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Can Temptation Explain Housing Choices in Later Life?

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Abstract. We use individual life-history data on twelve European countries to investigate the role of temptation in explaining the decision to become home-owners relatively late in life. The model we consider takes into account the standard motives for saving and investing in illiquid assets such as housing and individual retirement accounts, but recognizes that illiquid assets may be used by individuals who find it hard to procrastinate current consumption to control the temptation linked to having plenty of cash on hand. The evidence we produce is consistent with the notion that tempted individuals first resort to illiquid financial assets to control temptation, but as retirement age approaches they are more likely to use home-ownership as a commitment device.

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1. Introduction

The standard life-cycle model predicts that households should accumulate assets while working, and decumulate these assets to fund consumption spending in retirement. Recent economic research has identified certain stylised facts about retirement saving that seem puzzling within this benchmark. One strand of literature has discussed the “retirement savings puzzle” that households seem to experience a discrete drop, rather than a smooth change, in consumption at the time they retire. A second puzzle is the fact that households seem to demand assets that commit them to lock away their funds for fixed periods of time, even though such commitment reduces the opportunity to use wealth in times of unexpected “rainy day” need. A third fact that relatively simple models cannot easily explain is the relatively slow rate at which older households seem to decumulate wealth, with some retirees even continuing to save. (See Attanasio and Weber, 2010, for a review of this and other puzzles). To this (by no means exhaustive) list, we may add the issue that elderly households seem reluctant to utilise their housing wealth to fund spending (a “no downsizing puzzle”). Angelini et al. (2009), for example, document using European (SHARE) data that many elderly households are house-rich and cash-poor but do not use their housing equity to fund non-housing consumption after retirement.

Many different ways to explain puzzles such as those listed above have been suggested. As highlighted by Attanasio and Weber (2010), non-standard preferences, such as quasi-hyperbolic discounting (Laibson, 1997, O’Donoghue and Rabin, 1999) or temptation preferences (Gul and Pesendorfer, 2001, 2004; Bucciol, 2012), may explain a taste for commitment in investment decisions and so contribute to the explanation of several apparent puzzles. The aim of this paper is, using European data, to investigate the empirical support for the idea that temptation, and a consequent taste for commitment, may be important in shaping retirement saving decisions. As we describe below, our interest is not only in financial accumulation, but particularly in the choices of older workers and retirees about home-ownership.

Understanding how and why individuals make the (retirement) saving and investment decisions that they do is of interest for both academic audiences and pensions practitioners. Understanding the reasons why individuals choose to own their home and largely fail to reduce housing equity in the last years of their life, is also an interesting research agenda for economists and social scientists (Venti and Wise, 2004; Angelini et al., 2012) and has important policy implications in ageing societies.

As emphasized above, we are particularly interested in understanding the “no downsizing puzzle” or even the “upsizing puzzle” whereby many households are observed to purchase their homes late in life (at least late in the working life). Several possible explanations have been proposed: see Nakajima and Telyukova (2011) for a survey and detailed analysis of home equity release in old age in a rich life-cycle

model under uncertainty. The innovation of our research is to examine whether temptation preferences, which can plausibly help to explain other consumption-saving puzzles for older households, might also help explain not only the reluctance to spend housing wealth, but also the decision to purchase the main residence relatively late in life.

Temptation preferences give a high value to the commitment property of illiquid assets such as housing: since illiquid wealth cannot be disinvested immediately, agents cannot succumb to the temptation to spend it on current consumption. Removing this temptation can make agents better-off as they face lower self-control costs in trying to implement optimal forward-looking consumption and saving plans. Tempted individuals – who typically face a no-unsecured-borrowing condition that prevents them from falling into heavy debt early in life – look for ways to tie their hands, for example through holding illiquid assets. After retirement (once retirement accounts enter the decumulation phase), housing is the main (or often the only) illiquid asset that families can still choose to invest in. If temptation is a key driver of saving decisions, and particularly decisions about retirement savings, then this should affect households' decisions about how much to invest in housing in the run up to retirement, and about how quickly (or slowly) they run down housing wealth once retired.

Prima facie evidence for the role of housing wealth as a commitment device can be sought in micro data by investigating whether mature home-owners are more likely to have engaged in other activities that also help control temptation. In particular, individuals may engage in long-term saving plans by investing in life-insurance policies and/or individual retirement accounts. An ideal household level dataset containing information on holdings of these different assets is SHARE (Survey of Health, Ageing and Retirement in Europe). Using this dataset we are able to relate behaviour regarding holding and accumulation of these different assets to characteristics such as education and risk-taking behaviour, as well demographic and economic variables.

The purpose of this paper is to understand whether the decision to purchase a house for the first time is influenced by the holding of illiquid financial assets (retirement accounts and life insurance policies), that can be seen as ways to tie one's hands (commitment devices). We perform a discrete-time duration analysis through a logit regression model. This allows us to estimate the hazard rate of first owning a house, conditional on the ownership of illiquid financial assets and a number of observable characteristics, including a measure of permanent income. Given that ownership of illiquid financial assets may proxy for differences in unobserved characteristics, we also allow for unobserved heterogeneity, and check how the relationship between becoming a homeowner and the ownership of illiquid financial assets varies across the population of interest.

The remainder of the paper is organised as follows. Section 2 sketches a theoretical framework for the temptation and self-control motive; Section 3 describes the data; Sections 4 and 5 comment on the parameter estimates of the duration model with and without unobserved heterogeneity. Section 6 concludes.

2. *A Theoretical Framework*

Gul and Pesendorfer (2001) build a theoretical framework for temptation and a self-control motive, where agents have preferences not only over alternatives but also over *sets* of alternatives. They define as tempting those alternatives that are sub-optimal from a forward-looking perspective, but optimal from a myopic perspective. When making their decisions, agents face a utility cost to exert self-control and avoid tempting alternatives. In the framework of Gul and Pesendorfer (2001), an agent may therefore prefer a given set of alternatives to another, larger set that includes the first set plus some further tempting alternatives. Hence, the use of commitment devices may lead to an improvement in wellbeing. For instance in the context of consumption decisions, a mandatory pension system is a commitment device because it forces an individual to postpone consumption in to old age. Our analysis derives from a variant of this framework that also includes housing and illiquid assets. We briefly describe it below.

Consider a life-cycle model where an individual lives at most for T years and every year t has to choose non-durable consumption $c_t \geq 0$, the allocation of private savings between liquid and illiquid assets (through the portfolio weight $w_t \in [0,1]$ of savings allocated to illiquid assets), and housing tenure, $h_t = \{0,1\}$ conditional on cash-on-hand (financial wealth plus disposable income) at the beginning of the year, x_t , and housing tenure in the previous period, h_{t-1} . The housing tenure state variable is just an indicator for renting ($h_t = 0$) or owning ($h_t = 1$) the home.

Cash-on-hand x_t evolves according to exogenous factors (income and market returns) and endogenous factors (consumption and the purchase/selling of a house). When purchasing/selling a house, a transaction cost φ proportional to the house price is paid. In addition, every year the homeowner spends a fraction $\psi \in [0,1]$ of the owned house value on repair and maintenance costs (Li and Yao, 2007). In contrast, when a household rents a house, it is free to change the rent size every year at no additional costs. The intertemporal budget constraint is then

$$x_{t+1} = R \left(\begin{array}{l} x_t - c_t - \psi p_t h_t - \rho p_t I_{\{h_t=0\}} \\ -(1+\phi) p_t h_t + (1-\phi) p_t h_{t-1} + 2\phi p_t h_t I_{\{h_t=h_{t-1}\}} \end{array} \right) + y_{t+1}$$

where R is the exogenous market return (that we assume fixed and certain), y_{t+1} is next-year's income, ρp_t is the rent cost (rent prices are a fraction ρ of ownership prices)¹, $-(1+\phi) p_t h_t$ is the cost of buying a new house, grossed up by the transaction cost, and $(1-\phi) p_t h_{t-1}$ is the amount, net of transaction costs, received after selling the old house. If the individual opts for making no change in housing owned from one year to another, then $h_t = h_{t-1}$ and the term $2\phi p_t h_t I_{\{h_t=h_{t-1}\}}$ removes transaction costs from the equation. $I_{\{h_t=0\}}$ is an index function that takes value 1 if the individual is a renter ($h_t = 0$), and 0 otherwise, while $I_{\{h_t=h_{t-1}\}}$ is an index function that has value 1 if there is no change in housing tenure (when $h_t = h_{t-1}$), and 0 otherwise.

As regards liquid and illiquid assets, for the sake of simplicity we assume that they provide the same return R , so that the portfolio allocation between liquid and illiquid assets is not driven by their returns. The decision on the portfolio weight w_t is instead relevant on the immediate availability of savings for consumption and housing needs: only liquid assets are immediately available, while illiquid assets will be available only after a certain amount of time (s periods, say). In this context, a non-tempted individual should always prefer the liquid asset, whilst tempted individuals will prefer to hold a fraction of wealth in illiquid assets, because of their commitment role.

The individual is liquidity constrained, which means that her consumption c_t cannot exceed the portion of cash-on-hand available at the moment, that is, $c_t \leq (1-w_t)x_t - \rho p_t + (1-\phi) p_t h_{t-1}$. That is, the tempting alternative is the fraction of cash-on-hand x_t invested in liquid assets $(1-w_t)$, net of the rent cost ρp_t , plus the lump-sum value of the house owned in period $t-1$, and sold in period t with a transaction cost ϕ . Notice that the largest consumption at time t can be achieved only in the presence of: i) full investment in liquid assets; and, ii) home rent rather than home ownership; and it coincides with $c_t^* = \max \{c_t\} = x_t - \rho p_t + (1-\phi) p_t h_{t-1}$.

In a fashion similar to Gul and Pesendorfer (2001, 2004), the uniperiodal utility function is defined as

$$(1) \quad U_t(c_t, h_t, x_t) = u(c_t, h_t) - \lambda \left(u(x_t - \rho p_t + (1-\phi) p_t h_{t-1}, 0) - u(c_t, h_t) \right)$$

¹ That is, the ownership of one unit of housing costs $(1/\rho)$ times the rent of the same unit of housing.

where the first addend, $u(c_t, h_t)$, is the utility function in standard models, and the second addend describes a temptation motive with parameter λ , where $u((1-w_t)x_t - \rho p_t + (1-\phi)p_t h_{t-1}, 0)$ is the utility reflecting the tempting, myopic behaviour, obtained with home renting and the largest possible immediate consumption, and $u(c_t, h_t)$ is the utility reflecting the actual decisions. The second addend can also be seen as the cost of exerting self-control and resisting temptation.

In order to increase the utility function (1), an agent should reduce the cost of self-control. In a myopic perspective, this is possible if she succumbs to temptation, and makes tempting decisions. In a forward-looking perspective, a preferable alternative may be that the agent ties her hands and commits herself to some decisions (e.g., home ownership and investment in illiquid assets) that reduce the future consumption choice set, therefore lowering the size of the tempting alternative. Throughout our analysis, therefore, we interpret the ownership of illiquid assets and housing as evidence of temptation.

3. *The Data*

Our main source of micro data is SHARELIFE, the third wave of the Survey of Health, Ageing and Retirement in Europe (SHARE), that asks respondents aged 50 and over to record life-history events regarding housing, health, children, relationships and financial investments. For our purposes information on previous investments in retirement accounts and life insurance policies (i.e., illiquid financial assets) is particularly relevant. Those who have invested are also asked about the year in which the first investment in each type of asset occurred. The respondents are a representative sample of the 50+ population in thirteen European countries but we exclude Poland from the analysis because of unreliable retrospective information on income. Information from SHARELIFE is merged with information on income and education from the second wave of SHARE (we consider the average over the 5 “constructed variables” imputations), and with permanent income estimates elaborated from Weiss (2012).

We reshape SHARELIFE as a longitudinal dataset, that is, for each respondent we have as many observations as her previous years of adult age. By “adult age” we mean any age between 19 and 80, or between the age in which the individual became independent (when she started to live on her own or when she established her own household) and the age in the year before the interview. Our benchmark analysis concentrates on the age range 40-70, when the temptation motive for home-ownership is most likely to be playing a key role (Angelini et al, 2012, document the presence of a non-negligible number of rent-own transitions in many European countries until age 70).

Our dependent variable is the dummy variable “owner”, taking the value 1 if the individual is home-owner at a given age, and 0 otherwise. We include in the sample all observations from individuals who have never been home-owners (for whom the variable “owner” is equal to 0 at all ages), and, for individuals who have owned their home, all observations up to the age at which the home-ownership first occurred (thus for these observations the variable “owner” is equal to 0 at all ages but the last one).

Appendix Table A1 reports the definition of all the variables used in this analysis. The specification is made of five groups of variables: financial ones (illiquid assets, i.e., life insurance policies and retirement accounts, and risk tolerance²), demographics (age, years of independence, gender, education, health status), household composition (marital status, children, household size), occupation (unemployment, retired, permanent income), and finally control variables (country, cohort). Most variables are taken in their level one year before. For the asset variables, we consider the level two years before, plus the number of years elapsed since the first investment. Summary statistics of these variables are reported in Table 1 for the full sample and in Table 2 for the sample in age 40-70.

TABLE 1 ABOUT HERE

TABLE 2 ABOUT HERE

4. *Estimates from a model without unobserved heterogeneity*

We first present parameter estimates of a discrete duration model, estimated with a standard logit regression following Jenkins (1995). Tables 3 and 4 display the estimates of the coefficients of main interest, respectively in the full sample and in the sample aged 40-70. We refer to the Appendix for the whole set of parameter estimates.

TABLE 3 ABOUT HERE

² We use the self-assessed answer to a question on portfolio allocation between riskless and risky assets. Available options are: (1) Take substantial financial risks expecting to earn substantial returns; (2) Take above average financial risks expecting to earn above average returns; (3) Take average financial risks expecting to earn average returns; (4) Not willing to take any financial risks. Most answers are concentrated in option (4). The variable we include in the specification is a dummy equal to 1 if the individual declares to be willing to take at least some risk, i.e., if she reports any option between (1) and (3).

Columns (1) to (3) of Table 3 display the parameters of interest for the equation explaining the probability of first becoming a home-owner as a function of income (respectively current, permanent including pensions, and permanent excluding pensions), ownership of liquid assets and risk attitude, controlling for age, gender, education, time-varying demographics (family size, marital status, presence of children), employment status, country and cohort dummies. Column (4) displays instead the average marginal effects corresponding to column (3) estimates, multiplied by 100.

We see from column (1) that current income has a strong, positive effect – having illiquid assets also has a major, positive impact (in line with our expectations if consumers use them as a commitment device to keep temptation under control), but the longer the individual has had them, the weaker the effect (in fact, the sign is reversed after 14 years of holding them). Risk tolerance (defined as a dummy equal to one if the individual declares at least some willingness to take financial risk) also increases the probability of becoming a home-owner.

In column (2) we replace the log of current income with the log of permanent income, computed as the discounted present value at age ten of all future earnings plus pension benefits (for details on how this measure was computed see Weiss, 2012). This is a much more appropriate conditioning variable, as it captures long term differences in resources that should explain why people choose to purchase illiquid financial assets and to become home-owners. Permanent income plays a very strong role in explaining the transition into home-ownership, but the coefficients on the other variables of interest are fairly stable.

In column (3) we focus on a narrower definition of permanent income that includes earnings but excludes pensions (as these may be in part affected by the decision to invest in individual retirement accounts). This measure also has the predicted, very strong, positive coefficient, with little effect on the other coefficients.

To better understand the economic meaning of the estimated coefficients, we report in column (4) the average marginal effects multiplied by 100: this can be interpreted as the effect of a unit increase in the explanatory variable on the percentage probability of transiting into home-ownership in a given year. Thus a 1% increase in permanent income increase the probability of becoming a home-owner by .33%; having illiquid assets increases the probability by almost half a percentage point, but this effect is halved after six years; finally, individuals classified as risk tolerant are almost one percent more likely to become home-owners in any given year (conditionally on not being home-owners already).

A potentially more interesting analysis is presented in Table 4, where the sample is restricted to the 40-70 age band. Home-ownership early in life is likely to be dominated by family formation and the birth of children, as well as by access to credit. By age forty, most individuals have reached a stable situation in terms of income, demographics (except for cases such as divorce, which we control for in our

regressions) and credit worthiness, so housing transitions become rarer, particularly the rent-own transitions we focus on in this paper.

We see that the signs and significance of estimated coefficients is broadly in line between tables 3 and 4, but with larger absolute values of the coefficients on illiquid assets. Average marginal effects are instead all smaller, reflecting the decreased number of transitions in the 40-70 sample. However, the average marginal effect of having illiquid assets is slightly more important in relative terms compared to permanent income (but the relative difference is quite small), and is now reversed after about 25 years of holding the asset (rather than 14).

TABLE 4 ABOUT HERE

We conclude the section with a graphical representation of the hazard rates of home ownership, conditional on the holding on non-liquid financial assets. The hazard rate of home ownership at age t can be computed as

$$h(t|x_t) = \frac{1}{1 + \exp\left\{-\bar{x}'\hat{\beta}\right\}}$$

where \bar{x} is the set of average explanatory variables, and $\hat{\beta}$ are the parameter estimates from the model using permanent income without pensions (column (3) of Appendix tables A2-A3); the hazard rate age profiles are similar using the output from the other columns.

Figure 1 plots the hazard rate-age profile from the full sample, showing a standard inverted-U shape peaking at age 40. Importantly, hazard rates for households holding illiquid assets are persistently higher than hazard rates for households not holding them.³ This evidence is confirmed in Figure 2 when restricting the attention to the sample in age 40-70.

FIGURE 1 ABOUT HERE

FIGURE 2 ABOUT HERE

³ The two curves in each figure are identical apart from the assumption on the holdings of illiquid assets two years before.

5. *Estimates from a model that allows for unobserved heterogeneity*

The estimates presented above do not take into account the potential confounding effect of unobserved heterogeneity in the desire to resist temptation or access to illiquid financial investment. It is possible that equally tempted individuals react differently to their temptation: some are more likely to lock themselves in IRAs, to later become home-owners (as a way to have a guaranteed stream of housing consumption services for the rest of their lives); others instead cannot do so, because this form of financial investment is not available to them, or will not do so because they don't value future consumption enough (they are not only tempted, but also highly impatient).

This type of issue has been recently investigated in the context of drug use. There the question of substance is whether the strong cross-sectional association between cannabis use and hard drugs use is due to some innate personality trait (frailty) or instead one can identify a "gateway effect" whereby cannabis is a stepping stone for hard drugs. Both van Ours (2003) and Melberg et al (2010) tackle this issue by specifying a latent class model where the hazard of using hard drugs is affected by previous use of cannabis, but some or all estimated parameters can differ across endogenously determined sub-groups of the population. Typically, this analysis highlights the presence of two such groups, one of which appears more prone to using drugs, the other more resistant. The estimates of the coefficients of interest typically change when heterogeneity is allowed to play a role, and this allows the identification of what part of the cannabis use effect is due to unobserved heterogeneity, and what part instead can be interpreted as a causal (gateway) effect.

Here we adopt the more general approach taken by Melberg et al (2010), whereby all parameters entering the logit model are allowed to vary across the two groups. The authors use the bivariate mixed proportional hazard model with shared frailty introduced in Abbring and Van Den Berg (2003). The model is made of two logistic regression equations, describing the outcome and treatment variables. In our case the treatment is identified by the ownership of illiquid assets (life insurance policies or retirement accounts), while the outcome is identified by home ownership. This model allows us to estimate how the probability to become a home-owner changes with and without the holding of illiquid assets. We also estimate the probability that each observation belongs to either group. In Table 5 we report key average marginal effects (multiplied by 100) based on parameter estimates for the full sample, while in Table 6 we present the same results for the 40-70 age group. Descriptive statistics for all variables, weighted by the predicted probability of belonging to each group, are presented in tables 7 and 8.

In column (2) of Table 5 we report the average marginal effects corresponding to the no heterogeneity model already presented in column (4) in Table 3. Column (1) does the same for the equation

predicting the probability of becoming the owner of illiquid assets. The estimated effects for this outcome variable of permanent income and risk tolerance are very large and significant. Columns (3) and (4) present the same effects computed using as weights the probabilities of belonging to group 1; this group is characterized by a larger proportion of illiquid financial asset holders – so we may call them “temptation resisters” – but also higher permanent income – so we may expect them to have easier access to credit. Columns (5) and (6) use instead the probability of belonging to group 2. It is worth stressing that a different logistic regression is estimated across the two groups (so differences in average marginal effects do not reflect solely differences in variable means), and that each individual in the sample can belong to either one group, or the other group, or both, depending on its predicted probabilities (that generate the individual weights in the logistic regressions).

TABLE 5 ABOUT HERE

Given that temptation is a more plausible determinant of the rent-own transition in the 40-70 age range, we repeat our exercise in this subsample; here we discuss the results presented in Table 6. It is worth stressing that, for this age band, group 1 individuals have 10% more permanent income on average than group 2 individuals, but are much more likely to own illiquid financial assets (39.5% of group 1 households do, compared to 22.3% in group 2). See Table 8 for further details.

TABLE 6 ABOUT HERE

Perhaps the most striking feature of Table 6 is the huge difference between the estimated effect of permanent income and risk tolerance on the probability of holding illiquid financial assets: when no heterogeneity is included, these effects are larger than when unobserved heterogeneity is allowed for. This difference is particularly strong for permanent income. Estimated average marginal effects are much less affected by allowance for unobserved heterogeneity: permanent income and risk tolerance are largely in line between the two groups, while we notice that for “temptation resisters” (group 1) the probability of becoming a home-owner is less strongly affected by illiquid asset holding. This pattern of coefficients seems in line with an explanation that focuses on limited access to illiquid financial investment for group 2 individuals – and this can explain why permanent income effects are so different across columns (1), (3) and (5) in both Tables 5 and 6.

TABLE 7 ABOUT HERE

TABLE 8 ABOUT HERE

6. *Conclusion*

In this paper we have used individual life-history data on twelve European countries to investigate the role of temptation in explaining the decision to become home-owners relatively late in life.

The model we considered takes in to account the standard motives for saving and investing in illiquid assets such as housing or retirement accounts. It also recognizes that illiquid assets may be used by individuals who find it hard to resist the temptation presented by a large stock of accessible “cash on hand”.

The prima facie evidence we produced is consistent with the notion that tempted individuals first resort to illiquid financial assets to control temptation, but as retirement age approaches they are more likely to use home-ownership as a commitment device. However, our estimates also suggest that there is a lot of heterogeneity in the access to illiquid financial investment prior to home purchase, something that may reflect institutional features of this specific type of financial markets, or more broadly different access to credit across Europe at different points in time.

The analysis we presented in this paper is suggestive, but tentative – a structural model is necessary to better investigate the commitment effect of the temptation preferences as opposed to limited access to financial markets, credit constraints or other reasons (e.g., strategic interactions between non-cooperative family members) that may induce a fraction of individuals to purchase their home relatively late in their lives. This is left for future research.

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Table 1. Summary statistics (full sample, N=248,628).

Variable	Mean	Standard Deviation	Minimum	Maximum
owner	0.035	0.184	0	1
liferet_2	0.205	0.404	0	1
yr_liferet	3.461	8.897	0	80
lperminc_nop	8.579	1.122	3.876	11.180
risk	0.251	0.434	0	1
age	41.441	13.962	21	80
yr_indep	19.080	13.599	2	74
female	0.556	0.497	0	1
hschool	0.340	0.474	0	1
college	0.187	0.390	0	1
phealth_2	0.061	0.239	0	1
dphealth_1in	0.008	0.087	0	1
dphealth_1out	0.004	0.059	0	1
hhsz_2	3.012	1.443	1	14
dhhsz_1in	0.082	0.274	0	1
dhhsz_1out	0.027	0.163	0	1
ifchildren_1	0.756	0.430	0	1
partner_1	0.803	0.398	0	1
widow_1	0.031	0.172	0	1
divorce_1	0.023	0.150	0	1
unempl_1	0.013	0.114	0	1
retired_1	0.105	0.306	0	1
cou_au	0.039	0.194	0	1
cou_swe	0.075	0.263	0	1
cou_net	0.111	0.314	0	1
cou_spa	0.034	0.181	0	1
cou_ita	0.080	0.271	0	1
cou_fra	0.114	0.318	0	1
cou_den	0.081	0.272	0	1
cou_gre	0.047	0.211	0	1
cou_swi	0.091	0.288	0	1
cou_bel	0.093	0.291	0	1
cou_cze	0.119	0.324	0	1
coh_19	0.018	0.131	0	1
coh_24	0.050	0.218	0	1
coh_29	0.093	0.290	0	1
coh_34	0.133	0.340	0	1
coh_39	0.155	0.362	0	1
coh_44	0.174	0.379	0	1
coh_54	0.143	0.350	0	1
coh_59	0.065	0.247	0	1

Table 2. Summary statistics (restricted sample in age 40-70, N=110,795)

Variable	Mean	Standard deviation	Minimum	Maximum
owner	0.021	0.143	0	1
liferet_2	0.284	0.451	0	1
yr_liferet	5.633	11.029	0	70
lperminc_nop	8.475	1.121	3.925	11.056
risk	0.218	0.413	0	1
age	51.810	8.278	40	70
yr_indep	28.520	9.586	2	64
female	0.545	0.498	0	1
hschool	0.343	0.475	0	1
college	0.154	0.361	0	1
phealth_2	0.096	0.295	0	1
dphealth_1in	0.011	0.105	0	1
dphealth_1out	0.005	0.071	0	1
hhsz_2	3.199	1.507	1	14
dhhsz_1in	0.010	0.097	0	1
dhhsz_1out	0.048	0.214	0	1
ifchildren_1	0.850	0.357	0	1
partner_1	0.810	0.392	0	1
widow_1	0.046	0.209	0	1
divorce_1	0.034	0.182	0	1
unempl_1	0.019	0.138	0	1
retired_1	0.160	0.367	0	1
cou_au	0.043	0.202	0	1
cou_swe	0.057	0.231	0	1
cou_net	0.117	0.321	0	1
cou_spa	0.035	0.184	0	1
cou_ita	0.085	0.278	0	1
cou_fra	0.101	0.301	0	1
cou_den	0.055	0.228	0	1
cou_gre	0.049	0.215	0	1
cou_swi	0.100	0.300	0	1
cou_bel	0.083	0.275	0	1
cou_cze	0.149	0.356	0	1
coh_19	0.019	0.138	0	1
coh_24	0.056	0.231	0	1
coh_29	0.102	0.302	0	1
coh_34	0.149	0.356	0	1
coh_39	0.170	0.376	0	1
coh_44	0.188	0.390	0	1
coh_54	0.113	0.316	0	1
coh_59	0.041	0.197	0	1

Table 3. Rent-Own transitions: model without unobserved heterogeneity (full sample)

	(1) Coefficients	(2) Coefficients	(3) Coefficients	(4) AME from (3)
Log current income	0.160*** (0.014)			
Log permanent income		0.148*** (0.017)		
Log permanent income (excluding pensions)			0.100*** (0.013)	0.333*** (0.042)
Illiquid assets (t-2)	0.144*** (0.040)	0.149*** (0.044)	0.144*** (0.044)	0.480*** (0.147)
Years with illiquid assets	-0.011*** (0.003)	-0.013*** (0.003)	-0.012*** (0.003)	-0.041*** (0.001)
Risk tolerant	0.219*** (0.023)	0.243*** (0.024)	0.251*** (0.025)	0.835*** (0.082)
Observations	319,530	255,254	248,628	248,628
Log-likelihood	-44,680.774	-36,274.928	-35,445.548	-35,445.548
McFadden's R ²	0.061	0.065	0.066	0.066

Note. Column (1): we exclude observations reporting no income. Columns (2)-(3): we exclude observations on self-employed workers (8.89% of the respondents) as well as the top and bottom 1% of the permanent income estimates. Column (4) reports 100 times the average marginal effects (AME) from the model in Column (3). The full regression output is reported in the Appendix Table A2. Standard errors in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 4. Rent-Own transitions: model without unobserved heterogeneity (ages 40-70)

	(1) Coefficients	(2) Coefficients	(3) Coefficients	(4) AME from (3)
Log current income	0.188*** (0.026)			
Log permanent income		0.194*** (0.032)		
Log permanent income (excluding pensions)			0.125*** (0.023)	0.252*** (0.047)
Illiquid assets (t-2)	0.155** (0.076)	0.168** (0.083)	0.186** (0.084)	0.375** (0.170)
Years with illiquid assets	-0.004 (0.003)	-0.007* (0.004)	-0.008** (0.004)	-0.015** (0.008)
Risk tolerant	0.242*** (0.045)	0.321*** (0.049)	0.323*** (0.049)	0.652*** (0.101)
Observations	144,174	114,205	110,795	110,795
Log-likelihood	-14,066.649	-11,091.964	-10,716.014	-10,716.014
McFadden's R ²	0.044	0.045	0.046	0.046

Note. Column (1): we exclude observations reporting no income. Columns (2)-(3): we exclude observations on self-employed workers (8.89% of the respondents) as well as the top and bottom 1% of the permanent income estimates. Column (4) reports 100 times the average marginal effects (AME) from the model in Column (3). The full regression output is reported in the Appendix Table A3. Standard errors in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 5. Model with unobserved heterogeneity: key marginal effects (full sample)

	No heterogeneity		Heterogeneity, group 1		Heterogeneity, group 2	
	(1) Illiquid assets	(2) Home- Ownership	(3) Illiquid assets	(4) Home- Ownership	(5) Illiquid assets	(6) Home- Ownership
Log permanent income (excluding pensions)	3.430*** (0.093)	0.333*** (0.042)	1.053*** (0.074)	0.264*** (0.054)	0.942*** (0.086)	0.408*** (0.059)
Illiquid assets (t-2)		0.480*** (0.147)		0.459** (0.210)		1.204*** (0.252)
Years with illiquid assets		-0.041*** (0.001)		-0.069*** (0.013)		0.001 (0.015)
Risk tolerant	3.341*** (0.176)	0.835*** (0.082)	1.425*** (0.140)	0.719*** (0.108)	1.754*** (0.155)	0.935*** (0.115)
Observations	248,628	248,628	206,925	206,925	155,536	155,536
Log-likelihood	-111,405.190	-35,445.548	-22,797.909	-18,726.990	-22,710.209	-16,575.558
McFadden's R ²	0.162	0.066	0.690	0.057	0.615	0.083

*Note. The table reports 100 times the average marginal effects from the bivariate mixed proportional hazard analysis on the holding of illiquid assets and home ownership, unweighted (Columns (1)-(2)), and weighted, using as weights the probability to belong to group 1 (Columns (3)-(4)) or group 2 (Columns (5)-(6)). The full regression output is reported in the Appendix Table A4. Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1*

Table 6. Model with unobserved heterogeneity: key marginal effects (ages 40-70)

	No heterogeneity		Heterogeneity, group 1		Heterogeneity, group 2	
	(1) Illiquid assets	(2) Home- Ownership	(3) Illiquid assets	(4) Home- Ownership	(5) Illiquid assets	(6) Home- Ownership
Log permanent income (excluding pensions)	4.728*** (0.150)	0.252*** (0.047)	0.314*** (0.119)	0.275*** (0.070)	1.201*** (0.107)	0.240*** (0.063)
Illiquid assets (t-2)		0.375** (0.170)		0.475* (0.259)		0.803*** (0.285)
Years with illiquid assets		-0.015** (0.008)		-0.016 (0.010)		-0.005 (0.013)
Risk tolerant	5.910*** (0.295)	0.652*** (0.1011)	3.006*** (0.224)	0.689*** (0.141)	0.820** (0.187)	0.626*** (0.137)
Observations	110,795	110,795	90,537	90,537	68,073	68,073
Log-likelihood	-57,180.815	-10,716.014	-9,590.687	-4,780.764	-9,511.313	-5,902.912
McFadden's R ²	0.158	0.046	0.718	0.045	0.702	0.052

*Note. The table reports 100 times the average marginal effects from the bivariate mixed proportional hazard analysis on the holding of illiquid assets and home ownership, unweighted (Columns (1)-(2)), and weighted, using as weights the probability to belong to group 1 (Columns (3)-(4)) or group 2 (Columns (5)-(6)). The full regression output is reported in the Appendix Table A5. Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1*

Table 7. Model with unobserved heterogeneity: Group characteristics (full sample)

GROUP 1	Variable	Mean	Standard Deviation	Minimum	Maximum
	owner	0.035	0.183	0	1
	liferet_2	0.227	0.419	0	1
	yr_liferet	4.117	9.853	0	80
	lperminc_nop	8.569	1.119	3.876	11.180
	risk	0.241	0.428	0	1
	age	41.599	13.883	21	80
	yr_indep	19.005	13.522	2.000	74.000
	female	0.532	0.500	0	1
	hschool	0.327	0.469	0	1
	college	0.184	0.387	0	1
	phealth_2	0.062	0.240	0	1
	dphealth_1in	0.007	0.086	0	1
	dphealth_1out	0.003	0.057	0	1
	hhsz_2	3.060	1.453	1	14
	dhhsz_1in	0.082	0.274	0	1
	dhhsz_1out	0.026	0.159	0	1
	ifchildren_1	0.763	0.425	0	1
	partner_1	0.815	0.389	0	1
	widow_1	0.029	0.167	0	1
	divorce_1	0.022	0.148	0	1
	unempl_1	0.012	0.109	0	1
	retired_1	0.109	0.312	0	1
	cou_aus	0.023	0.149	0	1
	cou_swe	0.090	0.286	0	1
	cou_net	0.057	0.231	0	1
	cou_spa	0.048	0.214	0	1
	cou_ita	0.113	0.317	0	1
	cou_fra	0.155	0.362	0	1
	cou_den	0.059	0.236	0	1
	cou_gre	0.078	0.268	0	1
	cou_swi	0.063	0.244	0	1
	cou_bel	0.064	0.244	0	1
	cou_cze	0.124	0.330	0	1
	coh_19	0.028	0.166	0	1
	coh_24	0.051	0.220	0	1
	coh_29	0.098	0.297	0	1
	coh_34	0.145	0.352	0	1
	coh_39	0.177	0.382	0	1
	coh_44	0.152	0.359	0	1
	coh_54	0.068	0.252	0	1
	coh_59	0.065	0.247	0	1

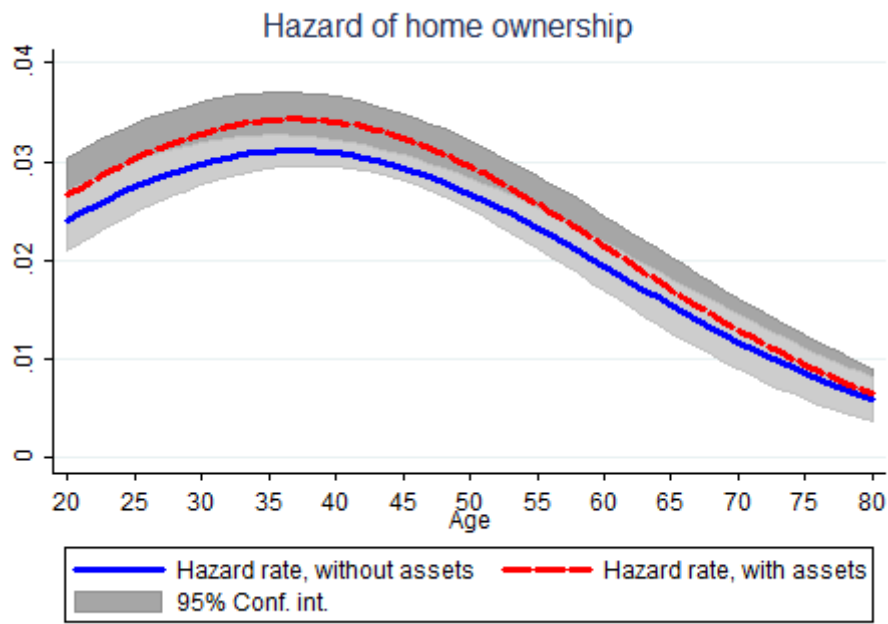
GROUP 2	Variable	Mean	Standard Deviation	Minimum	Maximum
	owner	0.036	0.186	0	1
	liferet_2	0.181	0.385	0	1
	yr_liferet	2.724	7.615	0	80
	lperminc_nop	8.590	1.124	3.876	11.006
	risk	0.263	0.440	0	1
	age	41.264	14.048	21	80
	yr_indep	19.164	13.686	2	67
	female	0.584	0.493	0	1
	hschool	0.353	0.478	0	1
	college	0.192	0.394	0	1
	phealth_2	0.060	0.238	0	1
	dphealth_1in	0.008	0.087	0	1
	dphealth_1out	0.004	0.062	0	1
	hhsiz_2	2.958	1.429	1	13
	dhhsiz_1in	0.082	0.275	0	1
	dhhsiz_1out	0.029	0.167	0	1
	ifchildren_1	0.747	0.434	0	1
	partner_1	0.790	0.407	0	1
	widow_1	0.032	0.177	0	1
	divorce_1	0.024	0.152	0	1
	unempl_1	0.014	0.118	0	1
	retired_1	0.099	0.299	0	1
	cou_au	0.057	0.232	0	1
	cou_swe	0.058	0.233	0	1
	cou_net	0.172	0.377	0	1
	cou_spa	0.018	0.134	0	1
	cou_ita	0.043	0.202	0	1
	cou_fra	0.068	0.251	0	1
	cou_den	0.105	0.306	0	1
	cou_gre	0.012	0.108	0	1
	cou_swi	0.122	0.327	0	1
	cou_bel	0.127	0.333	0	1
	cou_cze	0.113	0.317	0	1
	coh_19	0.005	0.073	0	1
	coh_24	0.049	0.215	0	1
	coh_29	0.087	0.282	0	1
	coh_34	0.120	0.325	0	1
	coh_39	0.210	0.407	0	1
	coh_44	0.170	0.376	0	1
	coh_54	0.133	0.339	0	1
	coh_59	0.062	0.241	0	1

Table 8. Model with unobserved heterogeneity: Group characteristics (ages 40-70)

GROUP 1	Variable	Mean	Standard Deviation	Minimum	Maximum
	owner	0.020	0.140	0	1
	liferet_2	0.375	0.484	0	1
	yr_liferet	7.800	12.530	0	70
	lpermnc_nop	8.530	1.088	3.925	11.002
	risk	0.221	0.415	0	1
	age	51.695	8.192	40	70
	yr_indep	28.451	9.471	2	64
	female	0.534	0.500	0	1
	hschool	0.318	0.466	0	1
	college	0.169	0.375	0	1
	phealth_2	0.101	0.301	0	1
	dphealth_1in	0.012	0.108	0	1
	dphealth_1out	0.005	0.073	0	1
	hhsz_2	3.175	1.446	1	14
	dhhsz_1in	0.009	0.094	0	1
	dhhsz_1out	0.049	0.215	0	1
	ifchildren_1	0.856	0.351	0	1
	partner_1	0.819	0.385	0	1
	widow_1	0.046	0.210	0	1
	divorce_1	0.035	0.185	0	1
	unempl_1	0.021	0.145	0	1
	retired_1	0.156	0.363	0	1
	cou_aus	0.039	0.194	0	1
	cou_swe	0.063	0.244	0	1
	cou_net	0.083	0.276	0	1
	cou_spa	0.015	0.123	0	1
	cou_ita	0.110	0.313	0	1
	cou_fra	0.056	0.230	0	1
	cou_den	0.061	0.240	0	1
	cou_gre	0.059	0.235	0	1
	cou_swi	0.117	0.321	0	1
	cou_bel	0.103	0.305	0	1
	cou_cze	0.152	0.359	0	1
	coh_19	0.004	0.066	0	1
	coh_24	0.096	0.295	0	1
	coh_29	0.070	0.255	0	1
	coh_34	0.099	0.299	0	1
	coh_39	0.190	0.393	0	1
	coh_44	0.195	0.396	0	1
	coh_54	0.121	0.326	0	1
	coh_59	0.046	0.209	0	1

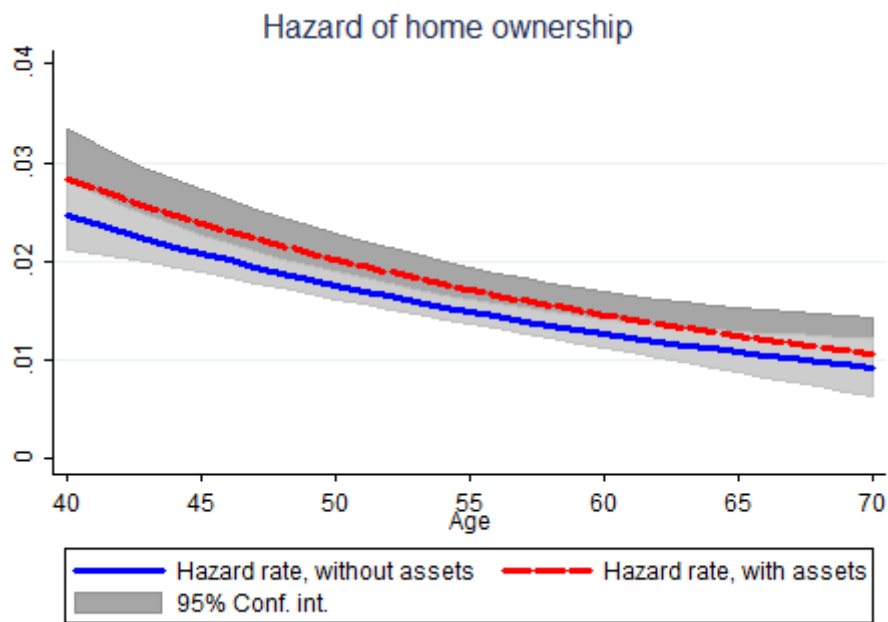
GROUP 2	Variable	Mean	Standard Deviation	Minimum	Maximum
	owner	0.021	0.145	0	1
	liferet_2	0.207	0.405	0	1
	yr_liferet	3.801	9.187	0	70
	lperminc_nop	8.429	1.146	3.925	11.056
	risk	0.215	0.411	0	1
	age	51.908	8.348	40	70
	yr_indep	28.579	9.682	2	64
	female	0.555	0.497	0	1
	hschool	0.364	0.481	0	1
	college	0.142	0.349	0	1
	phealth_2	0.092	0.289	0	1
	dphealth_1in	0.011	0.102	0	1
	dphealth_1out	0.005	0.069	0	1
	hhsiz_2	3.219	1.556	1	14
	dhhsiz_1in	0.010	0.101	0	1
	dhhsiz_1out	0.048	0.213	0	1
	ifchildren_1	0.845	0.362	0	1
	partner_1	0.802	0.398	0	1
	widow_1	0.046	0.209	0	1
	divorce_1	0.033	0.179	0	1
	unempl_1	0.018	0.132	0	1
	retired_1	0.164	0.370	0	1
	cou_aus	0.046	0.209	0	1
	cou_swe	0.051	0.219	0	1
	cou_net	0.146	0.353	0	1
	cou_spa	0.052	0.222	0	1
	cou_ita	0.063	0.243	0	1
	cou_fra	0.139	0.346	0	1
	cou_den	0.049	0.216	0	1
	cou_gre	0.040	0.195	0	1
	cou_swi	0.086	0.281	0	1
	cou_bel	0.065	0.247	0	1
	cou_cze	0.146	0.354	0	1
	coh_19	0.032	0.177	0	1
	coh_24	0.022	0.148	0	1
	coh_29	0.129	0.335	0	1
	coh_34	0.191	0.393	0	1
	coh_39	0.153	0.360	0	1
	coh_44	0.181	0.385	0	1
	coh_54	0.106	0.308	0	1
	coh_59	0.036	0.187	0	1

Figure 1. Hazard of home ownership (full sample)



Note. Hazard rates are estimated from Column (3) of Table A2.

Figure 2. Hazard of home ownership (ages 40-70)



Note. Hazard rates are estimated from Column (3) of Table A3.

APPENDIX

Table A1. Variable definitions

Variable	Meaning
owner	Dummy =1 if home owner, =0 otherwise
liferet	Dummy =1 if owner of illiquid assets (life insurance and /or retirement accounts)
linc	Logarithm of household total net income, corrected for PPP-adjusted exchange rate [from SHARE] (<i>excluding observations with null income, 0.8% of the sample</i>)
lperminc	Logarithm of lifetime earnings estimate as of age ten, for the head and the partner (<i>excluding self-employed workers</i>)
lperminc_nop	Logarithm of lifetime earnings estimate as of age ten, for the head and the partner, net of pensions (<i>excluding self-employed workers</i>)
liferet_2	Dummy =1 if held illiquid assets (life insurance or retirement accounts) two years before
yr_liferet	Years (≥ 2) since first holding of illiquid assets
risk	Dummy =1 if risk lover (<i>categories 1-3 in question as068_, wave 2</i>)
age	Age
age2	Age ²
yr_indep	Years the individual became independent (established own household)
female	Dummy =1 if female
hschool	Dummy =1 if high school degree at most [from SHARE]
college	Dummy =1 if college degree at most [from SHARE]
phealth_2	Dummy =1 if poor health status two years before
dphealth_1in	Dummy =1 if entered poor health status one year before
dphealth_1out	Dummy =1 if exited poor health status one year before
hhsz_2	Household size two years before
dhhsz_1in	Dummy =1 if increase in household size one year before
dhhsz_1out	Dummy =1 if decrease in household size one year before
ifchildren_1	Dummy =1 if had children one year before
partner_1	Dummy =1 if with a partner one year before
widow_1	Dummy =1 if widow one year before
divorce_1	Dummy =1 if divorced one year before
unempl_1	Dummy =1 if unemployed one year before
retired_1	Dummy =1 if retired one year before
cou_X	Dummy =1 if country X (<i>baseline is Germany</i>)
coh_XX	Dummy =1 if born in years 19XX-4 – 19XX (<i>baseline is years 1945-1949</i>)

Table A2. Model without unobserved heterogeneity (full sample)

VARIABLES	(1) Home- ownership	(2) Home- ownership	(3) Home- ownership	(4) AME from (3)
linc	0.160*** (0.014)			
lperminc		0.148*** (0.017)		
lperminc_nop			0.100*** (0.013)	0.003*** (0.000)
liferet_2	0.144*** (0.040)	0.149*** (0.044)	0.144*** (0.044)	0.005*** (0.001)
yr_liferet	-0.011*** (0.003)	-0.013*** (0.003)	-0.012*** (0.003)	-0.000*** (0.000)
risk	0.219*** (0.023)	0.243*** (0.024)	0.251*** (0.025)	0.008*** (0.001)
age	0.063*** (0.007)	0.065*** (0.008)	0.068*** (0.008)	0.002*** (0.000)
age2	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.000*** (0.000)
yr_indep	-0.021*** (0.003)	-0.023*** (0.003)	-0.023*** (0.003)	-0.001*** (0.000)
female	-0.027 (0.021)	0.013 (0.023)	0.019 (0.024)	0.001 (0.001)
hschool	0.124*** (0.025)	0.160*** (0.027)	0.164*** (0.028)	0.005*** (0.001)
college	0.258*** (0.028)	0.303*** (0.030)	0.310*** (0.030)	0.010*** (0.001)
phealth_2	-0.149*** (0.057)	-0.160** (0.064)	-0.154** (0.065)	-0.005** (0.002)
dphealth_1in	-0.107 (0.136)	-0.308* (0.164)	-0.290* (0.164)	-0.010* (0.005)
dphealth_1out	0.489*** (0.169)	0.480*** (0.186)	0.488*** (0.186)	0.016*** (0.006)
hhsz_2	-0.031*** (0.011)	-0.027** (0.013)	-0.022* (0.013)	-0.001* (0.000)
dhhsz_1in	0.035 (0.033)	0.053 (0.036)	0.056 (0.037)	0.002 (0.001)
dhhsz_1out	-0.133* (0.080)	-0.114 (0.089)	-0.123 (0.090)	-0.004 (0.003)
ifchildren_1	0.082** (0.032)	0.061* (0.035)	0.051 (0.036)	0.002 (0.001)
partner_1	0.604*** (0.038)	0.621*** (0.041)	0.630*** (0.042)	0.021*** (0.001)
widow_1	0.299*** (0.108)	0.358*** (0.124)	0.342*** (0.128)	0.011*** (0.004)
divorce_1	0.074 (0.103)	0.026 (0.113)	0.040 (0.113)	0.001 (0.004)
unempl_1	-0.282*** (0.105)	-0.267** (0.111)	-0.265** (0.111)	-0.009** (0.004)
retired_1	0.039 (0.072)	0.036 (0.079)	0.081 (0.081)	0.003 (0.003)
cou_aus	0.280*** (0.071)	0.294*** (0.078)	0.336*** (0.078)	0.011*** (0.003)
cou_swe	0.982*** (0.046)	0.963*** (0.053)	0.959*** (0.054)	0.032*** (0.002)
cou_net	0.466*** (0.047)	0.509*** (0.055)	0.530*** (0.055)	0.018*** (0.002)
cou_spa	0.891*** (0.055)	0.836*** (0.070)	0.854*** (0.071)	0.028*** (0.002)
cou_ita	0.493*** (0.047)	0.549*** (0.059)	0.555*** (0.059)	0.018*** (0.002)

cou_fra	0.648*** (0.043)	0.674*** (0.052)	0.682*** (0.052)	0.023*** (0.002)
cou_den	1.194*** (0.043)	1.168*** (0.051)	1.161*** (0.051)	0.039*** (0.002)
cou_gre	0.679*** (0.049)	0.721*** (0.062)	0.701*** (0.064)	0.023*** (0.002)
cou_swi	0.056 (0.054)	0.047 (0.063)	0.064 (0.062)	0.002 (0.002)
cou_bel	0.985*** (0.041)	0.994*** (0.050)	1.005*** (0.051)	0.033*** (0.002)
cou_cze	-0.499*** (0.063)	-0.532*** (0.070)	-0.565*** (0.070)	-0.019*** (0.002)
coh_19	-0.633*** (0.103)	-0.628*** (0.114)	-0.647*** (0.123)	-0.022*** (0.004)
coh_24	-0.351*** (0.059)	-0.354*** (0.067)	-0.352*** (0.069)	-0.012*** (0.002)
coh_29	-0.371*** (0.046)	-0.409*** (0.052)	-0.415*** (0.053)	-0.014*** (0.002)
coh_34	-0.208*** (0.038)	-0.294*** (0.043)	-0.313*** (0.044)	-0.010*** (0.001)
coh_39	-0.102*** (0.035)	-0.143*** (0.038)	-0.149*** (0.039)	-0.005*** (0.001)
coh_44	-0.039 (0.033)	-0.087** (0.036)	-0.093*** (0.036)	-0.003*** (0.001)
coh_54	0.081** (0.032)	0.081** (0.035)	0.080** (0.035)	0.003** (0.001)
coh_59	0.032 (0.040)	0.033 (0.044)	0.020 (0.044)	0.001 (0.001)
Constant	-6.693*** (0.194)	-6.541*** (0.227)	-6.091*** (0.197)	

Observations 319,530 255,254 248,628 248,628

*Note. Column (1): we exclude observations reporting no income. Columns (2)-(3): we exclude observations on self-employed workers (8.89% of the respondents) as well as the top and bottom 1% of the permanent income estimates. Column (4) reports average marginal effects (AME) from the model in Column (3). Standard errors in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$*

Table A3. Model without unobserved heterogeneity (restricted sample in age 40-70)

VARIABLES	(1) Home- ownership	(2) Home- ownership	(3) Home- ownership	(4) AME from (3)
linc	0.188*** (0.026)			
lperminc		0.194*** (0.032)		
lperminc_nop			0.125*** (0.023)	0.003*** (0.000)
liferet_2	0.155** (0.076)	0.168** (0.083)	0.186** (0.084)	0.004** (0.002)
yr_liferet	-0.004 (0.003)	-0.007* (0.004)	-0.008** (0.004)	-0.000** (0.000)
risk	0.242*** (0.045)	0.321*** (0.049)	0.323*** (0.049)	0.007*** (0.001)
age	-0.032 (0.035)	-0.035 (0.040)	-0.042 (0.041)	-0.001 (0.001)
age2	-0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
yr_indep	-0.004 (0.004)	-0.005 (0.004)	-0.004 (0.004)	-0.000 (0.000)
female	-0.111*** (0.039)	-0.065 (0.044)	-0.064 (0.045)	-0.001 (0.001)
hschool	0.189*** (0.047)	0.234*** (0.052)	0.250*** (0.053)	0.005*** (0.001)
college	0.474*** (0.055)	0.496*** (0.059)	0.532*** (0.060)	0.011*** (0.001)
phealth_2	-0.158** (0.079)	-0.177** (0.090)	-0.157* (0.091)	-0.003* (0.002)
dphealth_1in	0.044 (0.184)	-0.094 (0.217)	-0.109 (0.223)	-0.002 (0.004)
dphealth_1out	0.475* (0.252)	0.506* (0.277)	0.512* (0.277)	0.010* (0.006)
hhsz_2	-0.053*** (0.016)	-0.042** (0.019)	-0.042** (0.020)	-0.001** (0.000)
dhhsz_1in	0.411*** (0.126)	0.523*** (0.135)	0.534*** (0.137)	0.011*** (0.003)
dhhsz_1out	0.025 (0.092)	0.083 (0.103)	0.076 (0.105)	0.002 (0.002)
ifchildren_1	0.025 (0.063)	0.004 (0.070)	0.005 (0.071)	0.000 (0.001)
partner_1	0.502*** (0.080)	0.481*** (0.087)	0.511*** (0.088)	0.010*** (0.002)
widow_1	0.101 (0.142)	0.149 (0.162)	0.148 (0.166)	0.003 (0.003)
divorce_1	0.286** (0.145)	0.181 (0.159)	0.192 (0.161)	0.004 (0.003)
unempl_1	-0.105 (0.169)	-0.175 (0.182)	-0.173 (0.182)	-0.003 (0.004)
retired_1	-0.061 (0.084)	-0.138 (0.096)	-0.106 (0.099)	-0.002 (0.002)
cou_aus	0.106 (0.129)	0.149 (0.138)	0.176 (0.139)	0.004 (0.003)
cou_swe	0.756*** (0.091)	0.764*** (0.101)	0.764*** (0.102)	0.015*** (0.002)
cou_net	0.154* (0.090)	0.197* (0.103)	0.237** (0.103)	0.005** (0.002)
cou_spa	1.151*** (0.093)	1.107*** (0.116)	1.139*** (0.119)	0.023*** (0.002)
cou_ita	0.826*** (0.079)	0.890*** (0.099)	0.898*** (0.100)	0.018*** (0.002)

cou_fra	0.710*** (0.079)	0.707*** (0.092)	0.721*** (0.093)	0.015*** (0.002)
cou_den	0.446*** (0.104)	0.456*** (0.113)	0.431*** (0.114)	0.009*** (0.002)
cou_gre	1.253*** (0.078)	1.279*** (0.099)	1.319*** (0.102)	0.027*** (0.002)
cou_swi	0.237*** (0.087)	0.183* (0.102)	0.227** (0.101)	0.005** (0.002)
cou_bel	0.503*** (0.085)	0.500*** (0.100)	0.479*** (0.102)	0.010*** (0.002)
cou_cze	-0.262*** (0.097)	-0.308*** (0.110)	-0.341*** (0.109)	-0.007*** (0.002)
coh_19	-0.044 (0.153)	0.079 (0.167)	0.070 (0.181)	0.001 (0.004)
coh_24	0.187** (0.094)	0.242** (0.106)	0.233** (0.111)	0.005** (0.002)
coh_29	0.158** (0.077)	0.103 (0.088)	0.127 (0.089)	0.003 (0.002)
coh_34	0.251*** (0.068)	0.205*** (0.077)	0.181** (0.078)	0.004** (0.002)
coh_39	0.137** (0.066)	0.127* (0.074)	0.114 (0.075)	0.002 (0.002)
coh_44	0.044 (0.065)	-0.009 (0.073)	-0.019 (0.074)	-0.000 (0.001)
coh_54	0.090 (0.069)	0.111 (0.077)	0.101 (0.077)	0.002 (0.002)
coh_59	0.110 (0.092)	0.080 (0.104)	0.059 (0.104)	0.001 (0.002)
Constant	-4.958*** (0.922)	-4.848*** (1.054)	-3.970*** (1.058)	

Observations 144,174 114,205 110,795 110,795

*Note. Column (1): we exclude observations reporting no income. Columns (2)-(3): we exclude observations on self-employed workers (8.89% of the respondents) as well as the top and bottom 1% of the permanent income estimates. Column (4) reports average marginal effects (AME) from the model in Column (3). Standard errors in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$*

Table A4. Model with unobserved heterogeneity (marginal effects, full sample)

VARIABLES	Heterogeneity, group 1		Heterogeneity, group 2	
	(1) Illiquid assets	(2) Home- Ownership	(3) Illiquid assets	(4) Home- Ownership
lperminc_nop	0.011*** (0.001)	0.003*** (0.001)	0.009*** (0.001)	0.004*** (0.001)
liferet_2		0.005** (0.002)		0.012*** (0.003)
yr_liferet		-0.001*** (0.000)		0.000 (0.000)
risk	0.014*** (0.001)	0.007*** (0.001)	0.018*** (0.002)	0.009*** (0.001)
age	0.015*** (0.000)	0.002*** (0.000)	0.017*** (0.000)	0.003*** (0.000)
age2	-0.000*** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)
yr_indep	0.000 (0.000)	-0.001*** (0.000)	0.000*** (0.000)	-0.001*** (0.000)
female	-0.040*** (0.001)	0.002 (0.001)	-0.025*** (0.001)	-0.000 (0.001)
hschool	-0.009*** (0.002)	0.006*** (0.001)	0.014*** (0.002)	0.005*** (0.001)
college	0.010*** (0.002)	0.010*** (0.001)	0.024*** (0.002)	0.010*** (0.001)
phealth_2	0.013*** (0.002)	-0.003 (0.003)	0.004* (0.002)	-0.008** (0.003)
dphealth_1in	0.017*** (0.006)	-0.009 (0.007)	0.003 (0.006)	-0.011 (0.008)
dphealth_1out	0.015* (0.009)	-0.001 (0.010)	0.007 (0.010)	0.030*** (0.008)
hhsz_2	-0.003*** (0.001)	-0.001** (0.001)	-0.005*** (0.001)	-0.001 (0.001)
dhhsz_1in	0.003 (0.003)	-0.001 (0.002)	0.011*** (0.003)	0.005*** (0.002)
dhhsz_1out	-0.004 (0.004)	-0.007* (0.004)	0.001 (0.004)	-0.001 (0.004)
ifchildren_1	0.019*** (0.002)	0.003** (0.002)	0.012*** (0.002)	0.000 (0.002)
partner_1	0.025*** (0.002)	0.024*** (0.002)	0.021*** (0.002)	0.019*** (0.002)
widow_1	0.014*** (0.004)	0.009 (0.006)	0.026*** (0.004)	0.016*** (0.006)
divorce_1	0.001 (0.004)	0.002 (0.005)	0.024*** (0.005)	0.001 (0.005)
unempl_1	-0.031*** (0.005)	-0.001 (0.005)	-0.003 (0.006)	-0.018*** (0.005)
retired_1	0.005** (0.003)	0.001 (0.004)	0.008*** (0.003)	0.003 (0.004)
cou_aus	0.207*** (0.003)	0.004 (0.004)	-0.389*** (0.006)	0.025*** (0.003)
cou_swe	0.027*** (0.002)	0.033*** (0.002)	0.070*** (0.003)	0.029*** (0.003)
cou_net	0.306*** (0.003)	0.015*** (0.003)	-0.383*** (0.004)	0.029*** (0.003)
cou_spa	-0.145*** (0.006)	0.023*** (0.003)	-0.123*** (0.004)	0.042*** (0.003)
cou_ita	-0.139*** (0.004)	0.013*** (0.002)	-0.103*** (0.003)	0.032*** (0.003)
cou_fra	-0.069*** (0.003)	0.022*** (0.002)	-0.016*** (0.003)	0.025*** (0.003)
cou_den	0.291***	0.035***	-0.313***	0.050***

	(0.002)	(0.003)	(0.003)	(0.003)
cou_gre	-0.392***	0.017***	-0.133***	0.052***
	(0.030)	(0.002)	(0.006)	(0.003)
cou_swi	0.261***	0.006*	-0.311***	0.010***
	(0.002)	(0.003)	(0.002)	(0.003)
cou_bel	0.220***	0.037***	-0.345***	0.041***
	(0.002)	(0.002)	(0.003)	(0.003)
cou_cze	-0.121***	-0.011***	-0.192***	-0.028***
	(0.003)	(0.003)	(0.002)	(0.004)
coh_19	-0.551***	-0.027***	0.172***	-0.010
	(0.037)	(0.005)	(0.010)	(0.007)
coh_24	-0.047***	-0.008***	-0.127***	-0.016***
	(0.003)	(0.003)	(0.004)	(0.003)
coh_29	-0.057***	-0.013***	-0.115***	-0.015***
	(0.003)	(0.002)	(0.003)	(0.002)
coh_34	-0.046***	-0.008***	-0.070***	-0.014***
	(0.002)	(0.002)	(0.003)	(0.002)
coh_39	0.155***	-0.006***	-0.377***	-0.003
	(0.002)	(0.002)	(0.003)	(0.002)
coh_44	-0.027***	-0.001	-0.042***	-0.006***
	(0.002)	(0.002)	(0.002)	(0.002)
coh_54	0.001	0.004**	0.020***	0.001
	(0.002)	(0.001)	(0.002)	(0.002)
coh_59	0.019***	0.001	0.037***	-0.001
	(0.003)	(0.002)	(0.003)	(0.002)
Observations	206,925	206,925	155,536	155,536
Log-likelihood	-22,797.909	-18,726.990	-22,710.209	-16,575.558
McFadden's R ²	0.690	0.057	0.615	0.083

*Note. The table reports the average marginal effects from the bivariate mixed proportional hazard analysis on the holding of illiquid assets and home ownership, using as weights the probability to belong to group 1 (Columns (1)-(2)) or group 2 (Columns (3)-(4)). Standard errors in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$*

Table A5. Model with unobserved heterogeneity (marginal effects, restricted sample in age 40-70)

VARIABLES	Heterogeneity, group 1		Heterogeneity, group 2	
	(1) Illiquid assets	(2) Home- Ownership	(3) Illiquid assets	(4) Home- Ownership
lperminc_nop	0.003*** (0.001)	0.003*** (0.001)	0.012*** (0.001)	0.002*** (0.001)
liferet_2		0.005* (0.003)		0.008*** (0.003)
yr_liferet		-0.000 (0.000)		-0.000 (0.000)
risk	0.030*** (0.002)	0.007*** (0.001)	0.008*** (0.002)	0.006*** (0.001)
age	0.027*** (0.002)	-0.001 (0.001)	0.021*** (0.001)	-0.001 (0.001)
age2	-0.000*** (0.000)	0.000 (0.000)	-0.000*** (0.000)	0.000 (0.000)
yr_indep	0.000* (0.000)	-0.000 (0.000)	-0.001*** (0.000)	-0.000 (0.000)
female	-0.031*** (0.002)	-0.001 (0.001)	-0.009*** (0.002)	-0.001 (0.001)
hschool	0.277*** (0.002)	0.001 (0.002)	-0.215*** (0.002)	0.008*** (0.002)
college	0.029*** (0.003)	0.007*** (0.002)	0.024*** (0.002)	0.014*** (0.002)
phealth_2	0.011*** (0.003)	0.000 (0.002)	0.002 (0.002)	-0.007** (0.003)
dphealth_1in	0.007 (0.008)	-0.004 (0.007)	-0.002 (0.007)	-0.000 (0.006)
dphealth_1out	0.003 (0.012)	0.007 (0.008)	-0.013 (0.009)	0.015* (0.008)
hhsz_2	0.004*** (0.001)	-0.001 (0.001)	-0.001** (0.001)	-0.001 (0.000)
dhhsz_1in	0.005 (0.011)	0.014*** (0.004)	0.001 (0.010)	0.009** (0.004)
dhhsz_1out	-0.004 (0.004)	0.001 (0.003)	-0.004 (0.004)	0.002 (0.003)
ifchildren_1	0.009** (0.003)	-0.002 (0.002)	0.022*** (0.003)	0.001 (0.002)
partner_1	-0.008** (0.004)	0.011*** (0.003)	-0.010*** (0.003)	0.010*** (0.002)
widow_1	0.008 (0.005)	0.003 (0.005)	-0.005 (0.005)	0.004 (0.004)
divorce_1	-0.024*** (0.006)	0.009** (0.004)	-0.022*** (0.005)	-0.002 (0.005)
unempl_1	-0.016** (0.007)	-0.004 (0.005)	-0.022*** (0.006)	-0.003 (0.005)
retired_1	0.006** (0.003)	-0.002 (0.003)	0.009*** (0.002)	-0.002 (0.003)
cou_aus	-0.018*** (0.004)	0.004 (0.004)	0.006* (0.003)	0.004 (0.004)
cou_swe	0.254*** (0.005)	0.007** (0.003)	-0.217*** (0.005)	0.024*** (0.003)
cou_net	0.315*** (0.005)	0.001 (0.003)	-0.284*** (0.005)	0.009*** (0.003)
cou_spa	0.186*** (0.007)	0.020*** (0.004)	-0.383*** (0.022)	0.028*** (0.003)
cou_ita	-0.107*** (0.005)	0.015*** (0.003)	-0.037*** (0.003)	0.022*** (0.003)
cou_fra	0.202*** (0.005)	0.013*** (0.003)	-0.227*** (0.003)	0.018*** (0.003)
cou_den	0.279*** (0.005)	0.004 (0.003)	-0.248*** (0.003)	0.016*** (0.003)

	(0.007)	(0.003)	(0.007)	(0.003)
cou_gre	-0.204***	0.023***	-0.081***	0.031***
	(0.007)	(0.003)	(0.005)	(0.003)
cou_swi	-0.258***	0.001	0.244***	0.005*
	(0.003)	(0.003)	(0.003)	(0.003)
cou_bel	-0.279***	0.010***	0.198***	0.007**
	(0.005)	(0.003)	(0.004)	(0.003)
cou_cze	-0.136***	-0.008***	-0.069***	-0.005
	(0.003)	(0.003)	(0.003)	(0.003)
coh_19	0.405***	0.024***	-0.535***	-0.004
	(0.021)	(0.007)	(0.015)	(0.004)
coh_24	-0.387***	0.007**	0.260***	-0.000
	(0.006)	(0.003)	(0.005)	(0.004)
coh_29	0.088***	0.005*	-0.251***	0.001
	(0.008)	(0.003)	(0.004)	(0.002)
coh_34	0.147***	0.006**	-0.239***	0.003
	(0.005)	(0.002)	(0.003)	(0.002)
coh_39	-0.072***	0.004*	-0.050***	0.001
	(0.003)	(0.002)	(0.003)	(0.002)
coh_44	-0.025***	0.001	-0.036***	-0.002
	(0.003)	(0.002)	(0.002)	(0.002)
coh_54	0.043***	0.006***	0.045***	-0.002
	(0.003)	(0.002)	(0.003)	(0.002)
coh_59	0.088***	0.002	0.072***	0.000
	(0.005)	(0.003)	(0.004)	(0.003)
Observations	90,537	90,537	68,073	68,073
Log-likelihood	-9,590.687	-4,780.764	-9,511.313	-5,902.912
McFadden's R ²	0.718	0.045	0.702	0.052

*Note. The table reports the average marginal effects from the bivariate mixed proportional hazard analysis on the holding of illiquid assets and home ownership, using as weights the probability to belong to group 1 (Columns (1)-(2)) or group 2 (Columns (3)-(4)). Standard errors in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$*