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Does Home Ownership Crowd Out Investment in Children's Human Capital?

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Does Home Ownership Crowd Out Investment in Children's Human Capital?*

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Abstract

Parents can adopt two strategies to take care about their children and their future life: they can invest in their human capital, or in real (and financial) wealth to bequeath to them. The optimal children's endowment is assured in equilibrium by complete and perfect markets. However, in the real world markets are far from being perfect and the investment in real or financial wealth can ultimately displace the human capital's one. A strong preference for home ownership makes parents inclined to consider the house as the typical bequest-friendly asset, even at the expense of children's education. Misconceptions about the relative returns of the two different forms of wealth, with a perceived excessive premium from the returns from housing wealth, may also be at work. We argue that this scenario could be well represented by the Italian context. Therefore we analyze the possible trade off between (children's) human and (inherited) real capital by using the Bank of Italy's Survey of Household Income and Wealth (SHIW). Our evidence seems to confirm our hypothesis, and in particular the results are higher for the women's sample.

JEL codes: D10, D91, I21

Keywords: Education, bequests, parental investment

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1 Introduction

Parents generally care about their children, either for altruistic or for strategic reasons. To possibly secure for them a better life than their own, they can follow two main strategies: invest in the children's human capital, in order to enhance their future earnings and/or accumulate financial or real wealth to be bequeathed to them. In equilibrium, with complete markets and no imperfection, the marginal returns from the two strategies are equalized: an optimal distribution of children's endowment between human and financial (real) wealth is reached and no crowding out occurs. Put differently, when educational choices are "efficient", children with lower investment in education simply reflect a lower return on education than their peers (Baland and Robinson, 2000; Becker, 1974; Ben-Porath, 1967).

In the real world, markets are incomplete and far from perfect, so that crowding out can occur. A stylized illustration of how this can happen is the following: parents have a strong preference for home-ownership (possibly induced by distortions in the rent market or by more psychological reasons, such as the "pride of ownership"); in imperfect credit markets, the purchase of the house requires a previous accumulation in order to comply with the requirement for a down payment (a one hundred per cent mortgage is rarely granted and a down payment in the range of 40-60% of the house value is common practice in most European countries). This accumulation takes place more or less in the same years when children receive their education, further saving is required afterwards to repay the mortgage, and after the purchase the house is used by the family and becomes an indivisible and very illiquid form of wealth. These features make the buying of a house consistent with both altruistic and strategic bequest motives, and it makes parents inclined to consider the house as the typical bequest-friendly asset. Market imperfections, for their part, may prevent the attainment of the optimal distribution of the bequest between education and financial/real wealth, largely at the expense of the former (Baland and Robinson, 2000). Although the process of sacrificing children's education in order to have enough finance for the house purchase can have little to do with irrational behaviour, it can nonetheless be helped by misconceptions about the relative returns from the two different forms of wealth, with a perceived higher premium from the returns from housing wealth over the returns from education.

We consider this stylized picture to be highly representative of the Italian situation and use it as a starting point for our paper. Members of Italian households seem particularly attached to home-ownership and show little decumulation of their housing wealth, even at very old ages. A large majority of households comprise home-owners (72% according to EU Statistics on Income and Living Conditions (EU-SILC, 2007); more recent data from SHIW confirm this feature at 73% in 2010) and their wealth

mainly consists of their first residence (70%).[1] In addition, there is evidence of a bequest motive for saving:[2] for example, when asked about their desire to leave a bequest, 50% of (a sample of) heads of household and their spouses answered positively to the question (SHIW, 2002).[3] We believe that this bias in favour of housing investment is partly responsible for the comparatively low average educational attainment in Italy with respect to average OECD results and, at the same time, it could explain the paradox of low educational attainments in a relatively rich country. In Italy only 14% of those aged between 25 and 64 have a tertiary education, compared to the OECD average of 27% (OECD, 2006); this increased slightly to 16% in 2012 compared to the European average of 29% (EUROSTAT). Further, while housing is usually considered a safe asset by Italian households, investment in education can indeed be a rather poor and risky choice if one considers the decreasing return from education that has characterized the country over the last 15 years (Naticchioni et al., 2010). This is also evident by computing the return to schooling from the SHIW dataset, where the average return from tertiary education strongly decreases over time, as reported in Table 1. We are aware that the extent to which tertiary education can be hindered by credict constraints faced by parents relies also on the evidence of how pervasive credits constraints for financing tertiary education are. Unfortunately, to the best of our knowledge, this evidence is difficult to gather for Italy, whereas recent evidence supports the role of parental income on children's tertiary education forthe US.[4]

The aim of this paper is to investigate whether parental housing investment might have displaced children's human capital by using the Bank of Italy's Survey on Household Income and Wealth (SHIW). The structure of the paper is as follows. In Section 2 we review the literature, and in Section 3 we present a theoretical framework. Section 4 sets out the empirical strategy, Section 5 describes the data, Section 6 comments the results and Section 8 concludes the paper.

2 Literature review

The presence of a bequest motive, either of an altruistic or strategic nature, in households' utility function has traditionally been disregarded in the life cycle type of models as being representative of the behaviour only of the (very) rich. In a different strand of literature, research has been devoted to understanding the

[1]The home-ownership share is lower in many European countries, such as France (57%), Germany (56%), whereas it is higher in many south-eastern European countries (EU-SILC, 2007). The SHARE (Survey of Health, Ageing and Retirement People, 2004-2006) survey confirms these country-differences, though the absolute numbers are higher (Italy (81%), France (75%), Germany (58%), Sweden (69%), Spain (89%). Greece (89%)).

[2]The SHIW survey in 2002 asked a sub-sample of couples about whether they planned or desired to leave a bequest to their children.

[3]As for the US, in a national study 47.5% of all respondents expected to leave a bequest (Kao et al., 1997).

[4]The empirical evidence for the US shows in recent studies that parental resources in the 2000s matter twice as much as in 1980s (Belley and Lochner, 2007), despite previuos studies downsized the role of family income on college-attendance once other factors such as abilities were accounted for (Cameron and Heckman, 1998; Carneiro and Heckman, 2002; Cameron and Taber, 2004).

driving forces behind voluntary bequests: (Becker, 1974), for example, explained them as motivated by altruistic motives, whereby parents decide how much to bequeath according to a utility function,which is increasing in their children's consumption. Hurd (1989), on the other hand, set out the egoistic model where parents derive utility which increases with the amount they bequeath rather than how much their heirs consume. In the strategic model set out by Cox (1987), parental utility is a function of how much attention and services they can obtain from their children. Parents value care more when it is provided by children than when it is bought in the marketplace, and are ready to compensate their children for it. As for the empirical evidence, there is either poor evidence that parental choices are driven by altruistic motives (Altonji et al., 1997; Laitner and Ohlsson, 2001; Nordblom and Ohlsson, 2002; Nordblom and Ohlsson, 2011) or a strong rejection of such hypothesis (Kopczuk and Lupton, 2007). According to the last authors the potential determinants of an altruistic motive - such as having children financially better off than their parents or with higher education - do not play a significant role in explaining the probability of a bequest, despite their being consistent with the altruistic hypothesis. At the same time, they rejected the strategic hypothesis because having children who live close to their parents does not significantly affect the probability of bequeathing. Contrary evidence, however, has been reported by other studies (Bernheim et al., 2004; Page, 2003), where bequests have been shown to serve as a means of reducing tax liability. Regardless of the specific driving motives, casual evidence tells us that bequests are an ordinary fact of life. Their weight on total wealth, however, is more problematic: estimates range between high values of the order of 43%, as found by Kotlikoff and Summers (1981),[5] and much lower values in the range of between 17% and 23% (Laitner and Juster, 1996; Modigliani, 1988). More recent estimates for the US (Kopczuk and Lupton, 2007) report that roughly 75% of the elderly population seems to have a bequest motive and that inherited wealth is a very high percentage of total wealth (80%). As for Italy, Barca et al. (1994) reported that households' inherited assets account for one third of total wealth. The bequest motive has been also found to be responsible for the faster decumulation of wealth for the elderly with independent children, assuming that the elderly transfer their wealth as inter vivos gifts (Ando et al., 1993).

To the best of our knowledge there are only few previous studies (Laitner and Ohlsson, 2001; Nordblom and Ohlsson, 2002) that have set out theoretical models in order to investigate the composition of bequests and in particular the relationship between (children's) human and physical capital. Laitner and Ohlsson (2001) presented three different models of intergenerational transfers: the altruistic, the egoistic, and the exchange or strategic model. They empirically tested these models by comparing the results obtained from Swedish and US micro-data. All the models predict that the amount transferred should be positively

[5]In a more recent study Wolff (2000) reported that about 80% of the wealth held by all US households comes from inter-generational transfers.

related to parental earnings: higher earnings by parents affect positively the optimal amount of resources received as a bequest. In the altruistic model, the authors included education as a component of the bequest, and derived a negative impact on the amount of physical capital transferred. However, the empirical results are in contrast with the negative correlation between education and transfers: indeed, the only case when the relevant coefficient is significant is also positive, possibly because of the endogeneity of children's education, which is correlated with unobserved parental altruism affecting also the amount of physical transfers. On the whole, their results weakly support the altruistic model, since the impact of children's earnings on inherited physical capital is negative, despite the relevant coefficient being never significant except in one (weakly significant) case for the US sample. In a different study, Nordblom and Ohlsson (2002) developed another altruistic model that allows for different types of education (public and private): in the case of a perfect substitution between the two, they predicted a positive relationship between the level of human capital acquired by the child and the likelihood of property transfers. On the assumption that the two types of education are not substitutes, the impact of an increase in public education brings about opposite effects on the child's human capital and property transfers: it increases the former and decreases the latter. It follows that there is a negative correlation between the size of the investment in physical and human capital. Parental income has a positive impact on the likelihood of both types of investment, whereas the child's wage rate has a negative impact on the likelihood and magnitude of the bequest, as expected by the altruistic motives driving parental decisions. The empirical results confirm some of the theoretical predictions of the model: being highly educated increases the likelihood of receiving a bequest from parents as expected. The authors interpreted this finding by arguing that, since the marginal return from the investment in education decreases, as opposed to the constant marginal return of investing in physical capital, parents have previously invested in their children's education, and therefore being highly educated exerts a positive influence on receiving inheritance. All these models, however, investigate empirically the potential impact of education on bequests, rather than the impact of the bequest on education, which our study is aimed at. In addition to that, only Nordblom and Ohlsson (2011) accounted for the potential endogeneity of human capital.

In a different context, Baland and Robinson (2000) presented a modified version of the human capital model developed by Becker (1991) with the aim of studying the welfare implications of child labour and the trade-off between child labour and the accumulation of human capital. In a two-period setting where parents altruistically decided the optimal amount of childrenâĂŹs time devoted to labour, how much to save and to bequeath, the model shows that the optimal level of child labour can be efficient if markets are perfect and parents leave a bequest. On the contrary, if one of those two conditions is not met, child labour turns out to be socially inefficient. In one case market imperfections prevented parents from borrowing in the first period and induced them to borrow from their children's labour earnings by

choosing optimally a level of child labour that was inefficiently high, thus reducing the time spent by children in education. A second source of inefficiency linked to the excessively high optimal level of child labour occurs when parents do not leave bequest, a case that is more likely to occur with poverty or a low level of altruism.

3 A theoretical framework

Our model is a simplified version of Baland and Robinson (2000) where parents can make their children better off by leaving them bequest and/or by investing in their human capital.

We consider a two periods model, with zero subjective discount rate. In the first period parents and children live together and parents are those who decide for their children: the amount of education to provide them with, denoted by e, and how much to set aside in order to leave them a bequest, b. If the maximum number of years in school is normalized to one, the ratio of time not spent in school is paid at the (fixed) wage market salary w_c. Children start consuming in period 2, when their parents will be dead. Parents are endowed with a utility function $V_p(c_p, U_c(c_c))$, defined over their own consumption of a single good, denoted by c_p and occurring in period 1 and over the utility function of the child, $U_c(c_c)$, in turn function of child consumption, c_c, which occurs in period t=2.

Assuming separability in the parents' utility function it follows that

$$V_p(c_p, U_c(c_c)) \equiv U_p(c_p) + \delta U_c(c_c) \tag{1}$$

where δ is a parameter measuring the extent of parents' altruism and it is assumed to be such that $0 \leq \delta \leq 1$. We assume imperfect capital markets: parents are not allowed to borrow, and, as a consequence, they can not leave negative bequest, $b >= 0$. It follows that parents cannot borrow against their children's human capital in period 1.

Parents face the following budget constraint

$$c_p = y - e - b \tag{2}$$

where y is labor earning, and the direct cost of investing in their children's education is normalized to one. Each child, in turn faces the following budget constraint in period 2

$$c_c = f(e) + b(1 + r) \tag{3}$$

where $f(e)$ is the parents' expected return on investment in their child's human capital, and it is assumed to be concave, increasing in e at a decreasing rate (i.e. $f^{'}(e) > 0, f^{''}(e) < 0$).
The inter-temporal utility is thus

$$U_p(y - e - b) + \delta U_c(f(e) + b(1 + r))$$

Applying the two first order conditions with respect to b and e to equation (1), subject to the budget constraints (2) and (3) and $b > 0$, $e > 0$, it follows that

$$U_p^{'}(y - e - b) = \delta U_c^{'}(f(e) + b(1 + r))(1 + r) \tag{4}$$

$$U_p^{'}(y - e - b) = \delta f' U_c^{'}(f(e) + b(1 + r)) \tag{5}$$

(4) and (5) hold with inequality ($>$) if $b = 0$ and $e = 0$. Dividing (4) by (5) it follows that, at the optimal level of b and e, the following equality must hold

$$f^{'}(e) = 1 + r \tag{6}$$

The standard human capital optimality condition follows: the marginal return on the child's education is equal to its marginal cost, i.e. the return on investing in capital, where r is the real interest rate.
It is interesting to observe how investment in human capital and bequests are affected by the return to capital, r. For the concavity of the function it is obvious that e declines when return to capital increases. To see how bequest vary according to the interest rate we differentiate the first order condition in (5) with respect to r, obtaining:

$$\delta \left[f'' e' U_c' + f' U_c^{''}(f' e' + b + b'(1 + r)) \right] = U_p^{''}(-e' - b')$$

$$b' = \frac{-U_p^{''} e' - \delta \left[f'' e' U_c^{'} + f' U_c^{''}(f' e' + b) \right]}{(\delta(1 + r) f' U_c^{''} + U_p^{''})}$$

The denominator is always negative for the concavity of the utility function, thus the sign of b' depends on the sign of the numerator only, which is not uniquely defined. For very small amount of bequests (b

approximately zero) the sign of b' is positive, implying that bequest always increases when its return (measured by the interest rate) increases.

When interest rate rises, education declines and bequests are likely to increase, particularly for those who optimally leave small amount of asset to their heirs, determining a potential displacement effect on human capital accumulation.

Let us now turn to the liquidity constraint case, where parents would optimally leave a negative bequests but they cannot, thus being constrained to leave zero bequest. If $b = 0$ and it is binding, it follows that

$$f^{'}(e) > 1 + r \tag{7}$$

thus e under liquidity constraints generates a lower investment in education than when parents optimally choose positive bequests.

We argue that the function $f^{'}(e)$ is the "knowledge" that parents have of the return on human capital of their children, rather than the "actual" return on their human capital. $f^{'}(e)$ is shaped according to the human capital owned by parents, in particular $f^{'}(e)$ is increasing in parents' education such that $f^{'}_{high}(e) > f^{'}_{low}(e)$ corresponding to high and low level of parental education, respectively. Parents with higher level of human capital expect the return on investment in their child's education to be higher than the return expected by parents endowed with a lower level of human capital. Hence the following inequalities must hold

$$f^{'}_{high}(e^{*}_{h}) > f^{'}_{low}(e^{*}_{l}) \tag{8}$$

and

$$e^{*}_{h} > e^{*}_{l} \tag{9}$$

As a consequence, other things being equal, parents endowed with a higher level of human capital choose to invest more in their child's human capital.

4 Empirical strategy

Our empirical strategy consists in estimating the following endogenous switching regression model, a modified version of the standard model as developed by (Maddala, 1986) in order to account for the fact

that our main dependent variable is binary, therefore we do not observe the true dependent variable, but only its realized value. The model set up is as follows:

$$\begin{aligned} d_i^* &= \mathbf{w_i}^{'}\gamma + \nu_i \\ d_i &= 1 \quad \text{iff} \quad d_i^* > 0 \\ d_i &= 0 \quad \text{otherwise} \end{aligned} \tag{10}$$

where d_i^* represents the unobserved parental optimal physical transfer to children as bequest, whereas we only observe its realized value, d_i, an indicator, which is set equal to one if the children have received any bequest.

The two unobserved regimes are described by the following model:

$$\begin{aligned} y_{i1}^* &= \mathbf{x_{i1}}^{'}\beta_1 + \epsilon_{i1} \quad \text{iff} \quad d_i = 0 \\ y_{i2}^* &= \mathbf{x_{i2}}^{'}\beta_2 + \epsilon_{i2} \quad \text{iff} \quad d_i = 1 \end{aligned} \tag{11}$$

where y_{i1}^*, and y_{i2}^* denote the unobserved parental optimal investment in children's human capital in the two regimes, the former corresponding to the sub-sample with no bequest received and the latter to the sub-sample with bequest. We only observe their realized values, y_{i1}, and y_{i2} representing two indicators for higher education, set equal to one if the individual has attained at least the university level, and zero otherwise.

$$\left.\begin{aligned} y_{i1} &= 1 \quad \text{iff} \quad y_{i1}^* > 0 \\ y_{i1} &= 0 \quad otherwise \end{aligned}\right\} \quad \text{iff} \quad d_i = 0 \tag{12}$$

$$\left.\begin{aligned} y_{i2} &= 1 \quad \text{iff} \quad y_{i2}^* > 0 \\ y_{i2} &= 0 \quad otherwise \end{aligned}\right\} \quad \text{iff} \quad d_i = 1 \tag{13}$$

where

$$(\nu_i, \epsilon_{i1}, \epsilon_{i2})^{'} \sim N(0, \Sigma) \tag{14}$$

and

$$\Sigma = \begin{pmatrix} \sigma_\nu & \sigma_{\nu 1} & \sigma_{\nu 2} \\ \sigma_{\nu 1} & \sigma_1^2 & \sigma_{12} \\ \sigma_{\nu 2} & \sigma_{12} & \sigma_2^2 \end{pmatrix} \tag{15}$$

By maximizing the log likelihood function relevant to the system (10)-(15) we estimate the following parameters: $\frac{\gamma}{\sigma_\nu}$, $\frac{\beta_1}{\sigma_1}$, and $\frac{\beta_2}{\sigma_2}$, ρ_1, and ρ_2, where $\rho_1 = cov(\nu, \epsilon_1)$ and $\rho_2 = cov(\nu, \epsilon_2)$ allowed to be different from zero because of the correlation between the two parental investment decisions.[6] The vector $\mathbf{x_{i1}}$ consists in individual characteristics, and additional regressors include time dummies, and dummies for the region of residence, whereas the vector $\mathbf{x_{i2}}$ contains the same regressors as $\mathbf{x_{i1}}$ plus the value of bequest received, which is missing in the first regime. The vector $\mathbf{w_i}$ contains the same regressors as $\mathbf{x_{i1}}$, plus an additional regressor included as exclusion restriction.

5 Data

The dataset used is the SHIW survey for the period 1993-2010.[7] This dataset provides the following pieces of information that have been included in the subsequent empirical analysis: the type of education received; detailed information about the ownership of the house of residence and other real estate; who are the single owners within the family and, in the case of ownership, how the house has been purchased or obtained. The possible answers to the last are the following: the house has been bought, inherited, partially inherited and partially bought, has been received as a gift, or has been built by the family/in cooperation with other families. Since 1993 the survey also contains information about the family background characteristics of the head of household and the spouse, such as the parents' highest level of education at the time when the latter were the same age as the respondent, and information about their occupation. We exploited this information in order to build up a set of indicators of parental characteristics. Our definition of bequest also includes gifts made during the parental lifetime, as bequests and gifts are considered to be substitutes (Nordblom and Ohlsson, 2002); it is likely that parents planning to leave a bequest end up with leaving inter vivos gifts or vice versa. According to this definition, 15% of the sample had received a form of (real estate) bequest, and this share rose to 21% if we consider the

[6] The likelihood function corresponding to the model (10)-(15) is a modified version of the built-in bivariate probit Stata routine, available upon request from the authors.

[7] We cannot consider previous years because we do not have information on parental socio-economic status, which we used in the empirical analysis.

household as the unit of analysis. As a robustness check we used an alternative broader definition of bequest that also included houses built by the family, since we argue that the definition of house built by the family may partially overlap with bequest. Replicating the empirical analysis with the inclusion of the latter group does not alter the main results (see Table A.2 in the Appendix).[8] Our selected sample consisted of the head of household or the spouse, due to the fact that we only had information on parental background characteristics for them, and we needed to link each respondent (the child) to his/her parents' information, which represented important explanatory variables in our empirical analysis. In addition, since the average age of graduation is 26.7, we selected individuals of 27 and older; students younger than 27 still enrolled in higher education would only report secondary school when asked about the highest level of education attained. Given that the questionnaire does not provide information about the person from whom the respondent has received the bequest, we did not consider widows and widowers in order to exclude those who are likely to have received the house of residence from their deceased partner.

As we could not identify who was the responsible for the bequest (i.e. whether it was parents or other relatives) because this information is not provided in the dataset, after excluding widows and widowers we relied on the assumption that the bequest was made on the parents' behalf. However, we were able to exploit the empirical evidence from the 1991 wave of the survey in order to support our assumption. In 1991, individuals receiving bequest or gifts were asked to specify from whom they had received them by distinguishing between parents, partners or others. It turned out that 86% had received the bequest from their parents, 9% from their partners and 4% from others, and when we excluded widow(er)s from our sample, the proportion of those receiving bequests from their parents is increased to 95%. In addition, 92% received gifts from the parents, 6% from others and only 1% from their partners.

Our empirical analysis aimed to detect whether receiving a bequest in the form of housing had any displacement effect on the highest educational level attained; therefore, we would ideally need to observe individuals who had already faced the prospect of receiving or not receiving a bequest/gift from their parents, namely those with at least one parent deceased. Unfortunately, this information on parents was only available for heads of household and their spouses not coresiding with parents. Four per cent of couples[9] lived with a parent; thus, by selecting only those not coresiding with their parents we end up with discarding part of the population and analysing a selected group. As a result, we decided to run the analysis on the all sample aged 27 or over and excluded only widow(er)s.[10] The sample size, after excluding those who did not meet the selection criteria or who had missing information on the variables

[8]Houses built in cooperation with other families are also included in this definition, but they do represent a negligible part of the total. According to this broader definition, the percentage of the sample that received a bequest amounted to 25% as opposed to 15% for the more restricted definition, which represents our benchmark for the empirical analysis.

[9]This information is available in all waves of the survey for the head of household, but only for 2008-2010 for both head of household and spouse.

[10]We then performed a robustness check by replicating the analysis selecting only those with at least one deceased (non-coresident) parent so as to corroborate our results with this selected sub-sample. In running this subsample analysis we had to exclude the year 1998 because the information about whether non-coresident parents are alive is missing for that year.

included in the empirical analysis, consisted of 44,552 observations. The dependent variable was the indicator for having higher education, which was set as equal to one if the highest educational attainment was a college or any postgraduate degree. Due to the fact that our dependent variable represented a single event in the individual's history, we needed to work with a repeated cross-section; for individuals who were part of the panel sample we have repeated observations; therefore, we considered only their last observation available.

We included the following explanatory variables shared by all the regressions throughout the empirical analysis: age, gender, number of siblings that account for family size, a set of indicators of parental educational level (three dummy variables for each parent corresponding to compulsory school, high school, and postgraduate education such as PhD or master's degree, with the excluded category corresponding to no education), and two indicators of parental occupation (not employed, employed as blue collar, with the excluded category being white collar or manager). School quality and - both observed and unobserved - individual ability are other crucial factors affecting the probability of (investing in children's) higher education (Cameron and Heckman 1998; Carneiro and Heckman, 2001; Cameron and Taber, 2004) since they all affect the (expected) return on the investment. However our data do not allow us to control for those factors nor the cross-section nature of the dependent variable allows to control for the individual unobserved heterogeneity by a fixed effects strategy. Therefore we can (partially) control only for individual ability considering parental education/occupation as proxies. Other included regressors consisted of: three dummy variables for the size of the municipality of residence taken as a proxy for different local labour market conditions, and regional and time fixed effects. An additional regressor included in the vector $\mathbf{w_i}$ (as an exclusion restriction affecting only the probability of bequeathing or leaving gifts to children, though not the choice of investing in their higher education) is an indicator set as equal to one for the years after 2001, when the Italian Parliament enacted a law eliminating all taxes on bequests and donations to children (*Law n. 383, 2001*). This choice was motivated by the substantial evidence that bequests and gifts are strongly correlated with bequests and inter vivos taxes (Bernheim et al., 2004, Page, 2003). This fiscal exemption was abrogated by a subsequent law put in place in 2006 (*Decreto Legge n. 262, 2006*). However, due to the fact that the latter maintained the tax exemption for amounts up to âĆň 1 m (whereas for higher values the tax rate was set equal to 4%), we consider that the fiscal regime introduced in 2001 is also valid for the years following 2006 due to the extremely high upper bound set for bequests and gifts covered by the tax exemption. The potential impact of the law on the value of the bequeathed housing wealth is evident from Graph 1. Graph 1 depicts the average value of bequest (for house of residence) according to the year when the bequest had been received.[11] From

[11] We consider here only the residence house because we do not have information on the year of ownership for other real estate.

the graph it is clear how the upward trend in the value of received housing has undergone a change from 2002 onwards, which can readily be ascribed to the introduction of the law that was passed in October 2001.

The extent of the potential displacement can be measured by both the extensive and the intensive dimensions, the former being the different probability of acquiring higher education for those receiving or not receiving any bequest when not receiving bequest corresponds to having parents with liquidity constraints, and the latter being the different probability of higher education for different values of bequest received, conditional on receiving any bequest. The variable of main interest in vector $\mathbf{x_{i2}}$, which accounts for the potential displacement effect at the intensive margin, consists of the (log) real value of all real estate received as bequest[12] together with its squared value in order to control for wealth effects that would dominate the potential displacement effect in case of a big amount of bequest being received.

Wealthy parents are unlikely to face any trade-off in their investment decisions; they tend to invest both in children's education and in housing, without facing any constraints. Therefore, in order to detect the potential trade-off, we needed to isolate those individuals who were particularly well-off and to distinguish the former from a pure wealth effect, which would bring about a positive correlation between the total value of bequest and the higher education received. In addition, this specification allowed us to identify the non-linear displacement effect derived from our theoretical framework.

From the theoretical model it follows that being liquidity constrained entails a zero bequest, because parents who want to leave a negative bequest cannot borrow against their children's human capital due to imperfections in the credit market; moreover, when the condition of zero bequest applies, it follows that there is a lower investment in education compared to the case of parents who are not liquidity constrained. In addition to evaluating the potential crowding-out effect of the bequest received on the human capital endowment, we also aimed to detect whether and how the potential determinants of the optimal investment in children's human capital differ for those parents who are liquidity constrained in comparison to parents who are not liquidity constrained. The endogenous switching regression model allows us to distinguish the determinants of the optimal investment in children's human capital under the two regimes, in addition controlling for the correlation between the two investment's decisions, since parental preferences are likely to affect the latter. We defined individuals as belonging to Regime 1 (i.e. with parents who are liquidity constrained) if they had not received any bequest, whereas those children whose parents were considered not liquidity constrained had received at least one bequest, either the house of residence or other real estate (Regime 2).

Table 2 reports the descriptive statistics of the sample: the first and the second column refer to the non-liquidity constrained and to the liquidity constrained sample, respectively, whereas the last column

[12] All monetary values were discounted by using the Consumer Price Index (CPI) based deflator (base year = 2005).

refers to the entire sample.

The gender composition slightly favoured men (53%), particularly for the sample with the bequest (59%). The average education level of the sample was low: only 9% of the sample had acquired any higher level of education, such as college or any postgraduate education, with a substantial difference between the two regimes favouring those with a bequest (14% as opposed to 8%). The two subsamples differed significantly in many respects: the sample with a bequest was more educated and also more likely to have parents with tertiary education, 5% of the more fortunate children had a father with tertiary education as opposed to 2% for the other group; the difference in the mother's education was also in the same direction, favouring those with bequest. Those receiving bequests seemed to live disproportionally in smaller municipalities, which can be interpreted as being due to sorting in areas with a lower return on human capital.

In addition a bigger family size is negatively correlated with receiving a bequest, and this can be understood as being due to pure wealth effects. Individuals living in an inherited house represented 11% of the sample, whereas those who had received other real estate represented 5%; in total, it turns out that over 15% of the sample had received a form of real estate as a bequest.

As already explained, our model assumes that parents are driven by altruistic motives towards their children; such altruism might take the form of leaving them a bequest (either real or financial) or, alternatively, investing in their education. However, in our empirical analysis we only focus on real estate, excluding financial wealth. This choice is due both to the data limitations and to the empirical evidence. First of all, the survey does not provide information on the origin of other forms of household wealth, particularly financial assets. In addition, the empirical evidence largely points towards a negligible role for financial wealth out of the total wealth to be bequeathed. From the SHIW it turns out that the wealth owned by the elderly (older than 84) is highly concentrated in real estate, the mean value of the share of real estate as a proportion of total wealth is 98%. As a consequence, we argue that the role of financial wealth is negligible in the inter-generational portfolio and accordingly we only focus on real estate bequests.

Table 3 reports the extent of the bequests over time: there is a steady positive trend confirmed also by restricting the sample to those with at least one deceased parent (right column); the share of those receiving a bequest has increased by 10 percentage points in less than two decades. At the same time there is also a positive trend in the share of those with higher education as reported in Table 4 either with or without a bequest, with a more pronounced increase for the latter subsample, with the proportion of those without a bequest being 6% in 1993 and reaching 13% by 2010. A similar pattern also holds true for those with at least one deceased parent (Columns 3 and 4). In particular, this descriptive evidence seems to confirm one of the predictions of our model: among children whose parents are liquidity constrained

(with no bequest), the share of those holding a tertiary education is significantly lower at only 8.5%, as opposed to 14% of children with parents with no liquidity constraints and this gap is even more evident for the subsample with at least one dead parent (6% vs 13%). This evidence is then highly supportive of the displacement effect at the extensive margin due to the presence of liquidity constraints. In addition, according to our model the displacement effect at the intensive margin occurs only for small values of bequest received, and this prediction seems to be confirmed by the correlation between the (log) value of the bequest received and the probability of acquiring a tertiary education (Table 5)for those receiving a bequest. By increasing the bequest value up to the median of the distribution, the share of those with tertiary education decreases, whereas above the median this correlation turns positive.

6 Estimation results

Table 6 reports the results of the endogenous switching regression model as described by (10)-(15), for the entire sample. The first column shows the results for the selection equation as given by (10) and the second and third columns describe the regressions relevant to the first and second regime, respectively. In Columns 3-5 we replicated the same estimates but we tried to control for the return on the two alternative investments in the main regression since we argue that they are strong determinants in parental choices: the return on higher education and on housing. Ideally, in order to carry out this analysis we should have included the returns on these investments at the exact time when the parents are in the decision-making process, namely when the children were around 19 years old. Unfortunately, the dataset only allowed us to recover the information after 1989, therefore we would have to exclude the vast majority of the sample, the median age being 51 and the maximum age 104, over the period 1993-2010. Our strategy was therefore to approximate the returns observed in the past with the current ones: we computed the return on the investment in tertiary education by running standard OLS Mincer regressions of annual labour earnings (in log) by year and region on a sample aged 15-65; our measure of the return on tertiary education was the coefficient relative to the indicator of having college or more education. The other education categories were: no education, compulsory school and high school, and the excluded category was no education; whereas, other regressors were: gender, part-time, age and age squared. The measure of the returns on housing investment was computed using house prices per square metre, since each individual was asked to report the value of his/her residence house and its size in square metres. For each household we computed the price of the residence house per square metre and we averaged this value by year and region so as to compute the growth rate by region, which is our proxy for the return on housing investment. We used individual self-reported house values instead of relying on national data, the reason being that we aimed to capture the perception of the returns on the alternative investment in human

capital rather than the actual one. Indeed, the return perception, no matter to what extent it reflects the actual return, is what drives parental decisions. The trend of the growth rate in real housing prices is reported in Table A.1 in the Appendix.

We started by focusing on the regime equation, which is whether the child received a bequest or did not. Let us highlight, first, the importance of our exclusion restriction, the abolition of the bequest tax (dummy law), which goes in the expected direction. The introduction of the law abolishing taxes on gifts and inheritances strongly affects the probability of leaving bequests.[13]We also found evidence that parental occupation does play a role in explaining the probability of receiving bequest; having poor parents is, in fact, associated with a lower probability of receiving a bequest and this holds true for both having a father or a mother employed as either a blue-collar worker or not employed.

Our theoretical model shows that parental education represents a pivotal variable in determining the optimal investment in children's education, which is also affected by parental liquidity constraints. Our results show that both the mother's and father's education significantly affects the optimal amount of bequest at an increasing pace.[14] As expected, the role of the family size is detrimental to human capital accumulation, since being born in a bigger family - captured by having a higher number of siblings[15] - is associated with a lower probability of receiving a bequest. Interestingly, we find a negative relationship between the size of the municipality of residence and the probability of receiving a bequest, this being potentially explained by the different returns on the investment in human capital according to the size of the municipality of residence. Typically bigger cities are characterized by better labour market opportunities, particularly by a higher return on the human capital endowment. This is further supported by the positive relationship found between the size of the municipality and the probability of higher education (Columns 2 and 3), and by observing the descriptive statistics; the probability of getting a higher education monotonically increases with the size of the municipality of residence, starting from a value of 5% for areas with less than 20,000 inhabitants and going up to 15% in case of areas with over 500,000 inhabitants.

The results reported in the second column correspond to the case of having liquidity constrained parents and they confirm the hypothesis stated in our theoretical framework. According to our assumption, parents endowed with a higher level of human capital tend to invest more in their children's education. This evidence can be attributed to their better knowledge of the investment returns on the latter compared to a parent with a lower level of human capital. Looking at the gender dimension of education, it turns out that the father's education exerts the highest (positive) impact in terms of magnitude. The

[13]An alternative way of defining this variable would be to set an indicator as equal to one if the year when the respondents received the bequest was subsequent to the introduction of the law. However, by using this definition we would not be able to classify those not receiving any bequest, unless we set their indicator to zero.

[14]The excluded category relevant to parental education corresponds to having no education.

[15]The respondent is asked about the number if non-coresident living siblings. Co-resident living siblings can be identified only for years 2008 and 2010, however the share of the sample living with siblings is negligible.

explanation we offer is that the father, especially in a traditional country such as Italy, has the main responsibility for investment decisions (of any type) within the family. As in the case of Column 1, family size also exerts a negative impact on the probability of receiving higher education. The role of parental resources is captured by the indicator for having a father who was employed as a blue-collar worker, which has the highest negative effect on the probability of acquiring higher education with respect to the other parental occupational-related regressors.

Looking at the results relevant to the second regime, our main variable of interest is represented by the value of the housing wealth received as a bequest and by its squared value.[16] These, we believe, are the most interesting results of our paper. Indeed, they indicate that some displacement occurs and housing investment crowds out educational investment for those receiving bequest. The higher the housing value the lower the probability of getting a degree, albeit up to a certain value of housing asset. The effect turns out to be strongly non-linear; in fact, the minimum point is reached at a value of 10.16 for the log of the bequest, which in turn has a mean value of 11.33. This non-linear effect probably reveals a sort of wealth effect, which overcomes the displacement effect for extremely high values of bequest received. In Columns 4-9 we replicate the same estimates but also include the two investment's returns and their interactions with three indicators of father's education in order to control for the better knowledge of the return on the investment for more educated parents. The results for the displacement effect do not change by including these additional regressors, which are never significant.[17]The extent of the endogeneity between the two alternative choices parents face is measured by the two parameters, ρ_1 and ρ_2, related to the first and second regime, respectively. It turns out that only for the subsample with liquidity constraints the parameter measuring the correlation between receiving a bequest and higher education, (ρ_1) is statistically significant. The positive sign of the parameter suggests that the unobserved parental components affecting the two investment decisions for this subsample point in the same direction, so the altruism towards children exerts its effect by both ensuring investment in their human capital and leaving them housing wealth.

To better highlight the effect of the displacement reported by the coefficients on housing wealth, we simulated the probability of obtaining higher education based on our estimation set, as shown in Tables 7 and 8. Table 7 reports, under the two regimes, the actual and the predicted probability of acquiring higher education, which we compute as the mean value of the predicted probability at the individual level. With no bequest received, the predicted probability is 8.2%, whereas it is 13.8% where any bequest is received, and these values coincide with the corresponding sample means suggesting that the model is

[16]Throughout the analysis we transformed the value of the bequest by taking the log of its value (and put at zero a zero value of bequest).

[17]This might be due to the downward bias of the relevant coefficient caused by measurement errors, since we are considering the current return to the investment instead of the investment instead of the return that was in place when the parents took the decisions. This approximation is due to data unavailability on the past returns.

extremely well-specified. We then focused on the sample with no liquidity constraints and we simulated the predicted probability of higher education following a 10% increase in the log value of the bequest. The results reveal a 9 percentage points reduction in the probability, with a decline from 13.8% to 4.8%. In addition to the displacement effect found, Table 7 confirms another prediction of our model: the model predicts that liquidity constrained parents invest significantly less in their children's education, other things being equal. According to our estimates, children whose parents face liquidity constraints have a probability of holding a college degree, including a PhD or a master's degree, that is 4 percentage points lower than their more fortunate peers. Therefore two main results can be inferred from our analysis: first human capital decisions are suboptimal under liquidity constraints. Educational levels, in fact, are lower for liquidity constrained households than for those unconstrained in the financial market, ceteris paribus. Second, even among those who are in the efficient equilibrium (not constrained in the credit market) some (efficient) displacement might occur. The efficiency of the crowding out effect might actually reveal a poor knowledge of the education and housing returns, rather than a well informed choice. Neither the returns on education, nor housing returns seem to be pivotal in driving educational choices.

Table 8 (Column 2) reports how the predicted probability of holding a tertiary education varies according to 10 deciles of the bequest's distribution, revealing a non-linear pattern: the probability, starting from a value of 10.5%, decreases up to the third decile by 1.5%, and then follows a slowly increasing pattern. This result - also confirmed by the Figure 2 - is consistent with the sample average (first column), even though the latter reports a more pronounced effect, with the decreasing pattern occurring up to the median bequest value.

7 Extensions: heterogeneity and robustness

The Italian labour market is highly heterogeneous with respect to gender: the reward for investing in education for women is well documented in the labour literature as being lower than for their male peers (Rustichelli, 2005; Olivetti and Petrongolo, 2008). The gender gap in median earnings has increased by 3 percentage points in a decade, starting from a value of 7 percent as of 2000 (OECD), in addition recent data report the unconditional hourly wage gap in the private sector to be 5.8% for Italy (EUROSTAT, 2011). The fact that this number is well below the EU average (27%) can be due to the endogenous positive selection of women into the labor market (Olivetti and Petrongolo, 2008); female participation rates are low and concentrated among high-wage women. Accounting for this positive selection in employment the gap would increase by 25%. Once the selection into employment is taken into account, the remaining gap can be attributed to labour market discrimination or to endogenous sorting of women into less rewarding career tracks. By looking at the SHIW data, it turns out that among those women with a

university degree only 37% have chosen high-paying fields such as Architecture, Economics and Statistics, Engineering, Maths, Medicine and Dentistry, and Veterinary Sciences as opposed to 70% of men with a bachelor's degree. Also, parental beliefs about the return on children's tertiary education can differ for daughters and for sons, since parents may internalize the evidence about the lower rewards daughters get from the investment in higher education. As a result, we can expect to find a higher displacement for women. We explored this channel by breaking down the sample by gender and replicating the analysis, shown in Table 6. Table 9 then reports the results for men and women separately. According to our findings, the displacement occurs mostly for women, whose relevant coefficient is substantially higher than in the full sample, whereas it is much lower and only weakly significant for men. The coefficients statistically differ at 1 percent level, revealing that the displacement for women is much more substantial than that for men, with a magnitude almost three times larger. When leaving a bequest, girls suffer from receiving less education to a larger extent than boys. Interestingly, moreover, the parameters measuring endogenous selection are consistent with the full sample results for men, with ρ_1 significant and with a positive sign, whereas they are in opposite direction to the full sample for women: only ρ_2 is significant and positive. As for the full sample, we quantify the potential displacement and the impact of parental liquidity constraints in Tables 10 and 11. From Table 10 we can see that the displacement effect at the extensive margin due to having liquidity constrained parents is slightly higher for daughters than that for sons. Drawing from the descriptive evidence, we can claim that the gap between the two regimes in the share of higher educated is 6 percentage points for daughters as opposed to 5 percentage points for sons. This first evidence cannot be confirmed when we take a deeper look at the data. In fact, once observed and unobserved (parental) factors are taken into account, this difference disappears. When looking at the intensive margin, on the other hand, the displacement effect occurs to a significant and consistent degree for daughters, and it is slightly lower but only weakly significant for sons: a 10% rise in the bequest value for those receiving bequest brings about a reduction of 12 percentage points in the likelihood of receiving higher education (11 percentage points for son). In addition, from the raw descriptive statistics, for increasing values of bequest up to the fourth decile of the distribution, the share of higher educated daughters decreases steadily by up to 5% percentage points, whereas the corresponding value for sons is 2 percentage points (Columns 1 and 3, Table 11). When observed and unobserved factors are controlled for this impact is lower, corresponding to a reduction of 3.6 percentage points and it is less monotonic for daughters (Column 2, Table 11), whereas it is slightly lower and also weakly significant for sons. As a robustness check, we replicated the estimation selecting only those with at least one deceased non-coresident parent in order to isolate those who had already faced the opportunity of receiving a bequest (Table A.2). The results are consistent with those found for the full sample with the displacement coefficient being lower in magnitude due to the higher average value of the bequest value (23,749 vs

21,137euro).

8 Conclusions

Fostering the investment in human capital is a major concern for policy-makers of OECD countries. In this respect, Italy is an interesting case to study because - irrespective of the fact that education is (almost) free - its average level of educational attainment is extremely low compared to other developed countries. On the other hand, Italian households are still characterized by a relatively high propensity to save, with a strong preference for investment in physical capital and particularly in housing wealth, which is combined with a comparatively strong parental desire to leave some wealth to their children. The timing of the decision for (less wealthy) parents about whether to invest in their children's education can overlap with the timing of accumulation for a house purchase, a situation that can cause the displacement of investment in children's human capital by investment in real estate.

Our empirical analysis of the issue as applied to Italy shows that parents face the trade-off between these two types of investment and tend to choose in a way that is consistent with an effective displacement. According to our findings, among children receiving a bequest the displacement occurs at the intensive margin and for low values of bequest; by increasing the value up to the third decile of the distribution the probability of acquiring higher education decreases by 1.5 percentage points, whereas for higher values the wealth effect dominates the observed displacement, showing a positive correlation between the bequest value and higher education. The magnitude of the displacement is such that raising the value of the bequest received by 10 percent reduces the probability of acquiring higher education by 9 percentage points. These results turn out to be higher and more significant for women as the reduction in their probability of receiving higher education is 12 percentage points as a result of a 10 percent increase in the bequest received. In addition to that, our findings confirm one of the predictions of our theoretical framework; market imperfections jeopardize the investment in children's human capital as children whose parents suffer from liquidity constraints have a 5 percentage points lower probability of acquiring higher education in comparison to more fortunate children.

We also confirm the positive and strong correlation between parental and children's education, which is in turn responsible for the extremely low educational mobility characterizing this country, as documented by many studies (Checchi et al., 1999; Checchi and Flabbi, 2007). This correlation also supports the hypothesis derived from our theoretical model: more highly educated parents are better able to evaluate the future return on the investment in their children's education, and we can expect the return to be higher than it is with respect to less well educated parents. As a result they will tend to invest more in education, all things being equal. In a recent study Abbott et al. (2013) build a life-cycle, heterogeneous

agent model with imperfects markets where individual make educational choices, and education can be financed by parental inter vivos transfers, students' labour supply during college, or government grants and loans. By simulating different policy experiments of federal grant programs on US data they find that an increase in college grants crowded out inter vivos parental transfers, the highest displacement occurring for wealthy parents, therefore suggesting that means-tested grant programs would produce the most welfare gains. In addition the existing grant programs turn out to be welfare improving and increase the GDP in the long-run. We believe our results point to strong policy implications, suggesting the importance of rebalancing policies that favour investment in housing towards ones that foster investment in children's human capital, such as means-tested students loan or grant programs.

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Table 1: Return to Higher Education over Time.

1993	0.882
1995	0.649
1998	0.480
2000	0.273
2002	0.449
2004	0.499
2006	0.397
2008	0.308
2010	0.421
Total	0.518

Source: SHIW 1993-2010.
Note: The values for return to tertiary education correspond to the coefficients obtained by running OLS mincerian regressions of (log) annual labor earnings by year and regions on the following regressors: gender, age, age squared, part-time, and a set of dummies for education (no education, compulsory school, high school, college or higher). The excluded category corresponds to no education and our measure of the return to tertiary education is the indicator for high school, college or higher.

Table 2: Summary statistics

Variable	**No Bequest**	**Bequest**	**Total**
Age*	51.577	53.683	51.896
Female*	0.480	0.410	0.469
No-edu*	0.056	0.033	0.053
Compul edu*	0.566	0.483	0.554
Second edu*	0.292	0.346	0.300
Higher edu*	0.085	0.138	0.093
Bequest (residence)	0.000	0.729	0.111
Bequest (others)	0.000	0.337	0.051
Any bequest	0.000	1.000	0.152
Bequest value	0.000	139,347.111	21,137.273
Father white collar*	0.427	0.525	0.442
Father blue collar*	0.542	0.444	0.527
Father not employed	0.031	0.031	0.031
Mother white collar*	0.143	0.205	0.153
Mother blue collar*	0.150	0.125	0.147
Mother not employed*	0.706	0.670	0.701
Fath no edu*	0.287	0.243	0.280
Fath compuls edu	0.620	0.626	0.621
Fath second edu*	0.070	0.082	0.072
Fath higher edu*	0.023	0.049	0.027
Moth no edu*	0.336	0.284	0.328
Moth compuls edu*	0.605	0.628	0.608
Moth second edu*	0.050	0.071	0.054
Moth higher edu*	0.009	0.016	0.010
Munic 0-20000*	0.258	0.340	0.270
Munic 20000-40000	0.200	0.205	0.201
Munic 40000-500000*	0.433	0.375	0.424
Munic 500000+*	0.109	0.080	0.105
N. siblings*	2.130	1.548	2.042
North east*	0.259	0.243	0.256
North west*	0.198	0.212	0.200
Centre	0.218	0.220	0.218
South	0.226	0.229	0.227
Island	0.099	0.095	0.098
N	6,758	37,794	44,552

Source: SHIW 1993-2010. $*$ denotes significant difference in two samples t-test (at least 5% significance level)

Table 3: Share of individuals with Received Bequest over Time

	Full sample	**Sample with one dead parent**
1993	0.110	0.127
1995	0.130	0.150
1998	0.142	
2000	0.143	0.168
2002	0.139	0.162
2004	0.161	0.186
2006	0.171	0.194
2008	0.208	0.238
2010	0.216	0.245
Total	0.152	0.171

Source: SHIW 1993-2010. The heading "Sample with one dead parent" denotes individuals with at least one parent dead. Data for year 1998 are not available because the information on parental living status is missing. The definition of bequest includes both the residence house and other real estates.

Table 4: Share of Higher Educated over Time by Bequest Received

	Full sample		**Sample with parent dead**	
	With no bequest	**With bequest**	**With no bequest**	**With bequest**
1993	0.057	0.134	0.043	0.127
1995	0.062	0.121	0.050	0.118
1998	0.086	0.132		
2000	0.086	0.142	0.062	0.132
2002	0.080	0.107	0.061	0.090
2004	0.102	0.140	0.081	0.133
2006	0.099	0.128	0.069	0.117
2008	0.107	0.157	0.092	0.155
2010	0.132	0.171	0.086	0.155
Total	0.085	0.138	0.062	0.127

Source: SHIW 1993-2010. The definition of bequest includes both the residence house and other real estates.

Table 5: Share of Higher Educated by Deciles of Bequest Value

Bequest value (decile)	**Higher educated**
1	0.112
2	0.100
3	0.087
4	0.082
5	0.102
6	0.118
7	0.135
8	0.170
9	0.191
10	0.287
Total	0.138

Source: SHIW 1993-2010. The definition of bequest includes both the residence house and other real estates. The bequest value is in log.

Table 6: Probability of receiving Bequest and Probability of having Higher Education

	Bequest	**High Edu**		**Bequest**	**High Edu**		**Bequest**	**High Edu**	
		No Bequest	**Bequest**		**No Bequest**	**Bequest**		**No Bequest**	**Bequest**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Bequest value			-0.691***			-0.694***			-0.693***
			(0.230)			(0.229)			(0.234)
Bequest value sq			0.034***			0.034***			0.034***
			(0.011)			(0.011)			(0.011)
Dummy law	0.222***			0.222***			0.222***		
	(0.030)			(0.030)			(0.030)		
Housing return					0.079	-0.073		0.001	-0.462
					(0.087)	(0.317)		(0.170)	(0.723)
Ret housxfath comp sch								0.085	0.442
								(0.176)	(0.756)
Ret housxfath sec sch								0.169	0.279
								(0.264)	(0.956)
Ret housxfath tert sch								-0.015	0.533
								(0.436)	(0.998)
High edu return					-0.006	-0.043		-0.054	-0.013
					(0.020)	(0.069)		(0.040)	(0.152)
Ret eduxfath comp sch								0.061	-0.124
								(0.042)	(0.165)
Ret eduxfath sec sch								0.028	0.281
								(0.067)	(0.210)
Ret eduxfath tert sch								0.013	0.060
								(0.102)	(0.238)
Age	0.007***	0.001	0.000	0.007***	0.001	0.000	0.007***	0.001	0.000
	(0.001)	(0.001)	(0.003)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.003)
Female	-0.111***	-0.146***	-0.069	-0.111***	-0.146***	-0.069	-0.111***	-0.146***	-0.069
	(0.015)	(0.015)	(0.047)	(0.015)	(0.015)	(0.047)	(0.015)	(0.015)	(0.048)
Father blue collar	-0.149***	-0.331***	-0.520***	-0.149***	-0.332***	-0.520***	-0.149***	-0.331***	-0.523***
	(0.017)	(0.023)	(0.057)	(0.017)	(0.024)	(0.057)	(0.017)	(0.023)	(0.058)
Father not employed	-0.123***	-0.142***	-0.167	-0.123***	-0.141***	-0.167	-0.123***	-0.142***	-0.161
	(0.045)	(0.043)	(0.119)	(0.045)	(0.043)	(0.119)	(0.045)	(0.043)	(0.120)
Mother blue collar	-0.183***	-0.173***	-0.023	-0.183***	-0.172***	-0.024	-0.184***	-0.172***	-0.024
	(0.030)	(0.031)	(0.102)	(0.030)	(0.031)	(0.101)	(0.030)	(0.031)	(0.105)
Mother not employed	-0.143***	-0.110***	-0.036	-0.143***	-0.109***	-0.036	-0.143***	-0.109***	-0.034
	(0.022)	(0.022)	(0.061)	(0.022)	(0.022)	(0.060)	(0.022)	(0.022)	(0.064)
Moth compuls edu	0.084***	0.176***	0.448***	0.084***	0.177***	0.449***	0.084***	0.177***	0.448***
	(0.025)	(0.029)	(0.094)	(0.025)	(0.029)	(0.094)	(0.025)	(0.029)	(0.095)
Moth second edu	0.072	0.436***	0.835***	0.072	0.437***	0.836***	0.072	0.437***	0.839***
	(0.045)	(0.045)	(0.144)	(0.045)	(0.045)	(0.141)	(0.045)	(0.045)	(0.149)
Moth higher edu	0.081	0.781***	1.121***	0.081	0.782***	1.124***	0.081	0.782***	1.114***
	(0.083)	(0.083)	(0.211)	(0.083)	(0.083)	(0.207)	(0.083)	(0.083)	(0.218)
Fath compuls edu	0.034	0.250***	0.303***	0.034	0.251***	0.302***	0.034	0.212***	0.345**
	(0.026)	(0.039)	(0.103)	(0.026)	(0.039)	(0.102)	(0.026)	(0.044)	(0.143)
Fath second edu	0.051	0.655***	0.796***	0.051	0.656***	0.793***	0.051	0.629***	0.662***
	(0.041)	(0.053)	(0.150)	(0.041)	(0.053)	(0.147)	(0.041)	(0.062)	(0.184)
Fath higher edu	0.410***	1.204***	1.295***	0.410***	1.204***	1.293***	0.410***	1.193***	1.246***
	(0.055)	(0.065)	(0.140)	(0.055)	(0.065)	(0.139)	(0.055)	(0.083)	(0.192)
N. siblings	-0.075***	-0.106***	-0.113***	-0.075***	-0.106***	-0.113***	-0.075***	-0.106***	-0.114***
	(0.005)	(0.006)	(0.018)	(0.005)	(0.006)	(0.018)	(0.005)	(0.006)	(0.019)
Munic 20000-40000	-0.149***	-0.024	0.043	-0.149***	-0.024	0.044	-0.149***	-0.025	0.046
	(0.022)	(0.026)	(0.076)	(0.022)	(0.026)	(0.074)	(0.022)	(0.026)	(0.079)
Munic 40000-500000	-0.250***	-0.043	0.158	-0.250***	-0.043	0.156	-0.250***	-0.044	0.157
	(0.019)	(0.028)	(0.104)	(0.019)	(0.028)	(0.100)	(0.019)	(0.028)	(0.111)
Munic 500000+	-0.372***	-0.081**	0.203	-0.372***	-0.080**	0.200	-0.372***	-0.082**	0.208
	(0.031)	(0.039)	(0.155)	(0.031)	(0.039)	(0.149)	(0.031)	(0.039)	(0.165)
N	44,552	6,758	37,794	44,552	6,758	37,794	44,552	6,758	37,794
ρ_1		0.967***			0.966***			0.967***	
		(0.014)			(0.014)			(0.014)	
ρ_2			0.449			0.450			0.451
			(0.351)			(0.334)			(0.383)

Note: The estimation method is the endogenous switching regression model. The dependent variable are: an indicator for having received any bequest (Bequest) for the selection equation, and an indicator for having higher education (High edu) under the two regimes. Additional regressors: regional and time dummies. Robust standard errors in parenthesis, significance: (*) if p<.1, (**) if p<.05, (***) if p<.01.

Table 7: Simulation. Share of Higher Educated over Time by Received Bequest

	No Bequest	**Bequest**
Actual	0.085	0.138
Predicted	0.082	0.138
Predicted with 10% growth in bequest value		0.048

Source: SHIW 1993-2010. The heading "Actual" denotes actual values from raw data, the heading "Predicted" denotes predicted values from the estimates reported in Table 6.

Table 8: Simulation. Share of Higher Educated by decile of Bequest

	Higher Educated	
Bequest value (decile)	**Actual**	**Predicted**
1	0.112	0.105
2	0.100	0.090
3	0.087	0.092
4	0.082	0.093
5	0.102	0.101
6	0.118	0.127
7	0.135	0.141
8	0.170	0.159
9	0.191	0.188
10	0.287	0.287
Total	0.138	0.138

The heading "Actual" denotes actual values from raw data, the heading "Predicted" denotes predicted values from the estimates reported in Table 6.

Table 9: Probability of receiving Bequest and Probability of having Higher Education by Gender

	Women			**Men**		
	Bequest	**High Edu**		**Bequest**	**High Edu**	
		No Bequest	**Bequest**		**No Bequest**	**Bequest**
	(1)	(2)	(3)	(4)	(5)	(6)
Bequest value			-1.070***			-0.477*
			(0.338)			(0.279)
Bequest value sq			0.052***			0.024*
			(0.016)			(0.013)
Dummy law	0.212***			0.240***		
	(0.047)			(0.040)		
Age	0.009***	-0.014***	-0.008**	0.005***	0.001	0.004
	(0.001)	(0.001)	(0.003)	(0.001)	(0.001)	(0.003)
Father blue collar	-0.126***	-0.458***	-0.550***	-0.169***	-0.386***	-0.468***
	(0.027)	(0.041)	(0.085)	(0.023)	(0.066)	(0.140)
Father not employed	-0.029	-0.255**	-0.316	-0.175***	-0.136**	0.010
	(0.067)	(0.101)	(0.196)	(0.060)	(0.062)	(0.177)
Mother blue collar	-0.169***	-0.164**	-0.079	-0.181***	-0.151***	0.122
	(0.045)	(0.069)	(0.136)	(0.040)	(0.048)	(0.139)
Mother not employed	-0.141***	-0.031	0.058	-0.145***	-0.097***	-0.041
	(0.034)	(0.046)	(0.087)	(0.030)	(0.038)	(0.099)
Moth compuls edu	0.127***	0.281***	0.517***	0.044	0.192***	0.419***
	(0.038)	(0.069)	(0.148)	(0.033)	(0.066)	(0.135)
Moth second edu	0.086	0.565***	0.760***	0.073	0.517***	0.935***
	(0.070)	(0.089)	(0.189)	(0.061)	(0.106)	(0.189)
Moth higher edu	0.130	0.923***	1.224***	0.040	0.861***	1.074***
	(0.118)	(0.141)	(0.260)	(0.119)	(0.154)	(0.262)
Fath compuls edu	0.060	0.555***	0.532***	0.022	0.331***	0.243*
	(0.040)	(0.084)	(0.176)	(0.034)	(0.121)	(0.138)
Fath second edu	0.108*	1.180***	0.986***	0.010	0.744***	0.789***
	(0.062)	(0.099)	(0.203)	(0.055)	(0.201)	(0.176)
Fath higher edu	0.448***	1.538***	1.439***	0.389***	1.397***	1.223***
	(0.083)	(0.134)	(0.217)	(0.075)	(0.214)	(0.326)
N. siblings	-0.078***	-0.126***	-0.100***	-0.073***	-0.100***	-0.100**
	(0.007)	(0.015)	(0.025)	(0.006)	(0.008)	(0.048)
Munic 20000-40000	-0.103***	0.147***	0.002	-0.184***	0.009	0.176
	(0.033)	(0.052)	(0.097)	(0.029)	(0.078)	(0.112)
Munic 40000-500000	-0.230***	0.268***	0.065	-0.271***	0.014	0.373***
	(0.029)	(0.046)	(0.095)	(0.025)	(0.106)	(0.120)
Munic 500000+	-0.321***	0.319***	0.126	-0.428***	-0.002	0.471**
	(0.046)	(0.065)	(0.140)	(0.042)	(0.138)	(0.194)
N	20,904	2,772	18,132	23,648	3,986	19,662
ρ_1		-0.242			0.883***	
		(0.239)			(0.144)	
ρ_2			0.482**			-0.181
			(0.197)			(0.546)

Note: The estimation method is the endogenous switching regression model. The dependent variable are: an indicator for having received any bequest (Bequest) for the selection equation, and an indicator for having higher education (High edu) under the two regimes. Additional regressors: regional and time dummies. Robust standard errors in parenthesis, significance: (*) if p<.1, (**) if p<.05, (***) if p<.01.

Table 10: Simulation. Share of Higher Educated by Decile of Bequest and by Gender

	Women		**Men**	
	No Bequest	**Bequest**	**No Bequest**	**Bequest**
Actual	0.081	0.141	0.090	0.136
Predicted	0.077	0.141	0.071	0.130
Predicted with 10% growth in bequest value		0.025		0.022

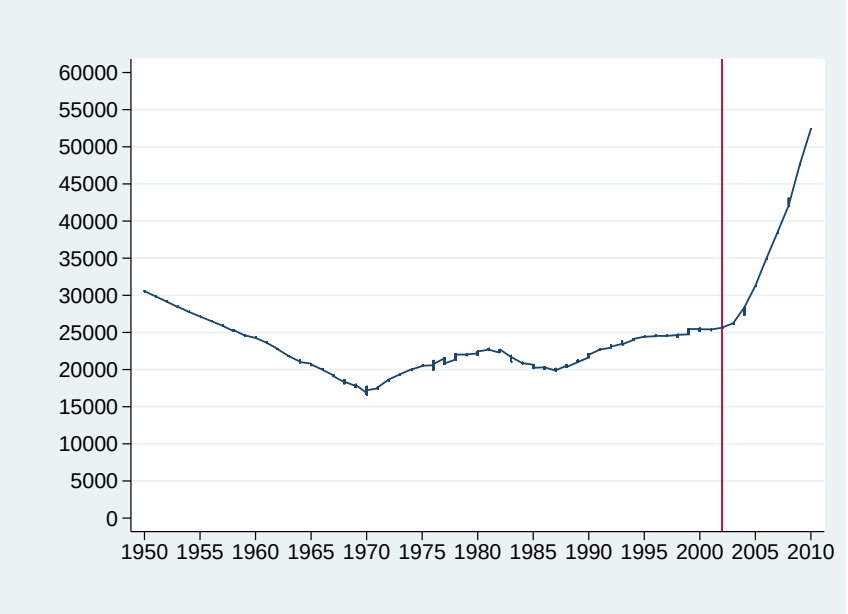
Source: SHIW 1993-2010. The heading "Actual" denotes actual values from raw data, the heading "Predicted" denotes predicted values from the estimates reported in Table 9.

Table 11: Simulation. Share of Higher Educated by Decile of Bequest

	Higher Educated			
	Women		**Men**	
Bequest value (decile)	**Actual**	**Predicted**	**Actual**	**Predicted**
1	0.125	0.116	0.113	0.107
2	0.082	0.080	0.105	0.075
3	0.078	0.087	0.093	0.081
4	0.073	0.080	0.092	0.082
5	0.090	0.094	0.099	0.095
6	0.130	0.125	0.108	0.116
7	0.140	0.138	0.128	0.124
8	0.199	0.186	0.173	0.150
9	0.199	0.196	0.177	0.177
10	0.301	0.307	0.279	0.303
Total	0.141	0.141	0.136	0.131

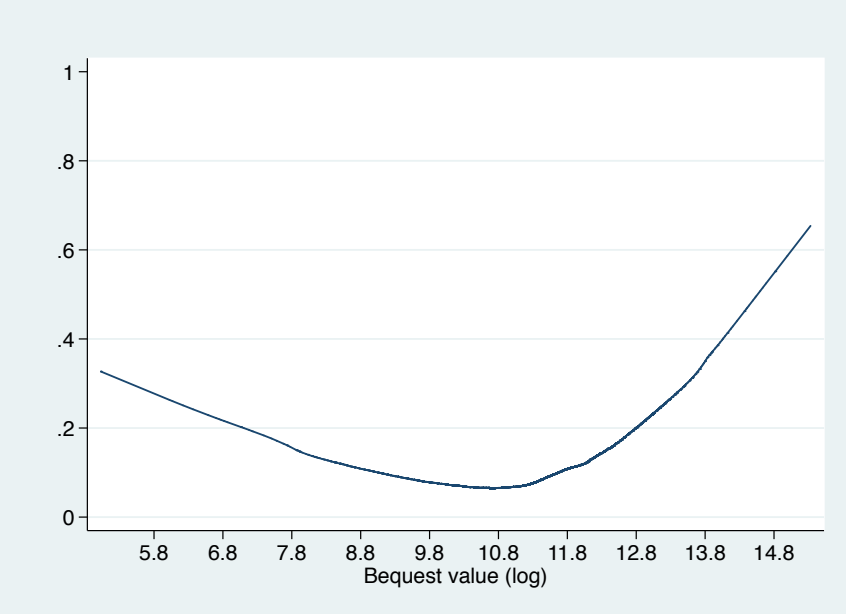
Source: SHIW 1993-2010. The heading "Actual" denotes actual values from raw data, the heading "Predicted" denotes predicted values from the estimates reported in Table 9.

Figure 1: Value of Bequest received by Year



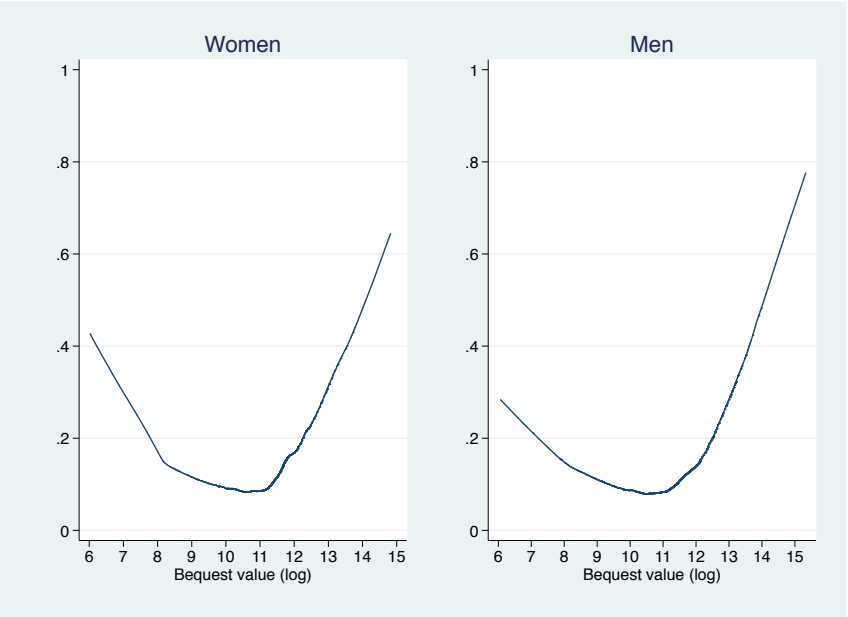
Source: SHIW 1993-2010. The value of the bequest received denotes the average (real) value of bequest for the residence house by year when the bequest was received.

Figure 2: Simulated Probability of Higher Education by Value of Bequest



Source: SHIW 1993-2010. The predicted probability is obtained by using the values from Table 6

Figure 3: Simulated Probability of Higher Education by Value of Bequest and Gender



Source: SHIW 1993-2010. The predicted probability is obtained by using the values from Table 9

Appendix

Table A.1: Growth Rate in Housing Prices over time

1993	0.882
1995	0.649
1998	0.480
2000	0.273
2002	0.449
2004	0.499
2006	0.397
2008	0.308
2010	0.421
Total	0.518

Source: SHIW 1993-2010. The growth rate of housing price is computed by taking the average of the reported values of the residence houses per squared meter

Table A.2: Robustness check. Probability of receiving Bequest and Probability of having Higher Education. Sample: individuals with dead parent

	Bequest	**High Edu**		**Bequest**	**High Edu**		**Bequest**	**High Edu**	
		No Bequest	**Bequest**		**No Bequest**	**Bequest**		**No Bequest**	**Bequest**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Bequest value			-0.229***			-0.232***			-0.234***
			(0.074)			(0.072)			(0.072)
Bequest value sq			0.011***			0.011***			0.011***
			(0.003)			(0.003)			(0.003)
Dummy law	0.249***			0.249***			0.248***		
	(0.040)			(0.040)			(0.040)		
Housing return					0.047	-0.170*		-0.481	-0.187
					(0.243)	(0.093)		(0.527)	(0.176)
Ret housxfath comp sch								0.597	0.021
								(0.538)	(0.177)
Ret housxfath sec sch								0.563	-0.143
								(0.673)	(0.356)
Ret housxfath tert sch								0.599	0.222
								(0.893)	(0.585)
High edu return					0.030	-0.028		-0.118	-0.051
					(0.050)	(0.020)		(0.123)	(0.039)
Ret eduxfath comp sch								0.160	0.022
								(0.128)	(0.040)
Ret eduxfath sec sch								0.176	0.086
								(0.160)	(0.080)
Ret eduxfath tert sch								0.247	0.190
								(0.204)	(0.144)
Age	-0.002***	-0.009***	0.000	-0.002***	-0.009***	0.000	-0.002***	-0.009***	0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Female	-0.110***	-0.249***	0.083***	-0.110***	-0.249***	0.084***	-0.110***	-0.249***	0.084***
	(0.019)	(0.033)	(0.022)	(0.019)	(0.033)	(0.022)	(0.019)	(0.033)	(0.022)
Father blue collar	-0.151***	-0.478***	0.033	-0.151***	-0.478***	0.037	-0.151***	-0.479***	0.036
	(0.022)	(0.037)	(0.033)	(0.022)	(0.037)	(0.032)	(0.022)	(0.037)	(0.033)
Father not employed	-0.045	-0.058	-0.002	-0.045	-0.058	-0.000	-0.045	-0.059	0.001
	(0.055)	(0.082)	(0.063)	(0.055)	(0.082)	(0.063)	(0.056)	(0.082)	(0.063)
Mother blue collar	-0.238***	-0.169**	0.213***	-0.238***	-0.168**	0.213***	-0.239***	-0.170**	0.214***
	(0.038)	(0.077)	(0.045)	(0.038)	(0.077)	(0.045)	(0.038)	(0.083)	(0.045)
Mother not employed	-0.180***	-0.027	0.197***	-0.180***	-0.027	0.196***	-0.180***	-0.028	0.197***
	(0.028)	(0.054)	(0.032)	(0.028)	(0.053)	(0.032)	(0.028)	(0.061)	(0.032)
Moth compuls edu	0.110***	0.310***	-0.020	0.110***	0.310***	-0.024	0.111***	0.310***	-0.024
	(0.030)	(0.056)	(0.041)	(0.030)	(0.056)	(0.040)	(0.030)	(0.056)	(0.040)
Moth second edu	0.169***	0.608***	0.116	0.169***	0.609***	0.111	0.168***	0.608***	0.111
	(0.061)	(0.086)	(0.073)	(0.061)	(0.086)	(0.072)	(0.061)	(0.085)	(0.073)
Moth higher edu	0.190	1.053***	0.347**	0.189	1.053***	0.342**	0.190	1.048***	0.334**
	(0.124)	(0.162)	(0.157)	(0.124)	(0.162)	(0.157)	(0.124)	(0.163)	(0.157)
Fath compuls edu	0.029	0.533***	0.038	0.029	0.533***	0.034	0.029	0.413***	0.021
	(0.031)	(0.069)	(0.041)	(0.031)	(0.069)	(0.039)	(0.031)	(0.101)	(0.045)
Fath second edu	0.099*	1.225***	0.119*	0.099*	1.225***	0.112*	0.099*	1.097***	0.078
	(0.053)	(0.088)	(0.064)	(0.053)	(0.087)	(0.063)	(0.053)	(0.126)	(0.073)
Fath higher edu	0.437***	1.706***	0.144	0.438***	1.705***	0.139	0.438***	1.540***	0.040
	(0.073)	(0.105)	(0.089)	(0.073)	(0.105)	(0.088)	(0.073)	(0.156)	(0.113)
N. siblings	-0.082***	-0.115***	0.056***	-0.082***	-0.114***	0.057***	-0.082***	-0.115***	0.057***
	(0.006)	(0.015)	(0.009)	(0.006)	(0.014)	(0.009)	(0.006)	(0.017)	(0.009)
Munic 20000-40000	-0.154***	0.177***	0.185***	-0.154***	0.177***	0.186***	-0.154***	0.175**	0.186***
	(0.027)	(0.063)	(0.032)	(0.027)	(0.062)	(0.031)	(0.027)	(0.072)	(0.031)
Munic 40000-500000	-0.274***	0.223***	0.341***	-0.274***	0.223***	0.339***	-0.274***	0.220**	0.339***
	(0.024)	(0.073)	(0.030)	(0.024)	(0.072)	(0.029)	(0.024)	(0.092)	(0.030)
Munic 500000+	-0.407***	0.311***	0.475***	-0.407***	0.312***	0.473***	-0.407***	0.309**	0.476***
	(0.039)	(0.100)	(0.047)	(0.039)	(0.098)	(0.046)	(0.039)	(0.126)	(0.046)
N	26,646	4,559	37,794	22,087	4,559	22,087			
ρ_1		0.224			0.221			0.231	
		(0.321)			(0.315)			(0.440)	
ρ_2			-0.994***			-0.995***			-0.995***
			(0.004)			(0.003)			(0.003)

Note: The estimation method is the endogenous switching regression model. The dependent variable are: an indicator for having received any bequest (Bequest) for the selection equation, and an indicator for having higher education (High edu) under the two regimes. Additional regressors: regional and time dummies. Robust standard errors in parenthesis, significance: (*) if p<.1, (**) if p<.05, (***) if p<.01.

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