-
	-347.09	339.43	330.69	-331.39	-329.80	
Openness	500.37	-14.26	-183.45	-203.59	-210.77	-
	-351.12	345.37	337.91	-336.84	-334.82	
Extraversion	-233.34	494.06	432.25	484.42	580.60 *	-
	-353.67	342.87	334.51	-335.26	-333.53	
Agreeableness	-1669.58**	-1299.14**	-727.52**	-704.10**	-692.95 **	-
	-343.50	333.06	327.00	-326.73	-324.77	
Emotional Stability	1571.39 ***	614.49*	346.96	291.37	323.46	-
	-339.40	337.97	329.20	-329.42	-327.39	
Locus of Control	1994.86 ***	1667.41***	962.91***	808.83**	808.85**	-
	346.41	336.00	331.91	332.17	330.43	
General Controls	-	X	X	X	X	X
Labor Controls	-	-	X	X	X	X
Attitude	-	-	-	X	X	X
Savings Controls	-	-	-	-	X	X
N	2760.00	2760.00	2760.00	2760.00	2760.00	2760.00
AIC	38300.20	38087.03	37924.14	37909.63	37866.46	37872.72

Note: Numbers of observation: 2760. General: female, age, education, number of kids, east, couple, migration. Labor: self employed, public sector, work experience, unemployment spell, log net income, log household income. Attitude: smoking, responsibility for old age provision, expected inheritance, financial risk taking. Saving: house related savings , other savings. Source: *SOEP* 2002, 2004, 2005, 2007 and 2009

The estimates for agreeableness and locus of control are significant in all specifications and only decrease in size as more control variables are added. The coefficient for extraversion only becomes significant as the controls for other saving types are added. It is insignificant in all previous specifications. Emotional stability is only estimated to be significant in the first two specifications. As more controls are added the effect decreases at first in size and then becomes insignificant from specification M3 onward. Also in specification M2, which only contains the general controls, there is a significant effect of conscientiousness but no insignificant effect in all other specifications. Therefore, the effect of extraversion on life and retirement savings could be debatable and is open to more research. The effects of agreeableness and locus of control are consistently estimated with all specifications.

Omitting the personality traits in specification M6 slightly increases the AIC value but also changes the size of the average marginal effects for some of the control variables. The effects of having a migration background or being self employed increase in the specification without the personality traits. The same holds true for the effects of the income variables and the attitude about who should take care of old age provision. Without the personality traits the coefficients for unemployment spells is estimated to have a significant impact. Therefore, estimating without personality traits introduces additional omitted variable bias.

6 Conclusion

This paper gives insight to the question if the money people save for retirement is influenced by their personality traits. Expanding the understanding of preference heterogeneity, and consequently of the heterogeneity of individual's temporal decision making is important to fully comprehend how and why people save for retirement. More accurate data about the actual amounts saved can lead to more precise estimations.

A personality type that is likely to have more retirement savings than the average individual can be constructed. This individual would be characterized by an average to high level of conscientiousness being striving for achievement, orderly and self disciplined. High levels of extraver-

sion as in being assertive and friendly as well as low levels of agreeableness meaning lower than average levels of altruism, sympathy and modesty lead to higher savings for retirement. Additionally high levels of emotional stability as in being self conscious, less prone to depression or anxiety as well as a rather internal locus of control as in thinking that one is the maker of his own success and less dependent on external circumstances result in higher retirement savings.

Also a negative effect of extraversion on house related savings is found. This indicates a shift away from house related savings to more dedicated saving products for individuals with higher levels of extraversion. While openness to experience does not seem to have an effect on retirement savings the negative effects of agreeableness contradict the positive effects found in the literature. But the negative estimates of agreeableness are stable over all model specifications.

Although it is possible to identify a combination of characteristics that would maximize the amount of private retirement savings, it is difficult to draw any policy conclusion from the results. One way would be childhood intervention to groom the specific traits, as they seem to be malleable before 25. But this carries the controversial thought of indoctrination and conformity. A better way to approach the issue would be an informational campaign. Motivating individuals to take part in private assessments of their personality and afterwards providing them with informational material concerning their results and how these may affect their savings decision.

To really be able to provide reliable information further research into the development of the personality and the combination of personality inventories with better data on investment decisions is needed. Still the findings in this paper suggest that when investigating how people save for retirement personality should be considered in addition to general economic determinants.

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A Appendix

A.1 Supplementary Descriptive Tables

Table 9: Descriptive Statistics for the Control Variables

	Mean	SD	Min	Max
Female	0.4815	(0.500)	0	1
Age	43.5170	(6.804)	30	55
Education	12.6009	(2.661)	7	18
Number of Kids	1.6333	(1.127)	0	12
Self Employed	0.0688	(0.253)	0	1
Public Sector	0.0656	(0.248)	0	1
East	0.2707	(0.444)	0	1
Couple	0.8149	(0.388)	0	1
Migration	0.1772	(0.382)	0	1
Work Exp	18.1600	(8.233)	0	40.2
Unemployment	0.7617	(1.709)	0	15.9
Log Net Income	7.1584	(0.739)	3.8712	9.6803
Log H Net Income	7.8955	(0.447)	5.4681	9.8201
House rel. Savings	0.6301	(0.483)	0	1
Other Savings	0.5449	(0.498)	0	1
Ret. Savings	0.5746	(0.494)	0	1
Smoking	0.2964	(0.457)	0	1
Res. Old Age	2.6051	(0.821)	1	5
Inheritance	0.2565	(0.437)	0	1
Financial Risk	2.7293	(2.250)	0	10

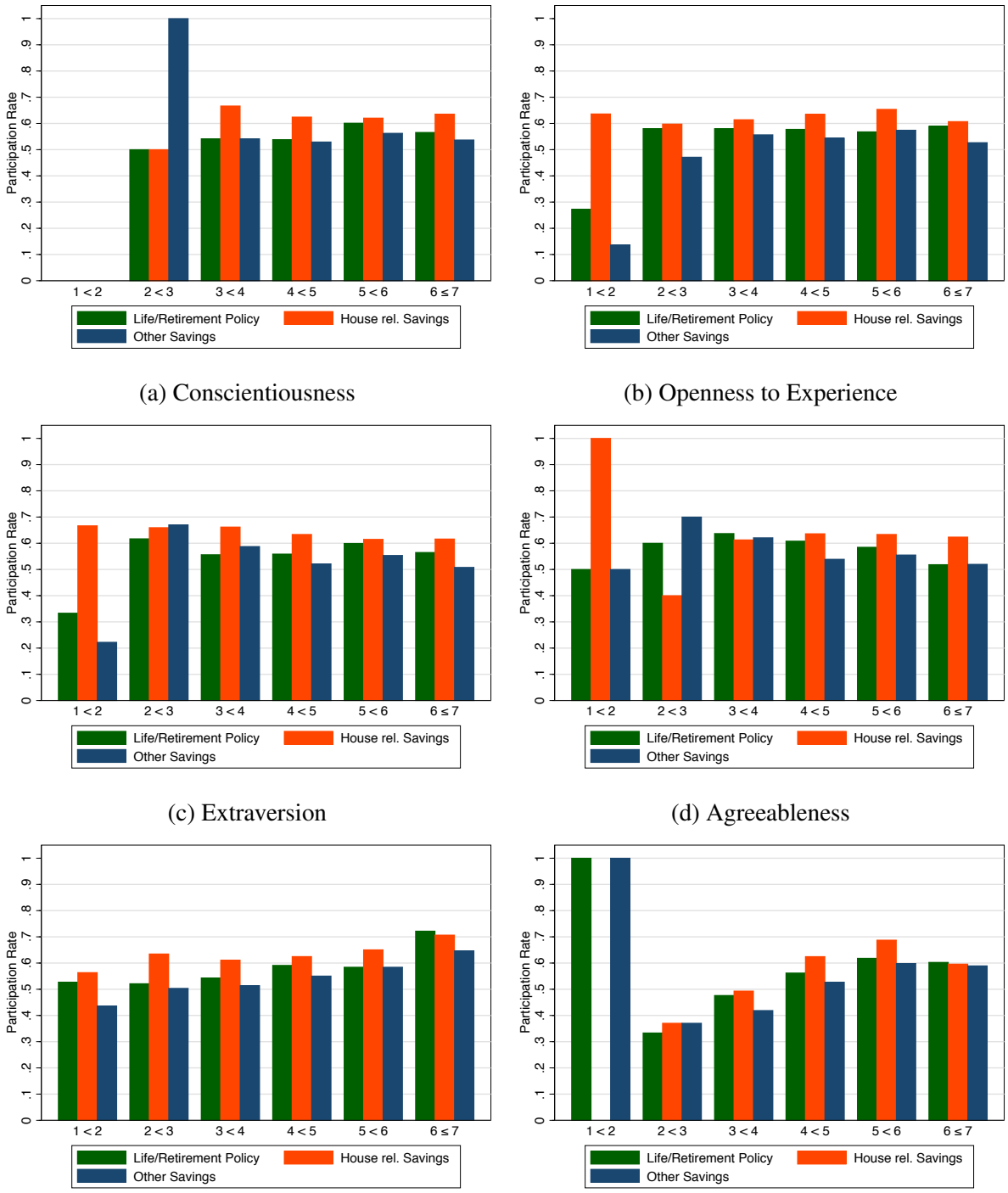
Note: Numbers of observation: 2760. Source: *SOEP* 2002,2004,2005,2007 and 2009

Table 10: Used Measurement of Locus of Control from the SOEP questionnaire

Locus of Control	
How my life goes depends on me.	Internal LoC
If a person is socially or politically active, he/she can have an effect on social conditions.	Internal LoCs
One has to work hard in order to succeed.	Internal LoC
Compared to other people, I have not achieved what I deserved.	External LoC
I frequently have the experience that other people have a controlling influence over my life.	External LoC
The opportunities that I have in life are determined by the social conditions.	External LoC
I have little control over the things that happen in my life.	External LoC

Source: SOEP questionnaire, wave 2010.

A.2 Supplementary Graphs



(a) Conscientiousness

(b) Openness to Experience

(c) Extraversion

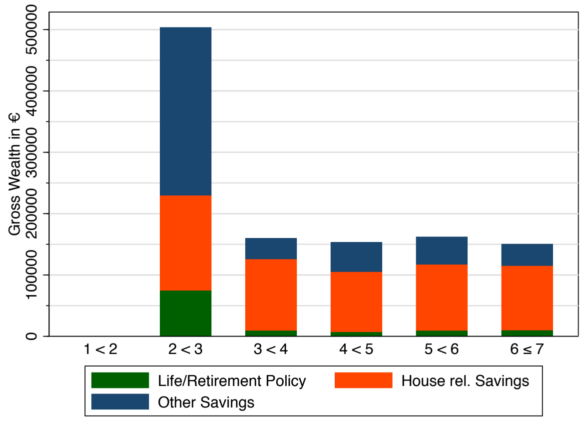
(d) Agreeableness

(e) Emotional Stability

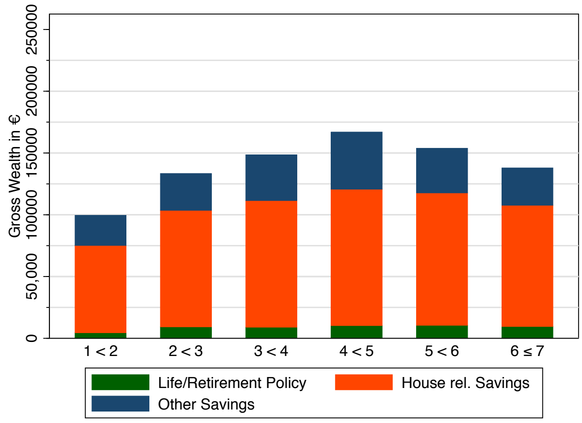
(f) Locus of Control

Note: The x-axis has 6 categories which are coded for one equals everything from 1 to below 2, two from 2 to below 3, and so forth for the other categories while six as the last category is coded as 6 and above including 7. Source: SOEP 2007 with 2760 observations.

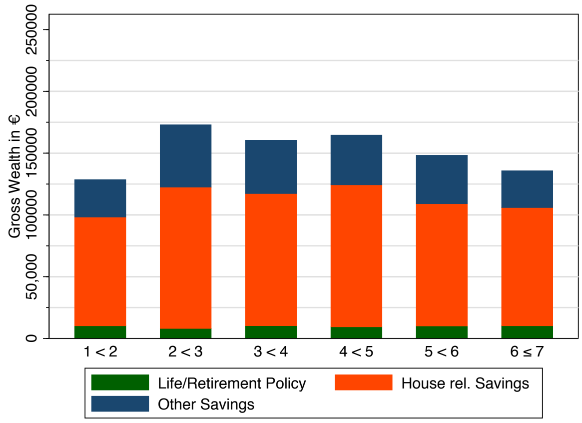
Figure 4: Participation rate over the personality traits



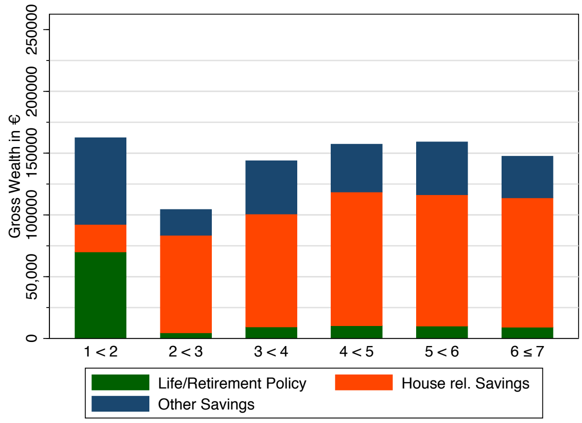
(a) Conscientiousness



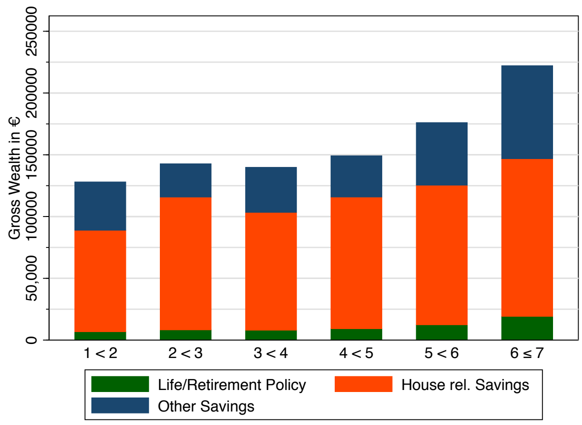
(b) Openness to Experience



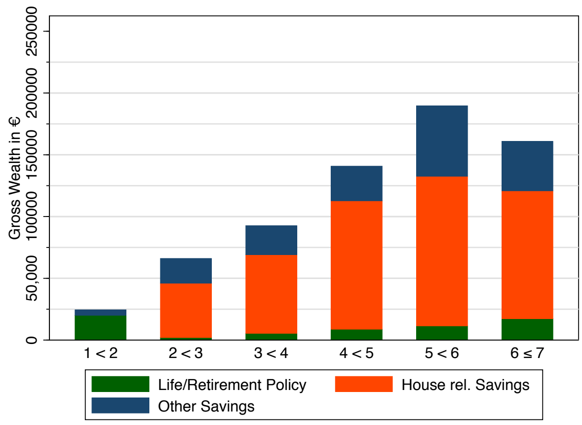
(c) Extraversion



(d) Agreeableness



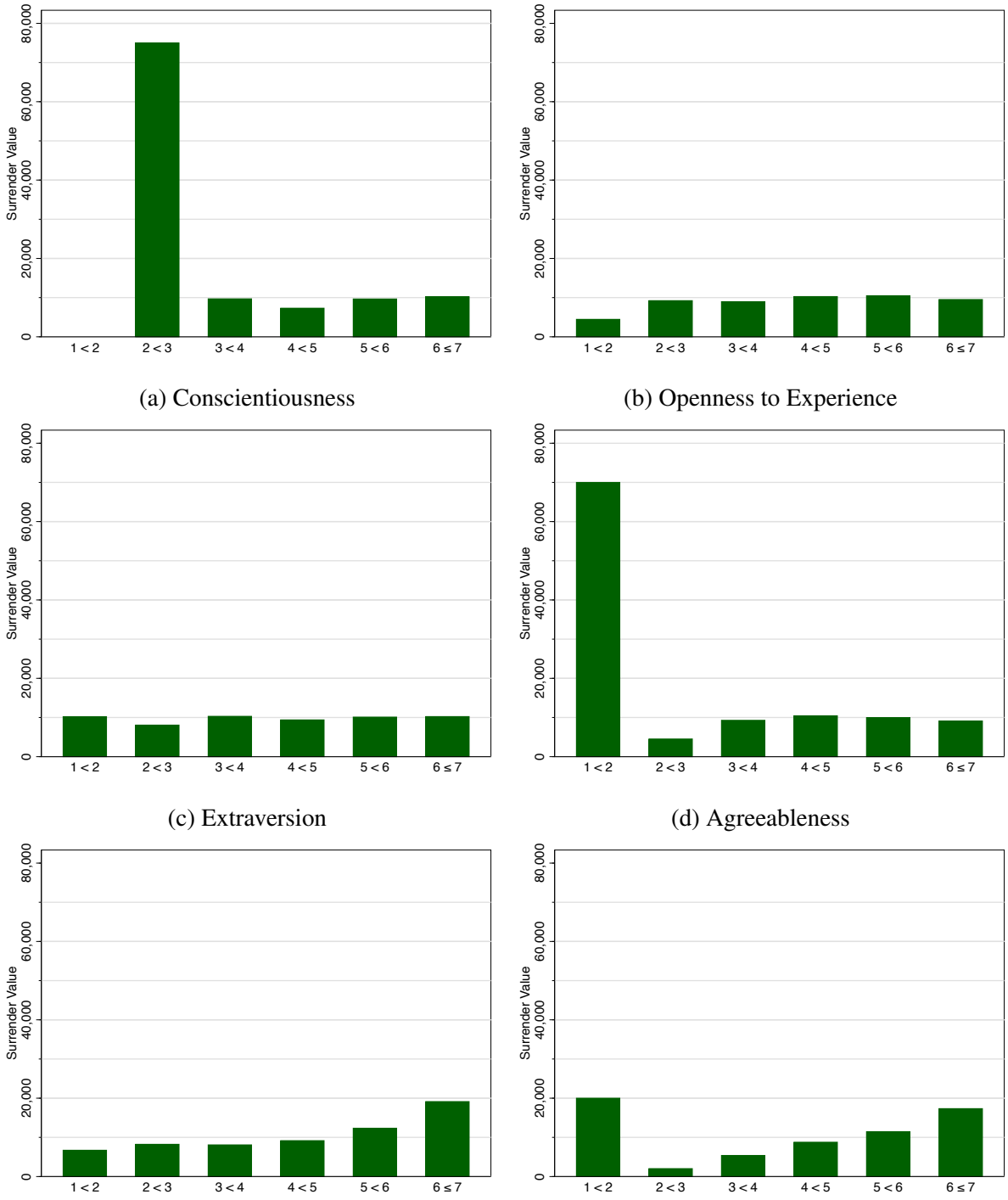
(e) Emotional Stability



(f) Locus of Control

Note: The x-axis has 6 categories which are coded for one equals everything from 1 to below 2, two from 2 to below 3, and so forth for the other categories while six as the last category is coded as 6 and above including 7. Source: SOEP 2007 with 2760 observations.

Figure 5: Combined Surrender Value of the Saving Types over Personality Traits



(a) Conscientiousness

(b) Openness to Experience

(c) Extraversion

(d) Agreeableness

(e) Emotional Stability

(f) Locus of Control

Note: The x-axis has 6 categories which are coded for one equals everything from 1 to below 2, two from 2 to below 3, and so forth for the other categories while six as the last category is coded as 6 and above including 7. Source: SOEP 2007 with 2760 observations.

Figure 6: Surrender Value of the Life/Retirement Policy over Personality Traits

A.3 Full Regression Results

Table 11: Average Marginal Effects for the Probit Regression

Variable	RS	HS	OS
Conscientiousness	0.0014	0.0066	0.0243***
	(0.0098)	(0.0094)	(0.0093)
Openness	-0.0081	0.0077	-0.0048
	(0.0098)	(0.0095)	(0.0095)
Extraversion	0.0191*	-0.0185*	-0.0126
	(0.0098)	(0.0095)	(0.0096)
Agreeableness	-0.0168*	0.0096	-0.0101
	(0.0097)	(0.0093)	(0.0091)
Emotional stability	-0.0014	-0.0043	-0.0042
	(0.0096)	(0.0093)	(0.0093)
LoC	0.0095	0.0066	-0.0004
	(0.0096)	(0.0094)	(0.0090)
Female	-0.0079	0.0186	0.0098
	(0.0231)	(0.0229)	(0.0224)
Age	-0.0069***	-0.0011	0.0080***
	(0.0024)	(0.0022)	(0.0022)
Education	0.0057	-0.0009	0.0083**
	(0.0043)	(0.0043)	(0.0041)
Number of Kids	-0.0052	0.0309***	-0.0370***
	(0.0086)	(0.0086)	(0.0086)
Self Employed	0.0224	-0.0795**	0.2390***
	(0.0356)	(0.0338)	(0.0390)
Public Sector	-0.0635*	0.1327***	0.0259
	(0.0370)	(0.0408)	(0.0375)
East	0.0909***	0.0202	0.0670***
	(0.0219)	(0.0213)	(0.0209)
Couple	-0.0538**	0.1081***	-0.0622**
	(0.0269)	(0.0261)	(0.0263)
Migration	-0.0810***	0.0038	-0.0307
	(0.0234)	(0.0231)	(0.0233)
Work Exp	0.0076***	0.0046**	-0.0068***
	(0.0022)	(0.0021)	(0.0020)
Unemployment	-0.0043	-0.0315***	-0.0285***
	(0.0061)	(0.0061)	(0.0065)
Log Net Income	0.0717***	0.0214	0.0683***
	(0.0190)	(0.0187)	(0.0187)
Log H Net Income	0.1298***	0.0956***	0.2228***
	(0.0277)	(0.0271)	(0.0262)
Smoking	0.0050	-0.0819***	-0.0769***
	(0.0200)	(0.0187)	(0.0187)
Res. Old Age	0.0254**	0.0068	0.0107
	(0.0109)	(0.0106)	(0.0105)
Exp Inheritance	0.0197	0.0782***	0.0643***
	(0.0213)	(0.0210)	(0.0206)
Financial Risk	0.0067	0.0034	0.0225***
	(0.0042)	(0.0041)	(0.0039)
House rel. savings	0.1110***		0.0794***
	(0.0187)		(0.0179)
Other savings	0.0948***	0.0802***	
	(0.0190)	(0.0182)	
Ret. rel. savings		0.1036***	0.0903***
		(0.0176)	(0.0176)
N	2760	2760	2760
F-test (p-value)	0.24	0.36	0.16

Note: RS: Life/retirement policies; HS: House related savings; OS: Other savings. Standard errors appear in parentheses. ***, ** and * denote significance at the 1%, 5% and 10% level, respectively. F-test (p-value) denotes the p-value associated with an F-test of joint significance of the personality traits. Source: Based on *SOEP* 2002, 2004, 2005, 2007 and 2009

Table 12: Average Marginal Effects for the Tobit Regression

	Tobit			OLS
Variable	RS	HS	OS	NW
Conscientiousness	398.02	1718.89	481.92	-1599.02
	(329.80)	(2438.62)	(1976.29)	(3662.51)
Openness	-210.77	1176.50	-1799.18	-5956.50**
	(334.82)	(2471.66)	(2013.20)	(2838.17)
Extraversion	580.60*	-5259.64**	-2270.41	-787.25
	(333.53)	(2464.14)	(1995.22)	(3267.68)
Agreeableness	-692.95**	2632.36	-1087.53	-1742.96
	(324.77)	(2411.50)	(1961.01)	(3115.80)
Emotional stability	323.46	-388.28	-248.77	1441.01
	(327.39)	(2413.64)	(1976.22)	(3515.87)
LoC	808.85**	2003.25	1305.59	3900.45*
	(330.43)	(2458.30)	(1993.08)	(2316.59)
Female	-1658.22**	167.83	3071.53	-6123.02
	(788.43)	(5922.87)	(4757.72)	(8908.48)
Age	114.41	893.17	2092.19***	3822.87***
	(82.98)	(598.02)	(487.52)	(729.80)
Education	360.37**	528.64	538.67	566.51
	(147.55)	(1087.09)	(867.69)	(1730.13)
Number of Kids	-430.57	12093.25***	-5222.37***	36.84
	(300.08)	(2181.30)	(1802.15)	(2485.95)
Self Employed	5059.79***	2969.43	61885.11***	93402.91***
	(1156.46)	(8888.59)	(6633.28)	(26674.57)
Public Sector	-3791.02***	18552.44**	3657.57	987.22
	(1203.28)	(8801.33)	(6929.94)	(16259.43)
East	-924.11	-21595.38***	3087.01	-25533.81***
	(738.09)	(5560.08)	(4470.97)	(5494.60)
Couple	-1611.19*	34649.88***	-8968.63	-1026.59
	(933.01)	(7122.63)	(5675.20)	(6455.34)
Migration	-2122.63**	-16833.82***	-11382.57**	-26134.42***
	(854.17)	(6160.48)	(5161.16)	(5377.45)
Work Exp	216.21***	948.60*	-1484.56***	-837.45
	(77.22)	(557.39)	(454.87)	(556.97)
Unemployment	-352.02	-9698.81***	-5580.34***	-2654.67**
	(235.87)	(1795.04)	(1571.27)	(1219.21)
Log Net Income	2694.33***	631.52	14810.65***	14091.32**
	(678.07)	(4902.97)	(4049.57)	(7018.49)
Log H Net Income	4358.81***	57034.01***	48401.07***	52790.06***
	(955.96)	(7149.18)	(5763.82)	(8969.31)
Smoking	-1208.64*	-23760.36***	-13824.78***	-20639.45***
	(694.13)	(5139.67)	(4263.96)	(5268.53)
Res. Old Age	943.65**	977.84	3652.47	4355.39
	(371.88)	(2751.53)	(2241.06)	(3781.57)
Exp Inheritance	776.75	19586.93***	8389.14**	16621.44**
	(703.35)	(5203.79)	(4160.65)	(7972.04)
Financial Risk	106.53	497.53	3662.76***	2472.93**
	(139.74)	(1045.78)	(843.46)	(1221.83)
House rel. savings	2930.93***		15881.92***	
	(666.36)		(4052.97)	
Other savings	3240.48***	18183.06***		
	(663.10)	(4869.18)		
Ret. rel. savings		18010.66***	14139.53***	
		(4740.49)	(3893.35)	
N	2760	2760	2760	2760
F-test (p-value)	0.00	0.29	0.68	0.05

Note: RS: Life/retirement policies; HS: House related savings; OS: Other savings. Standard errors appear in parentheses. ***, ** and * denote significance at the 1%, 5% and 10% level, respectively. F-test (p-value) denotes the p-value associated with an F-test of joint significance of the personality traits. Source: Based on *SOEP* 2002, 2004, 2005, 2007 and 2009

Table 13: Average Marginal Effects for the Probit Regression - Dummies

Variable	RS	HS	OS
Female	-0.0040	0.0151	0.0086
	(0.0229)	(0.0226)	(0.0224)
Age	-0.0073***	-0.0013	0.0082***
	(0.0024)	(0.0022)	(0.0022)
Education	0.0051	-0.0010	0.0075*
	(0.0043)	(0.0042)	(0.0041)
Number of Kids	-0.0048	0.0316***	-0.0376***
	(0.0086)	(0.0086)	(0.0086)
Self Employed	0.0241	-0.0818**	0.2350***
	(0.0356)	(0.0335)	(0.0390)
Public Sector	-0.0657*	0.1278***	0.0260
	(0.0370)	(0.0408)	(0.0376)
East	0.0901***	0.0218	0.0684***
	(0.0219)	(0.0213)	(0.0209)
Couple	-0.0514*	0.1098***	-0.0619**
	(0.0268)	(0.0259)	(0.0263)
Migration	-0.0821***	0.0053	-0.0304
	(0.0233)	(0.0231)	(0.0233)
Work Exp	0.0079***	0.0048**	-0.0068***
	(0.0022)	(0.0021)	(0.0020)
Unemployment	-0.0034	-0.0322***	-0.0291***
	(0.0061)	(0.0061)	(0.0066)
Log Net Income	0.0719***	0.0201	0.0689***
	(0.0190)	(0.0186)	(0.0187)
Log H Net Income	0.1258***	0.0916***	0.2250***
	(0.0276)	(0.0271)	(0.0262)
Smoking	0.0062	-0.0849***	-0.0777***
	(0.0200)	(0.0186)	(0.0186)
Res. Old Age	0.0252**	0.0077	0.0107
	(0.0109)	(0.0106)	(0.0105)
Exp Inheritance	0.0201	0.0755***	0.0626***
	(0.0213)	(0.0210)	(0.0206)
Financial Risk	0.0064	0.0031	0.0223***
	(0.0042)	(0.0040)	(0.0039)
House rel. savings	0.1097***		0.0816***
	(0.0187)		(0.0180)
Other savings	0.0964***	0.0823***	
	(0.0189)	(0.0181)	
Ret. rel. savings		0.1023***	0.0920***
		(0.0176)	(0.0176)
N	2760	2760	2760
F-test (p-value)	0.27	0.21	0.77

Note: RS: Life/retirement policies; HS: House related savings; OS: Other savings. Standard errors appear in parentheses. ***, ** and * denote significance at the 1%, 5% and 10% level, respectively. F-test (p-value) denotes the p-value associated with an F-test of joint significance of the personality traits. Source: Based on *SOEP* 2002, 2004, 2005, 2007 and 2009

Table 14: Average Marginal Effects for the Tobit Regression - Dummies

	Tobit			OLS
Variable	RS	HS	OS	NW
Female	-1618.38**	-760.49	2363.83	-7852.23
	(781.17)	(5882.62)	(4725.22)	(8401.09)
Age	96.22	915.19	2077.74***	3765.57***
	(82.62)	(596.98)	(486.47)	(714.82)
Education	332.10**	577.58	543.52	646.35
	(145.94)	(1078.28)	(861.01)	(1698.68)
Number of Kids	-416.34	12292.50***	-5339.79***	179.02
	(299.95)	(2183.85)	(1805.29)	(2457.72)
Self Employed	5100.85***	2754.10	61878.60***	93159.40***
	(1154.54)	(8885.11)	(6635.65)	(26268.47)
Public Sector	-4012.66***	17595.77**	3408.14	-457.65
	(1201.04)	(8804.88)	(6935.06)	(16188.71)
East	-873.98	-21132.35***	2946.18	-25656.93***
	(736.08)	(5559.27)	(4469.13)	(5532.43)
Couple	-1527.72*	34811.62***	-8915.64	-691.48
	(927.83)	(7104.93)	(5652.92)	(6512.69)
Migration	-2176.36**	-16239.40***	-11402.20**	-26023.08***
	(852.02)	(6157.88)	(5157.64)	(5386.21)
Work Exp	226.83***	941.54*	-1491.54***	-811.32
	(76.94)	(556.73)	(454.04)	(549.03)
Unemployment	-341.61	-9686.87***	-5682.11***	-2559.80**
	(235.82)	(1796.64)	(1570.65)	(1204.18)
Log Net Income	2687.20***	397.72	14711.13***	13531.34*
	(676.31)	(4904.99)	(4048.54)	(7045.42)
Log H Net Income	4321.61***	55775.87***	48968.94***	52989.55***
	(952.99)	(7144.64)	(5746.49)	(8961.75)
Smoking	-1224.12*	-24906.43***	-14182.70***	-21720.34***
	(692.41)	(5133.08)	(4259.75)	(5345.63)
Res. Old Age	990.07***	1116.96	3846.45*	4791.19
	(370.57)	(2745.66)	(2237.33)	(3888.16)
Exp Inheritance	787.17	19336.50***	8328.90**	16793.91**
	(702.35)	(5206.10)	(4162.56)	(7967.55)
Financial Risk	99.70	350.47	3677.87***	2459.42**
	(139.01)	(1042.39)	(840.82)	(1207.89)
House rel. savings	2868.51***		16159.52***	
	(665.56)		(4055.89)	
Other savings	3334.75***	18801.38***		
	(661.02)	(4862.01)		
Ret. rel. savings		17389.21***	14070.53***	
		(4739.55)	(3894.39)	
N	2760	2760	2760	2760
F-test (p-value)	0.00	0.27	0.75	0.18

Note: RS: Life/retirement policies; HS: House related savings; OS: Other savings. Standard errors appear in parentheses. ***, ** and * denote significance at the 1%, 5% and 10% level, respectively. F-test (p-value) denotes the p-value associated with an F-test of joint significance of the personality traits. Source: Based on *SOEP* 2002, 2004, 2005, 2007 and 2009

Table 15: Model Selection based on Life/Retirement as Dependent Variable

	M1	M2	M3	M4	M5	M6
Conscentiousness	190.57	593.30*	410.37	531.64	398.02	
	-347.09	339.43	330.69	-331.39	-329.80	
Openness	500.37	-14.26	-183.45	-203.59	-210.77	
	-351.12	345.37	337.91	-336.84	-334.82	
Extraversion	-233.34	494.06	432.25	484.42	580.60 *	
	-353.67	342.87	334.51	-335.26	-333.53	
Agreeableness	-1669.58**	-1299.14**	-727.52**	-704.10**	-692.95 **	
	-343.50	333.06	327.00	-326.73	-324.77	
Emotional Stability	1571.39 ***	614.49*	346.96	291.37	323.46	
	-339.40	337.97	329.20	-329.42	-327.39	
Locus of Control	1994.86 ***	1667.41***	962.91***	808.83**	808.85**	
	346.41	336.00	331.91	332.17	330.43	
Female		-5186.80 **	-1881.95 **	-1639.30**	-1658.22**	-1557.28**
		656.22	787.24	-793.14	-788.43	-766.76
Age		375.60 ***	154.40*	136.84*	114.41	81.76
		47.32	83.43	-83.14	-82.98	-82.49
Education		1052.22***	503.88***	384.81***	360.37**	312.69**
		121.77	145.85	-148.23	-147.55	-145.49
Number of Kids		-752.79**	-539.22*	-490.01	-430.57	-427.83
		301.00	300.45	-300.25	-300.08	-300.54
East		-2249.892**	-627.9247	-514.2151	-924.11	-921.2242
		704.9425	737.6088	740.0786	738.0872	739.6123
Couple		1683.107***	-1390.729	-1420.465	-1611.193*	-1614.853 *
		845.9876	936.5251	933.3173	933.012	929.5039
Migration		-3226.994**	-2461.746**	-2280.424**	-2122.634**	-2203.98***
		872.8898	858.336	857.8003	854.1704	855.4892
Self Employed			5673.872***	5464.665***	5059.786***	5214.531***
			1161.828	1157.781	1156.458	1152.133
Public Sector			-3310.286**	-3326.032**	-3791.022**	-3789.78***
			1213.326	1210.423	1203.276	1206.534
Work Exp			182.52**	209.75 ***	216.21***	238.58***
			77.43	-77.32	-77.22	-77.02
Unemployment			-643.52***	-560.64**	-352.02	-401.25*
			236.71	-235.62	-235.87	-236.08
Log Net Income			3089.72***	3031.34***	2694.33***	2870.59***
			682.91	-680.44	-678.07	-678.93
Log H Net Income			5847.34***	5419.06***	4358.81***	4744.77***
			949.65	-948.44	-955.96	-951.70
Smoking				-1803.43**	-1208.64*	-1074.73
				-692.60	-694.13	-692.45
Res. Old Age				1048.70***	943.65**	1010.27***
				-374.14	-371.88	-371.93
Inheritance				1261.06*	776.75	905.40
				-704.83	-703.35	-703.26
Financial Risk				193.69	106.53	140.79
				-139.71	-139.74	-138.46
House rel. Savings					2930.93***	2896.49***
					-666.36	-668.11
Other Savings					3240.48***	3259.12***
					-663.10	-664.04
N	2760	2760	2760	2760	2760	2760
AIC	38300.20	38087.03	37924.14	37909.63	37866.46	37872.72

Note: Numbers of observation: 2760. Source: Based on *SOEP* 2002, 2004, 2005, 2007 and 2009