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Early Life Conditions and Financial Risk–Taking in Older Age

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Abstract
Using life-history survey data from eleven European countries, we investigate whether childhood conditions, such as socioeconomic status, cognitive abilities and health problems influence portfolio choice and risk attitudes later in life. After controlling for the corresponding conditions in adulthood, we find that superior cognitive skills in childhood (especially mathematical abilities) are positively associated with stock and mutual fund ownership. Childhood socioeconomic status, as indicated by the number of rooms and by having at least some books in the house during childhood, is also positively associated with the ownership of stocks, mutual funds and individual retirement accounts, as well as with the willingness to take financial risks. On the other hand, less risky assets like bonds are not affected by early childhood conditions. We find only weak effects of childhood health problems on portfolio choice in adulthood. Finally, favorable childhood conditions affect the transition in and out of risky asset ownership, both by making divesting less likely and by facilitating investing (i.e., transitioning from non-ownership to ownership).

Keywords: Portfolio Choice, Childhood Socio-economic Status, Cognition, Health, Financial Risk.

JEL Classification: G11, D14, E21, J13, C23, C25

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1. Introduction

Why so many households do not invest in risky financial assets? This puzzle has been preoccupying economists for many years (Haliassos and Bertaut, 1995; see also the contributions in Guiso, Haliassos, and Jappelli, 2001, for cross-country evidence on this issue). Up to now, the overwhelming majority of the investigations of this puzzle have examined factors that are present in adulthood. We propose to study this puzzle from a different angle that has not yet been, to the best of knowledge, explored in the literature.[1] Specifically, we go back in time and examine the effect of childhood conditions on household investment in risky financial assets and on individuals' risk preferences in adulthood.

We find that risky asset ownership in older age, as well as the willingness to undertake financial risk, is strongly and positively associated with childhood socio-economic status (SES) and childhood cognition. On the other hand, the influence of health problems early in life seems to be weaker. Crucially, these results are obtained while controlling for SES and cognition in adulthood (including education, wealth, income, and health) in a variety of ways. This indicates the existence of direct and longstanding (possibly permanent) effects of childhood conditions in economic choices and attitudes later in life.

There are several channels through which childhood experiences could affect financial decisions in adulthood. First, childhood conditions have direct implications for wealth latter in life, which is in turn strongly associated with risky asset ownership. The fact that severe poverty is self-perpetuating across generations has been extensively documented. Oftentimes, an early life of deprivation has a negative effect on childhood health. Poor childhood health

[1] There are several papers that investigate how socio-economic status in adulthood affects portfolio decisions. For example, individuals with higher education, income and wealth hold a larger fraction of their financial wealth in stocks (McArdle, Smith and Willis 2009). Cognitive skills are also found to influence portfolio decisions in older age, as these decisions may be cognitively demanding (Christelis, Jappelli and Padula, 2010; Jappelli and Padula, 2011). In addition, the household finance literature has examined the influence of health on portfolio choice (Rosen and Wu, 2004, Edwards, 2008; Yogo, 2009; Coile and Milligan, 2006). as well as that of age, with portfolios in retirement exhibiting reduced risk (Guiso, Haliassos, and Jappelli, 2001; Ameriks and Zeldes, 2004).

adversely affects cognition and wealth accumulation in adulthood, thus leading to the perpetuation of poverty (Palloni 2006).[2]

Second, childhood conditions affect individuals' stock of human capital. The benefits of positive early childhood experiences (as indicated by height) extend to the old age, as taller individuals enjoy better physical and mental health when they are old (Case and Paxson, 2008a). Furthermore, using height as a marker for lifelong experiences, Korniotis and Kumar (2010) find that taller individuals are more likely to participate in financial markets, and when they do so, they also hold riskier financial portfolios. Hence, health or cognitive problems in childhood may put people at a disadvantage when they start their working lives. With diminished human capital, individuals will experience a lower lifetime income, with direct implications for portfolio choice. Case, Fertig and Paxton (2005) find that being born in a low SES family has a negative impact on childhood health, lowers investments in human capital and worsen health in early adulthood, all effects associated with lower adult earnings.

Third, early life experiences may affect portfolio choice by shaping the attitude toward risk. For instance, a difficult childhood may lead to higher risk aversion in adulthood. Results from Hryshko, Luengo-Prado and Sorensen (2010) suggest that attitudes such as risk aversion are partly shaped by childhood SES. They find that besides age, gender, religion, and parents' risk aversion, a higher level of education of the latter makes children less risk averse in adulthood, which should lead to riskier portfolio allocations.

Fourth, childhood conditions may affect the rate of return of capital. Indeed, early cognitive skills are likely to have a direct impact on adult cognition and the level of financial sophistication. The household finance literature has long recognized that financial sophistication affects saving and portfolio decisions. Van Rooij et al. (forthcoming) find that

[2] Further evidence on the positive effect of health and socio-economic status early in life on their counterparts in adulthood is given by Currie (2009), and Luo and Waite (2005).

financial literacy is associated with higher probability to invest in the stock market and with greater wealth. Calvet et al. (2009) construct an index of financial sophistication and show that poor financial sophistication explains a set of investment mistakes, which include under-diversification, inertia in the risky share of the portfolio, and the tendency to sell winning stocks and hold losing stocks. Furthermore, Lusardi and Mitchell (2007) and Behrman et al. (2010) analyzed the link between financial literacy and saving decisions. Finally, Christelis et al. (2010) find that the propensity to invest in stocks is strongly associated with cognitive abilities.

Fifth, childhood conditions may affect the type of uncertainties that an individual will have to face during adulthood. Having certain medical conditions early in life can lower life expectancy and lead to higher and more volatile health spending. On the other hand, low cognitive abilities can reduce the chances of keeping a job, thus leading to a less stable working life trajectory. As a result, increased exposure to risk in one dimension may lead people to reduce risks in other dimensions, for instance by increasing saving for precautionary reasons or by reducing investment in risky assets like stocks. Empirical evidence for the former effect was provided by Caroll and Samwick (1997), who documented that individuals exposed to higher income uncertainty systematically accumulate more wealth. Furthermore, Guiso, Jappelli and Terlizzese (1996) and Heaton and Lucas (2000) find that in the presence of other independent risks, investors reduce the exposure to rate-of-return risks, lowering the proportion of wealth in illiquid and risky assets (especially stocks).

In order to study the effects of childhood conditions on adult portfolio choice and risk attitudes we use micro-survey data that provide information on both current and retrospective conditions of people aged fifty and above in eleven European countries. We examine several questions related to childhood conditions that provide information on early health and SES, as well as on childhood cognitive skills. In addition, we also retrieve from our micro data information on asset choices and risk attitudes in adulthood, and thus can examine how they are linked to the early life conditions.

From a methodological point of view, the paper extends the literature on portfolio allocation by estimating the transition probabilities in and out of ownership for different financial assets. Our findings indicate that higher childhood SES and cognition make it less likely that households will sell their risky assets, and more likely that they will invest in them if they don't already own them.

The structure of the paper is as follows: Section 2 describes the data, while Section 3 discusses our estimation methodology. Our baseline results are presented in Section 4, while several robustness checks are performed in Section 5. Section 6 concludes.

2. Data

We use data from the first two waves of the Survey of Health, Ageing, and Retirement in Europe (SHARE), which took place in 2004-5 and 2006-7 in eleven European countries (Sweden, Denmark, Germany, the Netherlands, Belgium, France, Switzerland, Austria, Italy, Spain and Greece).[3] SHARE surveys those aged fifty and above and collects data on demographics, physical and mental health (including the administration of tests like grip strength), cognition, social activities, housing, employment, income, housing, assets and expectations.[4]

In 2008-9 SHARE conducted its third wave (SHARELIFE), which was different from the first two ones because it mostly collected retrospective information on respondents' lives, starting from childhood and arriving to the present. The questions covered, among other

[3] The second wave took place also in the Czech Republic, Poland, and Ireland, but given that we need to work with the two-wave panel data we do not use the information from these countries.
[4] More detailed information on waves 1 and 2 of SHARE can be found in Börsch-Supan *et al*. (2005), Börsch-Supan and Jürges (2005), Börsch-Supan *et al*. (2008).

things, the respondents' physical and mental health histories, early cognition, accommodation, working histories, and children and partner information.[5]

In SHARELIFE one can glean information on the SES in childhood through a few questions. We use two of them: i) a question on the number of rooms (excluding kitchen, bathrooms, and hallways) in the accommodation that the respondent's family lived in when the respondent was ten years old; ii) a question on the number of books that could be found in the house when the respondent was ten years old. There are five possible answers to this question, expressed in the following ranges: 0-10, 11-25, 26-100, 101-200, more than 200. As there are very few respondents that give answers that lie above the first range, we create a binary variable that takes the value of one if the answer is above the first range, and zero otherwise.

In order to get information on the respondents' cognitive abilities during childhood we use two SHARELIFE questions that ask about their performance at school at age ten, relative to their schoolmates, in mathematics and language. There are five possible answers to each of the two questions (the performance was much better, better, about the same, worse, much worse). We create two binary variables that take the value of one if the respondents were much better or better, and zero otherwise.

There are several questions in SHARELIFE that provide information on health during childhood. After experimenting with a number of them (more details will be given in Section 4), we finally chose for our baseline empirical specification to construct an indicator of health problems in childhood that equals one if respondents spent one or more months in the hospital or went to the hospital three or more times in one month during childhood.

Following Christelis, Jappelli and Padula (2010), in all our household-level specifications the childhood variables were aggregated over the two partners in a couple, i.e.,

[5] More details on SHARELIFE can be found in Börsch-Supan *et al*. (2011).

we took the maximum of the SES, cognition, and health problems variables over the two partners. When one of the two partners had a missing value in any of these variables we used the value of the responding partner. We will test the robustness of our results to this treatment of missing values in Section 5.

In order to assess the impact of childhood SES, cognition, and health on portfolio choice and risk taking in adulthood we chose to study the ownership of five financial assets, for which information can be found in both waves 1 and 2: directly held stocks, mutual funds, individual retirement accounts (IRAs), bonds, and whole life insurance.[6] Households can invest in stocks, which constitute the riskiest financial asset, through four of these five investment vehicles (i.e. with the exception of bonds), and the degree of riskiness should be typically higher for directly held stocks than for IRAs and whole life insurance.

In addition, financial respondents in wave 2 were asked about their risk preferences with respect to their investments. There were four possible answers that reported on whether respondents had the propensity to: i) take substantial financial risks expecting to earn substantial returns; ii) take above average financial risks expecting to earn above average returns; iii) take average financial risks expecting to earn average returns; iv) not take any financial risks. As there were few respondents that chose the first three options, we created a binary variable that was equal to one if the household was willing to take any financial risk, and zero otherwise. Given that the question about financial risk-taking was asked only in wave 2, we could only perform a cross-sectional analysis when modeling the associated variable. On the other hand, when using it as a forcing variable in the equations for the ownership of the five aforementioned assets, we assumed that its value in wave 1 was equal to the one in wave 2. Given the well-established importance of risk preferences in the study

[6] A whole life insurance policy is a policy that has a saving component that accumulates value over time, and thus can be (partly) invested in risky financial assets.

of portfolio choice, we preferred this solution to one that would involve discarding any risk preference information in our panel data analysis of asset ownership.

After merging the SHARELIFE data with those for waves 1 and 2 we ended up with a sample of 18,885 households and 29,322 individuals.[7] Information on the prevalence of the ownership of the five financial assets and of the propensity to take any financial risk can be found in Table 1. We note that the highest prevalence of stockholding can be found in Sweden (47%), and the lowest in Greece (4.8%). These two countries represent the two extremes also in the case of mutual funds (53.6% and 1.7%, respectively). Individual retirement accounts are also very prevalent in Sweden (45%), while Italy and Greece display the lowest prevalence (roughly 1.7%). Bond ownership is most widespread in Denmark, Germany and Switzerland (roughly 21%) and least common in Greece (1.4%). In the case of whole life insurance, Sweden is once more the country exhibiting the highest penetration of this financial product (37.5%), and Greece again exhibits the lowest (4.2%).

With respect to our childhood-related variables of interest, we note that the countries with the highest prevalence of more than ten books in the house are Sweden and Denmark (85% and 83%, respectively), while the lowest prevalence can be found in Italy (32%). The largest average number of rooms in the house at age ten can be found in Belgium (5.7), while the lowest in Greece (2.9). The two questions on early cognition show that Swedes and Danes are the most likely (at about 57%) to perform above average in both mathematics and language, while the Greeks are the least likely (roughly 34%). Finally, Austrians and Germans are the most likely to have spent one or more months in the hospital (16% and 15.2% respectively), while Greeks the least likely (roughly 1%).

[7] We use Release 2.4 of the wave 1 and 2 data, and Release 1.0 of the SHARELIFE data.

3. Econometric model

The main objective of our empirical strategy is to estimate, in a panel data setting, the effects of our forcing variables on the ownership of different financial assets, as well as on the transitions in and out of ownership. To that effect we use the semi-parametric discrete choice panel data model with autocorrelation developed in Christelis and Fonseca (2011).[8] For the willingness to assume some financial risk we will use a probit model, as the estimation is performed on a cross-section.

Transitions of discrete choice outcomes are often estimated by starting with a sample of respondents in which the outcome takes one value in the start of the panel, and then examining what happens in subsequent waves: a new binary variable is defined to be equal to one if there is a change to the other outcome in any of those waves, while it is equal to zero if there is no change. There are a couple of problems with this approach. First, it starts with a potentially very selected sample that consists of those for which the outcome takes a particular value. For example, in order to study transitions out of stock ownership one would start with a sample of those that were stock owners in the first wave of the panel. Selectivity can be a problem because the unobservables that affect the decision to be a stockholder (e.g. familiarity with the workings of the stock market) might also affect the transition out of stock ownership. In other words, only part of the sample is used, and the truncation is based on an endogenous decision, which can lead to inconsistent estimates. Second, this approach cannot handle the opposite transitions (in our example, from non-ownership to ownership) as separate events, as the transition is defined only for going from ownership to non-ownership. Therefore the case of the opposite transition would take the same value as the case of no transition, i.e., zero.

Another approach would be to model simultaneously the two ownership possibilities,

[8] The exposition in this section follows closely their arguments.

each with two possible outcomes (no transition and transition), by using a multinomial logit with four total outcomes. Some of the outcomes, however, would be irrelevant (and thus impossible to choose) for some cases of ownership. For example, transitions from ownership to non-ownership would be irrelevant for non-owners. The inability to choose some of the alternatives at any given point in time would be a violation of the assumptions of the multinomial logit. Alternatively, one could use a nested logit, but one of the assumptions in such a model would be that unobservables of the choices in different nests are uncorrelated with each other, an assumption that is difficult to justify in our context.

Our approach to the problem of estimating transitions starts from the specification of the household's decision problem, namely to own the asset or not. For this decision we posit an equation for a latent variable $y_{i,t}^*$ (for household *i*) given by

$$y_{i,t}^* = \mathbf{X}_{i,t}\boldsymbol{\beta} + c_k + \varepsilon_t \quad (1)$$

where $\mathbf{X}_{i,t}$ denotes a vector of control variables, c_k a random effect, and ε_t is a time varying noise term. As usual, there is an observed binary variable $y_{i,t}$ that is equal to one if the latent variable $y_{i,t}^*$ is greater than zero, and is equal to zero otherwise.

We assume that the random effect c_k takes values from a distribution with K points (the first point c_1 is normalized to zero as in Michaud and Tatsiramos, forthcoming), and for each point *k* (*k*=1,…, K) there is an associated probability p_k. In other words, we estimate a non-parametric distribution for the random effect, as in Heckman and Singer (1984). The use of a non-parametric distribution for the random effects should make our results more robust than those obtained under the typical assumption that the random effect is normally distributed (Mroz, 1999). We choose the optimal number of distribution points in each case by examining the value of the Akaike information criterion, which balances the value of the likelihood against the number of parameters used in the estimation.

The distribution of the noise term ε_t is of particular importance for our purposes. More specifically, we assume that it is autocorrelated, with correlation coefficient ρ, i.e.,

$$\varepsilon_t = \rho\varepsilon_{t-1} + w_t \qquad (2)$$

with $w \sim N(0, \sigma^2)$. We allow for the autocorrelation of the noise term because there might be unobservable factors affecting portfolio choice that are not independent over time. For example, some investors might be familiar with the stock market because they are acquainted with people professionally involved in it that provide them with stock tips. Such a source of information can be reasonably assumed to be present in more than one time period.

It is quite important to model the random effects separately from the noise terms for yet another reason: if one merged the random effect c_k with the noise term ε_t to produce a composite time-varying error term, this latter term would have a component (the random effect c_k) with an autocorrelation equal to one, and this could in practice limit the range of values that the autocorrelation coefficient of the composite error term would take. Therefore, modelling separately the random effects and the noise terms makes our model more flexible.

Equation (2) and the distributional assumption on w imply that ε_t is normally distributed with mean zero and variance equal to $\sigma^2/(1-\rho^2)$. As usual in a probit, we need a normalization in the distribution of the error term ε_t. Consequently, we divide the linear index of the latent variable by the standard deviation of ε_t, which is equal to $\sigma/\sqrt{1-\rho^2}$, and set $\sigma = 1$. This in turn means that the linear index $\boldsymbol{X}_{i,t}\boldsymbol{\beta}$ and the random effect c_k in the likelihood function will be multiplied by $\sqrt{1-\rho^2}$.

All the above imply that the probability of observing any combination of the two possible choices (one decision in each of the two periods in our sample) can be written, for a given point c_k of the distribution of the random effects, as follows:

$$h(\mathbf{y}_i \mid \mathbf{X}_i, c_k; \boldsymbol{\beta}, \rho) = \Phi_2\left(l_{i,t}(\mathbf{X}_{i,t}\boldsymbol{\beta} + c_k)\sqrt{1-\rho^2}, l_{i,t+1}(\mathbf{X}_{i,t+1}\boldsymbol{\beta} + c_k)\sqrt{1-\rho^2}, l_{i,t}l_{i,t+1}\rho\right) \quad (3)$$

where $\mathbf{y}_i = (y_{i,t}, y_{i,t+1})$, $\mathbf{X}_i = (\mathbf{X}_{i,t}, \mathbf{X}_{i,t+1})$, $l_{i,t} = 2y_{i,t} - 1$, $l_{i,t+1} = 2y_{i,t+1} - 1$, and Φ_2 denotes the bivariate cumulative standard normal distribution. Hence, the log likelihood of our sample can be written as

$$\ln L(\boldsymbol{\beta}, \rho, \mathbf{c}, \mathbf{p}) = \sum_{i=1}^{N}\left(\log \sum_{k=1}^{K} p_k \left[h(\mathbf{y}_i \mid \mathbf{X}_i, c_k; \boldsymbol{\beta}, \rho)\right]\right) \quad (4)$$

where $\boldsymbol{c} = (c_2, \ldots, c_K)$ and $\boldsymbol{p} = (p_2, \ldots, p_K)$.[9]

The study of transitions in asset ownership between the two periods comes naturally out of this setup if we consider that a transition probability is just a probability of an outcome at *t+1* conditional on an outcome at *t*, and hence is equal to the joint probability of the two outcomes divided by the marginal probability of the conditioning outcome at time *t*. The existence of ρ implies that the joint probability is not equal to the product of the marginal probabilities of the two outcomes; as a result, the conditional probability will not collapse to the marginal probability of the outcome at *t+1*.

Starting from (3), we can calculate the probability of transitioning from ownership of an asset at time *t* to non-ownership at time *t+1* as follows:

[9] More details on the maximization of the likelihood with respect to ρ and $\boldsymbol{p}$ are given in Appendix A.1.

$$prob(y_{t+1} = 0 \mid y_t = 1) = \sum_{k=1}^{K} p_k \frac{\Phi_2\left((\mathbf{X}_{i,t}\boldsymbol{\beta} + c_k)\sqrt{1-\rho^2}, -(\mathbf{X}_{i,t+1}\boldsymbol{\beta} + c_k)\sqrt{1-\rho^2}, -\rho\right)}{\Phi\left((\mathbf{X}_{i,t}\boldsymbol{\beta} + c_k)\sqrt{1-\rho^2}\right)} \quad (5)$$

i.e., by dividing the joint probability of ownership at *t* and non-ownership at *t+1* by the marginal probability of ownership at t, and integrating the resulting conditional probability over the distribution of the random effect.

Equation (5) makes it clear that we can form the joint probabilities needed to calculate transition probabilities only because of the presence of ρ. If ρ were equal to zero, the conditional probability in (5) would collapse to the marginal probability of the outcome at *t+1* for any value of the random effect c_k. Similarly, the transition from non-ownership in *t* to ownership in *t+1* is given by

$$prob(y_{t+1} = 1 \mid y_t = 0) = \sum_{k=1}^{K} p_k \frac{\Phi_2\left(-(\mathbf{X}_{i,t}\boldsymbol{\beta} + c_k)\sqrt{1-\rho^2}, (\mathbf{X}_{i,t+1}\boldsymbol{\beta} + c_k)\sqrt{1-\rho^2}, -\rho\right)}{\Phi\left(-(\mathbf{X}_{i,t}\boldsymbol{\beta} + c_k)\sqrt{1-\rho^2}\right)} \quad (6)$$

Let us also emphasize that conditional probabilities like the ones shown in (5) and (6) do not require an outcome defined as a transition; instead, they are naturally derived from the combinations of the static outcomes by taking advantage of the presence of autocorrelation in the noise term. In addition, the calculation of these transition probabilities does not require the presence of a lagged dependent variable, which would not be possible in our case because we have a two-period panel.[10]

[10] It is important to note that the calculation of transition probabilities and of their associated marginal effects is a partly counterfactual exercise, as is also the case with the usual unconditional (i.e., marginal) probabilities. When we consider the probability of, say, direct stockholding and how it is affected by a change in the value of a variable of interest, we calculate this probability also for sample units that are not observed to be stockholders in our sample. Correspondingly, when we examine the probability of a particular transition in the ownership of

At first glance, it might appear a bit odd that time-invariant factors like early life conditions might induce a change in behaviour from one period to the next. The channels through which the influence of childhood circumstances materializes are, however, the same ones that are relevant for the static asset ownership choice. For example, the higher stock of human capital and wealth in older age that are associated with high SES and cognition at childhood can bring about the circumstances that trigger financial market participation (Korniotis and Kumar, 2010). In addition, a higher willingness to bear financial risk, partly induced by favourable childhood circumstances, should make divesting from risky assets less likely, thus leading to a more stable and long-run-oriented investment strategy. Finally, higher childhood cognition can increase the level of financial sophistication in adulthood, which in turn can lead to less financial inertia and allocation mistakes, including under-diversification or inappropriate changes in portfolio composition.

As a result of the above, our model allows us to calculate the marginal effects of our variables of interest on the probabilities of: i) ownership (unconditional); ii) transitioning from ownership to non-ownership; iii) transitioning from non-ownership to ownership. When calculating the marginal effects on transition probabilities, we calculate the conditional probability for a given value of the forcing variable in both periods, then calculate the same probability for a second value of the forcing variable (again constant across time) and then take the difference of the two conditional probabilities. For the dummy variables denoting being above average at math and language, for having more than ten books in the house, and for spending one or more months in the hospital, the marginal effects denote the change in the relevant probability when the dummy variable changes from zero to one. For the number of rooms in the house the marginal effect reflects the change in the probability when the rooms increase by one. We estimate our marginal effects and their standard errors by

an asset, we calculate it also for sample units who do not exhibit this pattern of ownership over time.

simulation; the procedure that we follow is described in detail in Appendix A.1.

4. Empirical Results

As we have already discussed, we will examine the associations of our five variables of interest denoting childhood SES, cognition, and health. These associations will be expressed as marginal effects on the probabilities of ownership of five assets (stocks, mutual funds, individual retirement accounts, bonds, and whole life insurance), and of the willingness to assume at least some financial risk. In addition, we will examine the marginal effects on the transitions in and out of ownership of the five assets.

In addition to our variables denoting childhood conditions, we will include in our specification several other variables that have been found to be important determinants of risky asset ownership in the household finance literature. These include age, marital status, number of children, the willingness to bear financial risk, education, two cognition indicators (one derived from a numeracy test[11], and another one denoting self-reported good reading skills), real and financial wealth and household income.[12,13] The variables denoting education, numeracy and reading skills, and financial resources are particularly important because they represent SES and cognition in adulthood, and thus whatever effects we find from our childhood conditions variables will be net of the corresponding variables in adulthood. Finally, for the two individual-level outcomes (ownership of IRAs and willingness to bear financial risk) we also add a gender dummy.

In order to take into account the multi-country variability in our sample we also include country dummies. Furthermore, we cluster our errors at the country level, in order to capture

[11] See Christelis, Jappelli and Padula (2010).

[12] As is the case for childhood conditions variables, in household-level specifications we aggregate all remaining variables over the couple.

[13] In each specification, the financial wealth variable is net of the value of the asset the ownership of which is modelled. Household income is net of any capital income.

the effect of any (possibly time-varying) unobservable factors that affect sample units in a given country.

We first show the regression coefficients for stocks, mutual funds and individual retirement accounts in Table 2a, and for bonds, whole life insurance and the willingness to assume financial risk in Table 2b. Looking at variables other than our five variables of interest, we note that our results are to a very large extent in accordance with both previous findings in the household finance literature and with our intuition: we find strong positive associations of higher education, current cognition, economic resources, and the willingness to take financial risk with all five assets, while the associations with being in bad health are negative. The same patterns are also present in our cross-sectional probit results for the willingness to take financial risk.

One important result that comes out of our estimation is that the autocorrelation coefficient ρ is very large in absolute value and strongly significant for four out of the five assets examined (IRAs are the exception). These results provide a justification for our methodology that allows for autocorrelation in the error terms of our panel model, and uses ρ to calculate probabilities of ownership transitions and the associated marginal effects thereof.

Using the Akaike information criterion, the optimal number of distribution points was found to be two for the case of stocks and whole life insurance, three for bonds, four for mutual funds, and five for IRAs. When estimating our models with different numbers of distribution points, however, we found that, with few exceptions, the marginal effects of our variables of interest did not change between alternative specifications of the non-parametric distribution of the random effect.

It is well known that regression coefficients in non-linear discrete choice models do not allow us to calculate economically relevant magnitudes, and hence we turn our attention to marginal effects. First, we show in Table 3 the marginal effects of our variables of interest on the unconditional (static) probabilities of ownership of the five financial assets and of the willingness to assume financial risk. For stocks, we find that being above average at math is associated with an increase in the probability of ownership by 1 percentage points (pp), while living in a larger house (by one more room) has also a positive effect on stockholding (0.16 pp). Finally, spending time in a hospital during childhood reduces the probability of direct stockownership by 1 pp.

In the case of mutual funds, the SES variable that matters is having more than ten books in the house (2.3 pp), while being above average at math has once more a strong effect (1.3 pp). The number of books in the house is strongly positively associated with owning IRAs (1.9 pp).

Bonds represent the only assets for which we do not find an association with any of our variables of interest. This finding is not surprising because bonds are the least risky assets that we examine, and thus we would expect the effects of early life conditions to be weak for this particular asset. To put it another way, this finding reinforces our intuition that a crucial channel through which childhood conditions affect adulthood is the willingness to undertake risk.

Whole life insurance ownership is positively, but weakly, associated with having more than ten books in the house (1.6 pp, p-value: 0.093), while early cognition plays a role through having above average language skills (1.9 pp). Finally, for the willingness to assume some financial risk, having more than ten books in the house has a strong effect (4.6 pp). We also find a positive association with having above average language skills (0.5 pp).

The analysis of the probability of asset ownership transitions enriches our results by allowing the study of how investors update their choices over time. Consider first the marginal effects (shown in Panel A of Table 4) on the probability of transition from ownership to non-ownership, i.e., of divesting the asset. We find that higher childhood SES and cognition make it less likely that households will want to sell their assets. We note in particular the strong negative effects of being above average at math on divesting from stocks and mutual funds (-1.4 pp and -0.8 pp, respectively), as well as the negative effects of childhood SES (as indicated by having more than ten books in the house) on divesting from mutual funds and individual retirement accounts (-1.4 pp and -1.9 pp, respectively).

Finally, we examine the opposite transition probability, i.e., of investing in the asset in period *t+1* while not owning it in period *t*. Results are shown in Panel B of Table 4, and we note that childhood cognition and SES are positively associated with investing in risky assets, albeit with somewhat weaker effects (in absolute value) than those found for the divesting probability. Once more, above average mathematical skills are positively associated with investing in stocks (0.9 pp) and in mutual funds (1.5 pp), while above average language skills are associated with investing in whole life insurance (1.7 pp). In addition, having more than ten books in the house has a positive effect on investing in mutual funds (2.6 pp), and on opening an individual retirement account (1.9 pp).

These results are somewhat striking. Typically, individuals are exposed to increasing uncertainty as they age, mostly due to adverse health shocks becoming more severe and frequent, which in turn leads to significant medical expenditure. Increased exposure to risk in one dimension should lead individuals to reduce risks in other dimensions, for instance by reducing investments in risky assets (see Caroll and Samwick, 1997, Guiso, Jappelli and Terlizzese, 1996, and Heaton and Lucas, 2000). In addition, the shorter expected lifetime that comes about with aging, means that there is less time available to recover from an adverse asset price shock. Therefore, it is not surprising that the risky content of household portfolios declines with age (Ameriks and Zeldes, 2004). Our findings suggest that higher SES and cognition in childhood would mitigate this pattern, both by diminishing the propensity to exit from risky investments with age and by increasing, ceteris paribus, the willingness to undertake them.

To summarize, we find that both childhood SES and cognition have economically relevant positive associations with four of the five assets that we examine, and these associations are net of the strong effects of current SES (i.e., education and economic resources), and current cognition. We must also remember that early SES and cognition should have an effect on their current counterparts; therefore, it is very likely that our estimated marginal effects are conservative estimates of the overall effect of childhood cognition and SES on asset ownership and risk taking in older age.

5. Robustness checks

We experimented with various specifications of our estimating equations in order to check the robustness of our results. Due to space constraints we cannot show all the results from these checks; they are available from the authors upon request.

We first ran conventional random effects probits without autocorrelation in order to see whether our non-parametric specification of heterogeneity and our modelling of autocorrelation significantly affected our estimates. We found that the results from the random effect probits were very similar to those from our baseline models. We thus conclude that neither the non-parametric specification of the random effect nor the modeling of the autocorrelation in the noise term are likely to introduce biases in our estimation. On the other hand, due to its semi-parametric nature, our model should be more robust to the misspecification of the random effect, while the inclusion of autocorrelation allows the estimation of transition probabilities.

A concern one might have is whether our results are partly due to some non-linearities in the effects of the SES and cognition variables in adulthood that we are not capturing with our baseline specification. Therefore, we re-estimated our models using a more flexible specification that included dummies for quartiles for income, financial and real wealth, as well as a dummy for each value of the numeracy score. The results for static marginal effects are shown in Table 5 (the ones for transitions are shown in Appendix Table A.1), and we note that the effects of our childhood variables are still economically and statistically significant. The only exception is the now weak effect of childhood SES on direct stockholding; on the other hand the positive association of childhood SES with the ownership of mutual funds and IRAs, and with the willingness to assume financial risk remains strong.

It could also be the case that our results are affected by differential attrition in our sample, as respondents who experienced a higher SES and cognition in childhood might also have a longer life expectancy, and thus be over-represented in our sample. It is not a priori clear what kind of bias this differential attrition might introduce. For example, given that it leads to reduced variability in the childhood SES and cognition variables, it could lead to higher standard errors, and thus to less significant results. In other words, those who were less privileged in childhood need to appear in our sample, so that the effect of more favourable childhood conditions becomes apparent. In order to check the possible consequences of a differential attrition bias, we re-estimated our models including only households in which the maximum age of the two partners (or of the single head) was 65 or less in the first wave of SHARE. This led to a reduced sample of 11,249 households (16,159 individuals). The results from this younger sample are shown in Table 6 (static marginal effects), and in Appendix Table A.2 (effects on transition probabilities). We note that both childhood SES and cognition still have strong associations with risky asset ownership and risk preferences, and thus conclude that our baseline results are unlikely to be due to any differential attrition in our sample.

We also re-estimated our models without clustering the standard errors at the country level. Such specifications imply that any country-level effects can be dealt with satisfactorily by including country dummies in the conditional mean of the latent variables, as there is no further correlation in the unobservables among units in a given country. While there are some small differences in the significance of some variables, the overall picture remains the same. We thus conclude that our results are not affected in any significant way by the clustering of standard errors at the country level.

Our results up to now indicate that childhood health problems play a very limited role in risky asset ownership later in life (with the exception of direct stockholding), after accounting for current health conditions. In order to check the robustness of this result we experimented with three additional measures of childhood health conditions: self-reported health at childhood, the number of serious diseases experienced, and whether respondents had regular access to medical care until they were sixteen years old. We found that none of these additional variables affected risky asset ownership (including direct stockholding) or risk attitudes. We therefore conclude that childhood health problems are unlikely to have any effect on financial risk taking in older age, after controlling for current health status.

Finally, as we have already noted, in our sample we had a number of couples for which the information on childhood conditions was missing for one of the two partners. Up to now these couples were included in our estimation by using the information of the responding partner. After their exclusion, our samples for household-level outcomes consist of 10,926 observations.[14] In order to see the impact of this decision on our results, we estimated our models after excluding couples with missing values. We found that our overall results did not change, with one exception: socio-economic status, as indicated by the number of rooms in

[14] The issue of missing values in couples is not relevant for the case of IRAs and the willingness to bear financial risk, as these outcomes are modelled at the individual level.

the childhood house, has now a strong positive effect on whole life insurance. Therefore, it seems that ignoring the issue of missing values of the second partner in couples does not change the overall findings that we get from our baseline results.

6. Conclusions

This paper studies the influence of childhood SES, cognition, and health on financial asset investment and risk preferences in older age. Our results indicate that SES and cognition early in life have a lasting and economically significant effect on both investment choices and risk preferences, even after controlling for current SES and cognition. On the other hand, the effect of childhood health was found to be weaker. These results are robust to a variety of alternative specifications and estimation procedures, and also hold for the younger part of our sample, which indicates that they are not due to differential attrition.

Methodologically, our paper contributes to the household finance literature by showing how to take advantage of the autocorrelation of the noise term in panel data models in order to study asset ownership transitions. Our approach allows us to use the whole sample for our estimation, and hence avoid the selectivity problems that affect estimation in truncated samples.

Our findings point out to early childhood conditions as one potential answer to the puzzle of why so many households do not invest at all in risky financial assets, a behavior that is inconsistent with the predictions of standard models of portfolio choice. It appears that adverse childhood conditions leave permanent effects on individuals' cognitive capacities and risk preferences, making them reluctant to undertake risky financial investments.

Therefore, it is likely that policy interventions early in childhood have, among other things, the potential to increase individuals' ability to enhance their material circumstances in adulthood through the judicious choice of their financial investments. Judging from our results, such interventions should include measures to alleviate conditions associated with low SES such as poverty, as well as measures that aim to improve school performance. Doing better at school should in turn lead to higher financial literacy in adulthood, thus making investment in financial assets less daunting and more attractive.

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Appendix

A.1 Calculation of Magnitudes of Interest via Monte Carlo Simulation

The autocorrelation coefficient ρ and the vector of probabilities $\mathbf{p} = (p_2, \dots, p_K)$ must satisfy the following constraints: ρ must lie between minus one and one and $p_2, \dots, p_K$ must lie between zero and one. These constraints make convergence of our already complicated likelihood function even more difficult. Therefore we estimate ρ and $\mathbf{p}$ as functions of the unconstrained parameters ψ, and $\boldsymbol{\omega} = (\omega_2, \dots, \omega_K)$, that hence become the ones with respect to which the likelihood function is maximized. The mapping between these new parameters and ρ and $\mathbf{p}$ is as follows:

$$\rho = \frac{e^{\psi} - 1}{e^{\psi} + 1}$$
$$p_k = \frac{e^{\omega_k}}{\sum_{k=1}^{K} e^{\omega_k}} \tag{A.1}$$

with $\omega_1 = 0, k = 1, \dots K$. Given that marginal effects, ρ and $\mathbf{p}$ all represent magnitudes that are nonlinear functions of estimated parameters that are part of $\hat{a} = (\hat{\beta}, \hat{\psi}, \hat{c}_2, \dots, \hat{c}_K, \hat{\omega}_2, \dots, \hat{\omega}_K)$, we compute their point estimates and standard errors via Monte Carlo simulation (Train, 2003), i.e., by using the formula

$$E(g(\theta)) = \int g(\theta) f(\theta) d\theta \tag{A.2}$$

where θ denotes one or more parameters in a, $g(\theta)$ denotes the magnitude of interest and $f(\theta)$ the joint distribution of all the elements in θ. We implement this simulation estimator by drawing 1,000 times from the joint distribution of the estimated vector of parameters $\hat{a}$ under the assumption that it is asymptotically normal with mean and variance-covariance matrix equal to the maximum likelihood estimates. Then, for a given parameter draw j we generate the magnitude of interest $g(\hat{\theta}^j)$. For marginal effects in particular, we first calculate the partial effect corresponding to each individual in our sample and then calculate the marginal effect $g(\hat{\theta}^j)$ as the weighted average (using sample weights) of the effect across individuals.[15] We then estimate $E(g(\theta))$ and its standard error as the mean and standard deviation, respectively, of the distribution of $g(\hat{\theta}^j)$ over all parameter draws.

[15] We do not evaluate marginal effects at sample means since this practice can lead to severely misleading results (see Train, 2003, pp. 33-34).

Table 1. Descriptive Statistics

Variable	Sweden	Denmark	Germany	Netherlands	Belgium	France	Switzerland	Austria	Italy	Spain	Greece
Owns stocks	0.473	0.417	0.181	0.203	0.239	0.175	0.287	0.074	0.072	0.065	0.048
Owns mutual funds	0.536	0.178	0.182	0.151	0.201	0.197	0.234	0.071	0.062	0.053	0.017
Owns IRAs	0.450	0.375	0.106	0.041	0.272	0.289	0.180	0.067	0.016	0.112	0.017
Owns bonds	0.178	0.218	0.210	0.051	0.146	0.045	0.210	0.066	0.137	0.018	0.014
Owns whole life insurance	0.375	0.285	0.368	0.330	0.254	0.206	0.257	0.291	0.090	0.102	0.042
Willing to take some financial risk	0.433	0.464	0.285	0.252	0.318	0.241	0.330	0.172	0.165	0.106	0.197
Age (mean)	65.0	64.3	64.9	64.1	65.2	64.2	65.3	64.5	64.9	64.6	64.2
Couples	0.656	0.62	0.696	0.674	0.684	0.672	0.632	0.635	0.73	0.733	0.662
Number of children (mean)	2.23	2.17	2.03	2.33	2.14	2.21	2.05	2.09	2.03	2.33	1.86
Self-reported health bad or very bad	0.220	0.291	0.496	0.392	0.339	0.419	0.205	0.393	0.570	0.561	0.321
High school education	0.299	0.375	0.525	0.294	0.272	0.373	0.574	0.497	0.281	0.130	0.299
Post-secondary education	0.332	0.469	0.385	0.339	0.397	0.300	0.156	0.305	0.093	0.150	0.200
Good reading skills	0.936	0.883	0.762	0.715	0.842	0.783	0.858	0.862	0.557	0.486	0.685
Numeracy score (mean)	4.037	3.964	4.004	4.083	3.756	3.603	4.087	3.906	3.261	2.977	3.751
Real wealth in euros (median)	101,494	112,641	134,634	158,072	198,646	228,408	138,797	133,454	171,971	198,917	144,322
Financial wealth in euros (median)	27,680	41,139	27,369	27,710	31,704	17,074	52,142	9,832	5,607	4,420	2,577
Household income in euros (median)	37,239	33,628	32,436	36,618	27,804	33,667	37,942	29,791	21,552	20,258	18,933
More than ten books in the house when ten years old	0.855	0.834	0.787	0.794	0.673	0.653	0.777	0.662	0.318	0.488	0.455
Number of rooms in the house when ten years old (mean)	4.11	4.94	4.16	5.00	5.71	4.70	5.15	3.59	3.41	3.89	2.88
Was better than average at math in school when ten years old	0.565	0.563	0.49	0.486	0.546	0.433	0.484	0.426	0.443	0.406	0.361
Was better than average in language in school when ten years old	0.574	0.605	0.525	0.446	0.574	0.515	0.534	0.488	0.397	0.36	0.328
Spent time in the hospital during childhood	0.123	0.133	0.152	0.133	0.079	0.077	0.109	0.164	0.049	0.055	0.011
Number of households	1,798	1,766	1,485	1,708	2,644	1,991	1,078	886	1,816	1,369	2,319
Number of individuals	2,912	2,705	2,378	2,735	3,981	2,904	1,648	1,262	3,015	2,238	3,544

Table 2a. Estimation Results – Stocks, Mutual Funds, IRAs

Variable	Stocks			Mutual Funds			Individual Retirement Accounts		
	Coeff.	Std. Error		Coeff.	Std. Error		Coeff.	Std. Error	
Age/100	0.1255	0.3584		0.7342	0.6182		-7.6442	1.3044	***
Female	-..-	-..-		-..-	-..-		-0.0776	0.0862	
Is in a couple	0.2558	0.0519	***	0.1215	0.0833		0.0580	0.1339	
Number of children	-0.0439	0.0106	***	-0.0624	0.0175	***	-0.0319	0.0175	*
Self-reported health bad or very bad	-0.0453	0.0472		-0.1633	0.0516	***	-0.1770	0.0464	***
Willing to take some financial risk	0.8994	0.0723	***	1.2573	0.1078	***	0.6489	0.1492	***
High school education	0.1638	0.0410	***	0.2024	0.0806	**	0.3034	0.0758	***
Post-secondary education	0.4294	0.0839	***	0.5014	0.0932	***	0.4426	0.1049	***
Good reading skills	0.1115	0.0539	**	0.2439	0.1456	*	0.0944	0.0454	**
Numeracy score	0.0737	0.0220	***	0.0854	0.0446	*	0.0629	0.0245	**
Real wealth	0.0592	0.0076	***	0.0549	0.0121	***	0.0602	0.0187	***
Financial wealth	0.0327	0.0047	***	0.0444	0.0118	***	0.0278	0.0086	***
Non-capital income	0.0303	0.0093	***	0.0302	0.0174	*	0.0290	0.0163	*
Time effect for 2nd wave	-0.0988	0.0673		-0.4160	0.0888	***	0.3306	0.1427	**
Country dummy: Denmark	-0.3685	0.0178	***	-2.3485	0.2032	***	-0.7167	0.0724	***
Country dummy: Germany	-1.3764	0.1061	***	-1.9545	0.1599	***	-2.3712	0.3132	***
Country dummy: Netherlands	-1.2079	0.0972	***	-2.1821	0.1791	***	-..-	-..-	
Country dummy: Belgium	-1.1769	0.0950	***	-2.0407	0.1665	***	-1.0929	0.1516	***
Country dummy: France	-1.2184	0.0974	***	-1.6908	0.1281	***	-0.7624	0.1119	***
Country dummy: Switzerland	-0.8113	0.0599	***	-1.7307	0.1507	***	-1.8004	0.2378	***
Country dummy: Austria	-1.8808	0.1320	***	-2.8852	0.2260	***	-2.9207	0.4068	***
Country dummy: Italy	-1.7750	0.1124	***	-2.6527	0.1913	***	-3.8167	0.5496	***
Country dummy: Spain	-1.5915	0.1141	***	-2.8372	0.1932	***	-1.9348	0.2615	***
Country dummy: Greece	-2.0054	0.1278	***	-3.8584	0.2678	***	-3.7224	0.4642	***
More than ten books in the house when ten years old	0.0587	0.0351	*	0.2466	0.0867	***	0.1913	0.0630	***
Number of rooms in the house when ten years old	0.0166	0.0084	**	0.0163	0.0113		0.0053	0.0129	
Was better than average at math in school when ten years old	0.1082	0.0320	***	0.1339	0.0408	***	0.0514	0.0377	
Was better than average in language in school when ten years old	-0.0445	0.0343		0.0755	0.0439	*	-0.0018	0.0471	
Spent time in the hospital during childhood	-0.1187	0.0544	**	0.0930	0.0961		-0.1755	0.1152	
Constant	-1.8463	0.2886	***	-0.4837	0.5725	***	1.9538	0.9639	*
ρ	0.3307	0.0948	***	-0.4316	0.1000	***	-0.3201	0.2262	
Distribution points									
Point 2 value	-2.0091	0.0896	***	-4.2875	0.3261	***	-10.9949	3.1129	***
Point 2 probability	0.6424	0.0809	***	0.1940	0.0463	***	0.2096	0.0335	***
Point 3 value	-..-	-..-		-2.0208	0.1393	***	1.8235	0.2866	***
Point 3 probability	-..-	-..-		0.7548	0.0625	***	0.3391	0.0726	***
Point 4 value	-..-	-..-		3.8566	0.6646	***	4.0411	0.8535	***
Point 4 probability	-..-	-..-		0.0259	0.0141	*	0.1572	0.0159	***
Point 5 value	-..-	-..-		-..-	-..-		7.0964	0.8379	***
Point 5 probability	-..-	-..-		-..-	-..-		0.1478	0.0154	***
Number of Observations	18,885			18,885			26,628		
Log Likelihood	-6,946.6			-6,393.7			-9,040.8		

Notes: ***, **, * denote significance at 1%, 5% and 10%, respectively.

Table 2b. Estimation Results – Bonds, Whole Life Insurance, Willingness to Take Some Financial Risk

Variable	Bonds		Whole Life Insurance		Willing to take at least some financial risk	
	Coeff.	Std. Error	Coeff.	Std. Error	Coeff.	Std. Error
Age/100	4.3403	1.5550 ***	-5.2471	0.9483 ***	-0.0138	0.0030 ***
Female	-..-	-..-	-..-	-..-	-0.2591	0.0393 ***
Is in a couple	0.1589	0.0842 *	0.3621	0.0599 ***	0.2024	0.0408 ***
Number of children	-0.0935	0.0234 ***	0.0190	0.0111 *	-0.0265	0.0099 ***
Self-reported health bad or very bad	-0.1958	0.1115 *	0.0072	0.0433	-0.1735	0.0217 ***
Willing to take some financial risk	0.8400	0.2141 ***	0.3042	0.0452 ***	-..-	-..-
High school education	0.4075	0.1886 **	0.1346	0.0515 ***	0.1470	0.0511 ***
Post-secondary education	0.7130	0.2111 ***	0.2620	0.0587 ***	0.3699	0.0819 ***
Good reading skills	0.2733	0.1594 *	0.1122	0.0566 **	0.1036	0.0485 **
Numeracy score	0.1336	0.0577 **	0.0420	0.0311	0.1277	0.0190 ***
Real wealth	0.0691	0.0258 ***	0.0210	0.0064 ***	-..-	-..-
Financial wealth	0.0697	0.0159 ***	0.0072	0.0028 **	-..-	-..-
Non-capital income	0.0095	0.0254	0.0082	0.0064	-..-	-..-
Time effect for 2nd wave	-0.2405	0.1985	0.1696	0.0854 **	-..-	-..-
Country dummy: Denmark	0.2046	0.0936 **	-0.5345	0.0300 ***	0.0211	0.0099 **
Country dummy: Germany	0.2512	0.1583	-0.0419	0.0177 **	-0.3457	0.0173 ***
Country dummy: Netherlands	-1.8427	0.5096 ***	-0.2317	0.0309 ***	-0.5010	0.0137 ***
Country dummy: Belgium	-0.5672	0.1547 ***	-0.5370	0.0343 ***	-0.3537	0.0170 ***
Country dummy: France	-1.9594	0.6074 ***	-0.7172	0.0458 ***	-0.4558	0.0113 ***
Country dummy: Switzerland	0.2671	0.1429 *	-0.4697	0.0222 ***	-0.2873	0.0151 ***
Country dummy: Austria	-1.4422	0.4677 ***	-0.3078	0.0281 ***	-0.7633	0.0225 ***
Country dummy: Italy	-0.0873	0.1006	-1.2817	0.0650 ***	-0.6059	0.0250 ***
Country dummy: Spain	-2.2830	0.6792 ***	-1.1724	0.0556 ***	-0.7490	0.0338 ***
Country dummy: Greece	-2.7978	0.8559 ***	-1.7793	0.0764 ***	-0.4808	0.0219 ***
More than ten books in the house when ten years old	0.0597	0.0956	0.0698	0.0452	0.1600	0.0474 ***
Number of rooms in the house when ten years old	0.0210	0.0176	0.0105	0.0073	0.0190	0.0056 ***
Was better than average at math in school when ten years old	0.0737	0.0916	-0.0388	0.0494	0.0317	0.0329
Was better than average in language in school when ten years old	-0.0378	0.1010	0.0841	0.0232 ***	0.0214	0.0484
Spent time in the hospital during childhood	-0.1731	0.1273	-0.0179	0.0732	0.0568	0.0694
Constant	-6.2289	1.6703 ***	1.5131	0.6117 *	-0.1554	0.2420
ρ	-0.6569	0.2017 ***	0.4402	0.0761 ***	-..-	-..-
Distribution points						
Point 2 value	-2.7645	0.7232 ***	1.6674	0.6557 **	-..-	-..-
Point 2 probability	0.7743	0.0794 ***	0.5335	0.0503 ***	-..-	-..-
Point 3 value	2.2513	0.6279 ***	-..-	-..-	-..-	-..-
Point 3 probability	0.1283	0.0438 ***	-..-	-..-	-..-	-..-
Number of Observations	18,885		18,885		9,357	
Log Likelihood	-5,556.8		-7,792.2		-5,071.8	

Notes: ***, **, * denote significance at 1%, 5% and 10%, respectively.

Table 3. Unconditional (Static) Marginal Effects, Baseline Model

Variable	Stocks		Mutual Funds		Individual Retirement Accounts		Bonds		Whole Life Insurance		Willing to take at least some financial risk	
	Marginal Effect	Std. Error	Marginal Effect	Std. Error	Marginal Effect	Std. Error	Marginal Effect	Std. Error	Marginal Effect	Std. Error	Marginal Effect	Std. Error
More than ten books in the house when ten years old	0.0055	0.0031 *	0.0230	0.0069 ***	0.0186	0.0076 **	0.0036	0.0065	0.0152	0.0106	0.0455	0.0135 ***
Number of rooms in the house when ten years old	0.0016	0.0008 **	0.0016	0.0012	0.0004	0.0012	0.0010	0.0010	0.0023	0.0015	0.0054	0.0016 ***
Was better than average at math in school when ten years old	0.0102	0.0031 ***	0.0132	0.0042 ***	0.0049	0.0036	0.0044	0.0064	-0.0084	0.0111	0.0091	0.0094
Was better than average in language in school when ten years old	-0.0041	0.0033	0.0075	0.0045 *	-0.0004	0.0045	-0.0012	0.0056	0.0182	0.0057 ***	0.0061	0.0138
Spent time in the hospital during childhood	-0.0105	0.0044 **	0.0096	0.0099	-0.0160	0.0101	-0.0072	0.0058	-0.0039	0.0159	0.0164	0.0204

Notes: Marginal effects denote the change in the relevant choice probability when our variables of interest change as follows: the binary variables denoting having some books in the house, being above average at math and language at school, and spending time in the hospital during childhood change from zero to one, while the continuous variable denoting the numbers of rooms in the house respondents lived in at age ten changes by one unit.***, **, * denote significance at 1%, 5% and 10%, respectively.

Table 4. Marginal Effects on Ownership Transitions, Baseline Model

Variable	Stocks		Mutual Funds		Individual Retirement Accounts		Bonds		Whole Life Insurance	
	Marginal Effect	Std. Error	Marginal Effect	Std. Error	Marginal Effect	Std. Error	Marginal Effect	Std. Error	Marginal Effect	Std. Error
Panel A. Transition from ownership to non-ownership										
More than ten books in the house when ten years old	-0.0075	0.0043 *	-0.0137	0.0043 ***	-0.0185	0.0087 **	-0.0028	0.0056	-0.0153	0.0112
Number of rooms in the house when ten years old	-0.0022	0.0011 *	-0.0010	0.0008	-0.0004	0.0012	-0.0007	0.0008	-0.0022	0.0015
Was better than average at math in school when ten years old	-0.0143	0.0047 ***	-0.0082	0.0030 ***	-0.0047	0.0036	-0.0031	0.0056	0.0084	0.0111
Was better than average in language in school when ten years old	0.0056	0.0044	-0.0047	0.0031	0.0003	0.0044	0.0006	0.0044	-0.0181	0.0060 ***
Spent time in the hospital during childhood	0.0147	0.0062 **	-0.0058	0.0061	0.0150	0.0095	0.0047	0.0046	0.0041	0.0159
Panel B. Transition from non-ownership to ownership										
More than ten books in the house when ten years old	0.0048	0.0029 *	0.0257	0.0075 ***	0.0193	0.0083 **	0.0039	0.0070	0.0136	0.0093
Number of rooms in the house when ten years old	0.0014	0.0007 *	0.0018	0.0013	0.0004	0.0013	0.0011	0.0010	0.0021	0.0014
Was better than average at math in school when ten years old	0.0087	0.0027 ***	0.0149	0.0047 ***	0.0051	0.0037	0.0048	0.0069	-0.0077	0.0101
Was better than average in language in school when ten years old	-0.0037	0.0030	0.0084	0.0050 *	-0.0004	0.0046	-0.0014	0.0061	0.0167	0.0052 ***
Spent time in the hospital during childhood	-0.0090	0.0039 **	0.0111	0.0114	-0.0164	0.0103	-0.0078	0.0064	-0.0033	0.0145

Notes: Marginal effects denote the change in the relevant choice probability when our variables of interest change as follows: the binary variables denoting having some books in the house, being above average at math and language at school, and spending time in the hospital during childhood change from zero to one, while the continuous variable denoting the numbers of rooms in the house respondents lived in at age ten changes by one unit.***, **, * denote significance at 1%, 5% and 10%, respectively.

Table 5. Unconditional (Static) Marginal Effects, Flexible Specification

Variable	Stocks		Mutual Funds		Individual Retirement Accounts		Bonds		Whole Life Insurance		Willing to take at least some financial risk	
	Marginal Effect	Std. Error	Marginal Effect	Std. Error	Marginal Effect	Std. Error	Marginal Effect	Std. Error	Marginal Effect	Std. Error	Marginal Effect	Std. Error
More than ten books in the house when ten years old	0.0071	0.0062	0.0273	0.0113 **	0.0149	0.0073 **	0.0000	0.0051	0.0120	0.0098	0.0459	0.0133 ***
Number of rooms in the house when ten years old	0.0019	0.0015	0.0012	0.0012	0.0001	0.0011	0.0005	0.0009	0.0018	0.0015	0.0054	0.0016 ***
Was better than average at math in school when ten years old	0.0120	0.0044 ***	0.0088	0.0049 *	0.0039	0.0035	0.0038	0.0038	-0.0106	0.0105	0.0086	0.0094
Was better than average in language in school when ten years old	-0.0087	0.0059	0.0094	0.0046 **	-0.0013	0.0041	-0.0035	0.0044	0.0167	0.0058 ***	0.0060	0.0140
Spent time in the hospital during childhood	-0.0199	0.0087 **	0.0144	0.0082 *	-0.0150	0.0093	-0.0060	0.0043	-0.0019	0.0153	0.0164	0.0201

Notes: Marginal effects denote the change in the relevant choice probability when our variables of interest change as follows: the binary variables denoting having some books in the house, being above average at math and language at school, and spending time in the hospital during childhood change from zero to one, while the continuous variable denoting the numbers of rooms in the house respondents lived in at age ten changes by one unit.***, **, * denote significance at 1%, 5% and 10%, respectively.

Table 6. Unconditional (Static) Marginal Effects, Younger Sample

Variable	Stocks		Mutual Funds		Individual Retirement Accounts		Bonds		Whole Life Insurance		Willing to take at least some financial risk	
	Marginal Effect	Std. Error	Marginal Effect	Std. Error	Marginal Effect	Std. Error	Marginal Effect	Std. Error	Marginal Effect	Std. Error	Marginal Effect	Std. Error
More than ten books in the house when ten years old	0.0005	0.0038	0.0294	0.0109 ***	0.0241	0.0115 **	0.0027	0.0091	0.0048	0.0052	0.0630	0.0127 ***
Number of rooms in the house when ten years old	0.0022	0.0009 **	0.0018	0.0015	0.0011	0.0026	0.0011	0.0013	0.0002	0.0009	0.0043	0.0027
Was better than average at math in school when ten years old	0.0122	0.0040 ***	0.0047	0.0101	0.0068	0.0069	0.0032	0.0055	-0.0049	0.0040	0.0188	0.0168
Was better than average in language in school when ten years old	-0.0069	0.0065	0.0109	0.0072	0.0004	0.0079	-0.0073	0.0081	0.0090	0.0037 **	0.0001	0.0166
Spent time in the hospital during childhood	-0.0112	0.0052 **	0.0003	0.0141	-0.0212	0.0148	-0.0065	0.0082	0.0007	0.0081	0.0137	0.0293

Notes: Marginal effects denote the change in the relevant choice probability when our variables of interest change as follows: the binary variables denoting having some books in the house, being above average at math and language at school, and spending time in the hospital during childhood change from zero to one, while the continuous variable denoting the numbers of rooms in the house respondents lived in at age ten changes by one unit.***, **, * denote significance at 1%, 5% and 10%, respectively.

Table A1. Marginal Effects on Ownership Transitions, Flexible Specification

Variable	Stocks		Mutual Funds		Individual Retirement Accounts		Bonds		Whole Life Insurance	
	Marginal Effect	Std. Error	Marginal Effect	Std. Error	Marginal Effect	Std. Error	Marginal Effect	Std. Error	Marginal Effect	Std. Error
Panel A. Transition from ownership to non-ownership										
More than ten books in the house when ten years old	-0.0073	0.0065	-0.0298	0.0120 **	-0.0125	0.0070 *	0.0002	0.0064	-0.0124	0.0105
Number of rooms in the house when ten years old	-0.0020	0.0016	-0.0013	0.0012	-0.0001	0.0010	-0.0006	0.0012	-0.0018	0.0015
Was better than average at math in school when ten years old	-0.0123	0.0047 ***	-0.0097	0.0055 *	-0.0032	0.0030	-0.0038	0.0043	0.0107	0.0107
Was better than average in language in school when ten years old	0.0089	0.0061	-0.0103	0.0050 **	0.0009	0.0035	0.0032	0.0048	-0.0167	0.0060 ***
Spent time in the hospital during childhood	0.0204	0.0090 **	-0.0158	0.0091 *	0.0122	0.0078	0.0062	0.0049	0.0023	0.0157
Panel B. Transition from non-ownership to ownership										
More than ten books in the house when ten years old	0.0079	0.0069	0.0183	0.0102 *	0.0152	0.0072 **	0.0001	0.0049	0.0103	0.0084
Number of rooms in the house when ten years old	0.0021	0.0016	0.0009	0.0008	0.0001	0.0012	0.0004	0.0008	0.0016	0.0014
Was better than average at math in school when ten years old	0.0132	0.0046 ***	0.0057	0.0035	0.0041	0.0037	0.0040	0.0039	-0.0093	0.0093
Was better than average in language in school when ten years old	-0.0098	0.0067	0.0060	0.0031 *	-0.0014	0.0042	-0.0038	0.0045	0.0149	0.0052 ***
Spent time in the hospital during childhood	-0.0223	0.0099 **	0.0089	0.0052 *	-0.0155	0.0096	-0.0062	0.0045	-0.0014	0.0137

Notes: Marginal effects denote the change in the relevant choice probability when our variables of interest change as follows: the binary variables denoting having some books in the house, being above average at math and language at school, and spending time in the hospital during childhood change from zero to one, while the continuous variable denoting the numbers of rooms in the house respondents lived in at age ten changes by one unit.***, **, * denote significance at 1%, 5% and 10%, respectively.

Table A2. Marginal Effects on Ownership Transitions, Younger Sample

Variable	Stocks		Mutual Funds		Individual Retirement Accounts		Bonds		Whole Life Insurance	
	Marginal Effect	Std. Error	Marginal Effect	Std. Error	Marginal Effect	Std. Error	Marginal Effect	Std. Error	Marginal Effect	Std. Error
Panel A. Transition from ownership to non-ownership										
More than ten books in the house when ten years old	-0.0005	0.0047	-0.0202	0.0086 **	-0.0267	0.0124 **	-0.0017	0.0111	-0.0052	0.0056
Number of rooms in the house when ten years old	-0.0027	0.0013 **	-0.0013	0.0012	-0.0012	0.0029	-0.0015	0.0018	-0.0002	0.0010
Was better than average at math in school when ten years old	-0.0149	0.0054 ***	-0.0033	0.0076	-0.0076	0.0077	-0.0025	0.0066	0.0053	0.0043
Was better than average in language in school when ten years old	0.0083	0.0079	-0.0076	0.0054	-0.0003	0.0087	0.0056	0.0089	-0.0097	0.0039 **
Spent time in the hospital during childhood	0.0135	0.0066 **	-0.0001	0.0107	0.0239	0.0164	0.0052	0.0099	-0.0006	0.0089
Panel B. Transition from non-ownership to ownership										
More than ten books in the house when ten years old	0.0006	0.0034	0.0315	0.0112 ***	0.0193	0.0135	0.0030	0.0081	0.0053	0.0058
Number of rooms in the house when ten years old	0.0019	0.0008 **	0.0019	0.0016	0.0010	0.0022	0.0009	0.0009	0.0002	0.0010
Was better than average at math in school when ten years old	0.0109	0.0037 ***	0.0052	0.0108	0.0053	0.0061	0.0033	0.0051	-0.0054	0.0044
Was better than average in language in school when ten years old	-0.0063	0.0059	0.0117	0.0076	0.0005	0.0063	-0.0076	0.0079	0.0100	0.0039 **
Spent time in the hospital during childhood	-0.0100	0.0047 **	0.0007	0.0150	-0.0165	0.0141	-0.0064	0.0074	0.0005	0.0091

Notes: Marginal effects denote the change in the relevant choice probability when our variables of interest change as follows: the binary variables denoting having some books in the house, being above average at math and language at school, and spending time in the hospital during childhood change from zero to one, while the continuous variable denoting the numbers of rooms in the house respondents lived in at age ten changes by one unit.***, **, * denote significance at 1%, 5% and 10%, respectively.