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

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Abstract

Parents generally care for their kids, either for altruistic or for strategic reasons. To secure them a better life than their own, they can invest in the children's human capital or accumulate real wealth to bequeath 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. In the real world, with incomplete and imperfect markets, a displacement can occur. 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. Mis-perceptions of the relative returns of the two different forms of wealth, with a perceived excessive premium of the returns from housing wealth, may also be at work. We consider this picture to be highly representative of the Italian situation and analyse the possible trade off between (children's) human and real capital by using the Bank of Italy's Survey of Household Income and Wealth (SHIW). Our evidence points in the direction of confirming our hypothesis.

Keywords: D10, D91, I21

JEL codes: Education, bequests, parental investment

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1 Introduction

Parents generally care about their kids, 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 children. 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 to education than their peers (Baland and Robinson, 2000).

In the real world, markets are incomplete and far from perfect, so that crowding out can occur. A stylized illustration of how this could be the case 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 down payment (a 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; 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 make parents inclined to consider the house as the typical bequest-friendly asset. Market imperfections, on their parts, may prevent attainment of the optimal distribution of the bequest between education and financial/real wealth, largely at the expense of the former. 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 misperceptions of the relative returns of the two different forms of wealth, with a perceived excessive premium of the returns from housing wealth over the returns from education.

We consider this stylized illustration to be highly representative of the Italian situation and use it as a starting point for our paper. Italian households seem particularly attached to home-ownership and show little de-cumulation of their housing wealth even at very old ages. A large majority of households are home-owners (72%) (EU-SILC, 2007) and their wealth mainly consists of their first residence (70%)¹. In addition, there is evidence of a bequest motive for saving²: for example, when asked about their desire to leave a bequest, 50 per cent of (a sample of) heads of households and their spouses answered positively to

¹The home-ownership share is lower in many European countries, such as France (57%), Germany (56%), and Britain (71%), whereas it is higher in many eastern European countries (EU-SILC, 2007)

²The SHIW survey in 2002 asks a sub-sample of couples about whether they plan or desire to leave a bequest to their children.

the question (SHIW, 2002)³. We believe that this bias in favour of housing investment is partly responsible for the comparatively low average educational attainments in Italy with respect to average OECD results and, at the same time, can explain the paradox of low educational attainments in a relatively rich country. In Italy only 13% of those aged between 25 and 64 hold a tertiary education, compared to a 27% as for the OECD average (OECD, 2006). 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 returns on education that have characterized the country (Naticchioni et al., 2010) over the last 15 years. The evidence reported by Table 1 clearly shows the magnitude of this potential displacement typical of the Italian context: the share of individuals with a tertiary education has followed a steady low level over the time span between 1993 and 2008, corresponding to 10% of all individuals aged 27 and over, whereas, at the same time, the share of those receiving a bequest has increased starting from a value of 18% in 1993 and reaching 24% as in 2008 (SHIW).

We investigate the issue of whether parental housing investment might have displaced children's human capital, by using the Bank of Italy's Survey on Households Income and Wealth (SHIW).

The plan of the paper is set up as follows. In Section 2 we review the literature, in Section 3 we present a theoretical framework, Section 4 contains the empirical strategy, Section 5 describes the data, Section 6 comments the results and Section 7 concludes the paper.

2 Literature review

The presence of a bequest motive, of either 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 understand the driving forces of voluntary bequests: (Becker, 1974), for example, explains 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, sets the egoistic model where parents derive utility which is increasing in the amount they bequeath rather than in how much their heirs consume. In the strategic model set by Cox (1987), parental utility is a function of how much attention and services they can get from their children. Parents value care more when provided by children than when 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,

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

2011) or a strong rejection of the hypothesis (Kopczuk and Lupton, 2007). The last authors show that the potential determinants of an altruistic motive - such as having children financially better off than their parents or with high education - do not play a significant role in explaining the probability of bequest, despite the sign being consistent with the altruistic hypothesis. At the same time, they reject the strategic hypothesis because having children who live close to their parents does not significantly affect the probability of bequeathing. A contrary evidence, however, has been reported by other studies (Bernheim et al., 2004; Page, 2003), where bequests have been shown to serve as a mean for 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 in the order of 43% as found by Kotlikoff and Summers (1981)⁴, and much lower ones in the range between 17%-23% (Laitner and Juster, 1996; Modigliani, 1988). More recent estimates for U.S. (Kopczuk and Lupton, 2007) report that roughly 75% of the elderly population seems to have a bequest motive and that the percentage of inherited wealth on total wealth is a very high 80%. As for Italy, (Barca et al., 1992) report that households' inherited assets account for one third of total wealth. The bequest motive has been also found responsible for the faster de-cumulation of wealth for elderly with independent children, assuming that 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) which have set theoretical models in order to investigate the composition of bequest and in particular the relationship between (children') human and physical capital. Laitner and Ohlsson (2001) present three different models of intergenerational transfers: the altruistic, the egoistic, and the exchange or strategic model. They empirically test these models by comparing the results obtained from Swedish and U.S. micro-data. All models predict the amount of transfers to be positively related to parental earnings: higher earnings for parents affect positively the optimal amount of resources received as a bequest. In the altruistic model, the authors include education as a component of bequest, and derive a negative impact on the amount of transfers in physical capital. 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 endogeneity of the individual level of children's education, correlated with unobserved parental altruism affecting as well 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 U.S. sample.

⁴In a more recent study (Wolff, 2000) reports that about 80% of the wealth held by all U.S. households comes from inter-generational transfers

In a different study, Nordblom and Ohlsson (2002) develop another altruistic model, allowing for different types of education (public and private): in case of perfect substitution between the two, they predict a positive relationship between the level of human capital acquired by the child and the likelihood of property transfers. Under 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 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 investments, 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 interpret this finding by arguing that, since the marginal return to the investment in education is decreasing, 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 impact on receiving inheritance.

All these models, however, investigate empirically the potential impact of education on bequests, rather than the impact of the former on education, as our study aims at. In addition to that only Nordblom and Ohlsson (2011) account for the potential endogeneity of human capital.

In a different context, Baland and Robinson (2000) present 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 decide the optimal amount of child labour to devote to their children, how much to save and to bequeath, the model shows that the optimal level of child labour can be efficient if market are perfect and parents leave a bequest. On the contrary, if one of those two conditions are not met child labour turns out to be socially inefficient. In one case market imperfections prevent parents from borrowing in the first period and induce them to borrow from their children's labour earnings choosing optimally a level of child labour 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 which is more likely to occur with poverty or 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 are normalised 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 a 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

$$V_p(c_p, U_c(c_c)) \equiv U_p(c_p) + \delta U_c(c_c) \quad (1)$$

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, $b \geq 0$. It follows that parents cannot borrow against their children's human capital in period 1.

Parents face the following budget constraint

$$c_p = y - pe - b \quad (2)$$

where y is labour earning, p represents the direct cost of investing in their children's education. Each child, in turn faces the following budget constraint in period 2

$$c_c = f(e) + b(1 + r) \quad (3)$$

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

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

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

$$U'_p(y - pe - b) = \delta U'_c(f(e) + b(1 + r))(1 + r) \quad (4)$$

$$U'_p(y - pe - b) = \delta f' U'_c(f(e) + b(1 + r)) \quad (5)$$

(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

$$f'(e) = 1 + r \quad (6)$$

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:

$$\delta \left[f'' e' U'_c + f' U''_c (f' e' + b + b'(1 + r)) \right] = U''_p (-pe' - b')$$

$$b' = \frac{-U''_p pe' - \delta [f'' e' U'_c + f' U''_c (f' e' + b)]}{(\delta(1 + r)f' U''_c + U''_p)}$$

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

$$f'(e) > 1 + r \quad (7)$$

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 human capital of their

children. $f(e)$ 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

$$f^{high}(e_h^*) > f^{low}(e_l^*) \quad (8)$$

and

$$e_h^* > e_l^* \quad (9)$$

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:

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

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:

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

where y_{i1}^* , and y_{i2}^* denote the unobserved parental optimal investment in children's human capital in the two regimes, where the former corresponds 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} , which represent two indicators for higher education, set equal to one if the individual has attained at least the university level, and zero otherwise.

$$\left. \begin{array}{l} y_{i1} = 1 \quad \text{iff} \quad y_{i1}^* > 0 \\ y_{i1} = 0 \quad \text{otherwise} \end{array} \right\} \quad \text{iff} \quad d_i = 0 \quad (12)$$

$$\left. \begin{array}{l} y_{i2} = 1 \quad \text{iff} \quad y_{i2}^* > 0 \\ y_{i2} = 0 \quad \text{otherwise} \end{array} \right\} \quad \text{iff} \quad d_i = 1 \quad (13)$$

where

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

and

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

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 $\rho_1 = \text{cov}(\nu, \epsilon_1)$ and $\rho_2 = \text{cov}(\nu, \epsilon_2)$ allowed to be different from zero because of the correlation between the two parental investment decisions.⁵ 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.

⁵The likelihood function corresponding to the model (10)-(15) is available upon request from the authors.

5 Data

The dataset used is the SHIW survey for the period 1993-2008. This dataset provides the following information which are included in the subsequent empirical analysis: the type of education received; detailed information about the ownership of the house of residence; who are the owners within the family and, in case of ownership, how the house has been acquired, i.e. whether it has been bought, inherited, partially inherited and partially bought, received as a gift, or built by the family. Since 1993 the survey contains also information about 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, therefore we exploit this information in order to build a set of indicators of parental characteristics.

Our definition of bequest includes also gifts, as the two have been found to be substitutes for parents (Nordblom and Ohlsson, 2002), so it is likely that parents planning to leave a bequest end up with leaving inter-vivos gifts or vice-versa. As we cannot identify who is the responsible for the bequest (i.e. whether parents or other relatives), because this information is not provided by the dataset, we rely on the assumption that the bequest is on the parents' behalf.

Our selected sample consists in head of household or spouse, due to the fact that we have information on parental background characteristics only for them, and we need to link each respondent (the child) to his/her parents' information, which represent important explanatory variables in our empirical analysis. In addition, since the average age of graduation is 26.7, we select individuals older than 26; students younger than 27 still enrolled in higher education would report only secondary school when asked the highest level of education attained. Since the questionnaire does not provide information about the person from whom the respondent has received bequest, we do not consider widows and widowers in order to exclude those who are likely to have received the house of residence from their dead partner.

Our empirical analysis aims at detecting whether having received a bequest as housing had any displacement effect on the highest educational level attained: therefore, we only select individuals with at least one parent dead. The sample size, after excluding those who do not meet the selection criteria or who have missing information on the variables included in the empirical analysis, is 7,551. The dependent variable is an indicator for having higher education, set equal to one if the highest educational attainment is equal to college or any postgraduate degree. Due to the fact that our dependent variable represents one single event in the individual's history, we need to work with a pooled cross-section; for individuals who are part of the panel sample we have repeated observations, therefore we consider only their last observation available.

We include the following explanatory variables shared by all regressions throughout the empirical analysis: age, gender, number of siblings which account for family size, a set of indicators of parental educational level (three dummy variables per each parent corre-

sponding to compulsory school, high school, and postgraduate education such as PhD or Master, the excluded category corresponding to no education), and two indicators of the parental occupation (not employed, and employed as blue collar, the excluded category being white collar or manager). Other regressors consist in: three dummy variables for the size of the municipality of residence, taken as a proxy for different labour market conditions, regional and time fixed effects. The additional regressor included as an exclusion restriction in vector \mathbf{w}_i is the growth of housing prices in real terms at the time when the respondent was about to enter the labour market or embark in higher education (19 year old), since this represented the actual return on investing in housing thus likely correlated to the decision of leaving a bequest. The variable of main interest in vector \mathbf{x}_{i2} , which accounts for the potential displacement effect, consists in the (log) real value of the house of residence received as a bequest⁶. By considering the total value of bequest received (such as all real estates received) we argue that we cannot isolate the potential displacement effect of bequest on children’s education, since the former turns out to be dominated by the wealth effect. Wealthy parents are likely not 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 need to distinguish the latter from a pure wealth effect which would bring about a positive correlation between the total value of bequest and the higher education received. By using the value of the house of residence received as bequest we claim to be able to isolate the trade-off between the two investments, so discarding other real estates received as bequest. In addition, we also include an indicator for having inherited both the house of residence and another real estate in order to take into account the potential wealth effect, and isolate those individuals who are particularly well-off.

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 is binding, it follows a lower investment in education compared to the case of parents no liquidity constrained. In addition to evaluating the potential crowding-out effect of the bequest received on the human capital endowment, we also aim 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 compared to the case of parents no 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 define individuals as belonging to regime 1 (i.e. with parents liquidity constrained), if they have not received any bequests, whereas those whose parents are considered not liquidity constrained are children who have received at least one bequest, either the house of residence

⁶All real values are obtained by using the CPI-based deflator (base=2000).

or other real estates.

Table 2 reports the descriptive statistics of the sample. The gender composition slightly favours men (51%), our sample is relatively young since the average age is around 42; this is due to the fact that one of our regressors, the growth rate of real housing prices corresponding to the year when the parents face the decision of investing in their children's higher education (i.e. when children are 19 year old) is available only for the years since 1970 and onwards, therefore we lose all individuals older than 56 year old. The sample is on average low educated: over 50% of the sample owns only compulsory school or no education, whereas those who have acquired any higher level of education, such as college or any postgraduate education, represent the 10%.

The high percentage of home-owners at the household level (65%) confirms the well-documented Italian preference for home-ownership, and considering that our sample is relatively young this is an underestimation of the percentage for a sample covering also older cohorts. At the same time, individuals living in an inherited house represent 14% of the sample, whereas those who have received other real estates represent the 6%; it turns out that over 18% of the sample turns out to have received a form of real estate as bequest. At the household level, the existence of a bequest motive (of any kind) is more evident since the percentage of those who have inherited is almost 25% in our sample. The definition of bequest includes also gifts but it might be the case that other bequests fall into the category of houses declared as 'built by the family', therefore our measure can still underestimate the true percentage. These descriptive statistics confirm a well-known stylized fact that Italian households favour investment in real estate, which represents the 66% of household total net wealth.

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 data limitation 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 to that the empirical evidence is largely in favour of a negligible role for financial wealth out of the total wealth to be bequeathed. The wealth owned by the older (older than 49) in our sample is highly concentrated in real estates, the median value of the share of real estate out of the sum between real estate and financial wealth is over 92%, whereas the mean value is 77%. Therefore we argue that the role of financial wealth is negligible in the inter-generational portfolio and we only focus on real estate bequest.

The empirical evidence as provided by Table 3 seems to suggest a negative correlation between the value of the bequest received and the probability of acquiring a tertiary education (college or postgraduate education), at least up to the median value of the bequest's distribution, whereas for the top half of the bequest's distribution the correlation turns into positive. This first evidence is highly supportive of the prediction derived by

our theoretical framework. According to our model, in fact the displacement effect occurs only for small values of bequest received. In addition the descriptive statistics seem to confirm another prediction of our model; among children whose parents were liquidity constrained (with no bequest), the share of those holding a tertiary education is significantly lower, only 9.15% with respect to almost the 15% of children with parents with no liquidity constraints (see Table 5).

6 Estimation results

Table 4 reports the results of the endogenous switching regression model as described by (10) - (15). The first column shows the results for the regression given by (10) and the second and third columns describe the regressions relevant to the first and second regime, respectively. Starting from the first column, as expected the exclusion restriction exerts a positive and strongly significant impact on the probability of having a bequest, since this regressor measures the impact of the return on the investment in housing at the time when the respondent was 19 year old. We also find evidence that parental occupation does play a role in explaining the probability of receiving bequest; having poor parents is associated with a lower probability of receiving a bequest and this holds true for both having a father or a mother employed as blue collar or a mother not employed, the coefficient relevant to the father not employed is also negative but not statistically significant.

Our theoretical model shows that parental education is particularly important in determining the optimal investment in children education, which is also affected by parental liquidity constraints. The model instead does not predict a link between parental education and investment in physical capital in order to leave bequest. Our results show that parental education does not affect significantly the optimal bequest chosen by parents with the only exception of a positive impact found for the case of father with college or PhDs⁷. As expected the role of the family size is negative, since being born in a bigger family - explained by the number of siblings⁸ - 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 can be explained by the different return of 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 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 the descriptive statistics; the probability of having higher education increases monotonically with the size of the municipality of residence, starting from a value of 6% for areas with less than 20,000 inhabitants, up to

⁷The excluded category relevant to parental education corresponds to having no education.

⁸The respondent is asked about the number of non co-resident living siblings.

19% for the case of over 500,000 inhabitants.

The results reported in the second column correspond to the case of having liquidity constrained parents. These results confirm the hypothesis stated in our theoretical framework, according to our assumption, parents endowed with an higher level of human capital tend to invest more in their children's education, and this can be attributed to their better knowledge of the return to this type of investment with respect to the case of parents with a lower level of human capital. Our results show that father's education exerts the highest (positive) impact in magnitude, and this can be due to the fact that typically the father is the main responsible for investment decisions (of any types) within the family. As for the case of column 1, family size exerts a negative impact also 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, which affects negatively the probability of acquiring higher education, whereas all other occupational-related regressors have the expected signs, but are not statistically significant.

Looking at the results relevant to the second regime, our main variable of interest is represented by the value of the house of residence received as bequest⁹, whose coefficient confirms the existence of a crowding out effect of education in order to favour the investment in physical capital.

As for the other regressors, as expected having received two bequests from parents, both the house of residence and another real estate, captures the wealth effect, as it affects positively and strongly the probability of having received higher education as well. The positive coefficient found for the not employed mothers can be due to the well-off women rather than the unemployed ones, the former may unveil the presence of a wealth effect, which is correlated to higher education as well, particularly in the sub-sample with no liquidity constraints. In addition, regardless of having parents suffering from liquidity constraints, living in bigger cities, where the investment in human capital is more rewarded, fosters the investment in tertiary education.

Focusing on the magnitude of the displacement, we consider the simulation shown in Tables 5 and 6. Table 5 reports the predicted probability of acquiring higher education, which we compute as the mean value of the predicted probability at the individual level, this is equal to 14.95%, and it coincides with the sample mean suggesting that the model is extremely well-specified. There is a 0.4 percentage point reduction in the probability of acquiring higher education corresponding to a 70% increase in the bequest value¹⁰. The low magnitude of the displacement can be reconciled with the particular context of the public university in Italy where the cost of attending a public university is extremely low, amounting to about 2,000 Euro per academic year. Average university fees are about 9,000 pounds for the U.K., and at least 5,000 dollars for the U.S. In addition to the (low) displacement effect found, Tables 5 confirms another prediction of our model; the

⁹Throughout the analysis we transform the value of the bequest by taking the log its value plus 1.

¹⁰A 70% increase in the bequest value is equivalent to doubling the mean value of the bequest over the sample.

model predicts that parents who suffer from liquidity constraints invest significantly less in their children education, other things being equal; according to our estimates children whose parents face liquidity constraints have a probability of holding a college degree, or a master degree almost 6 percentage points lower than their more fortunate peers. Table 6 reports how the predicted probability of holding a tertiary education vary according to different percentiles of the bequest's distribution, unveiling an initially decreasing pattern up to the median value of the distribution, followed by an increasing one. This result is consistent with both the sample average and the prediction of our model, whereby the displacement effect occurs only for small value of bequest.

7 Conclusions

Fostering the investment in human capital is a major concern for policy-makers of OECD countries. In this respect, Italy represents 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, a strong preference for investment in physical capital, and particularly in housing wealth, which combines with a comparatively strong parental desire to leave some wealth to their children. The timing of the decision for (less wealthy) parents of whether to invest in their children's education can overlap with the timing of accumulation for the house purchase, a situation which can originate a displacement effect of investment in children's human capital (education) by investment in real estate.

Our empirical investigation of the issue as applied to Italy shows that parents face the trade-off between these two types of investments and tend to choose in a way that is consistent with an effective displacement. According to our findings, the displacement is present for lower values of bequest; increasing its value up to the median of the distribution reduces the probability of acquiring higher education, whereas for higher values the wealth effect dominates the displacement found, showing a positive correlation between the bequest value and higher education. The magnitude of the displacement is such that doubling the value of the bequest received reduces the probability of acquiring higher education by .4 percentage point. We reconcile the low magnitude of the impact found as due to the relatively low cost of the tertiary education in the Italian system.

On top of that our findings confirm one of the predictions of our theoretical framework; market imperfections jeopardise the investment in children human capital as children whose parents suffer from liquidity constraints have a lower probability of acquiring higher education (9.13%) with respect to more fortunate children (14.95%).

We also confirm the positive and strong correlation between parental and children education, in turn responsible for the extremely low educational mobility characterizing this specific country, as documented by many studies (Checchi et al., 1999; Checchi and

Flabbi, 2007). This correlation also supports the hypothesis derived by our theoretical model. Higher educated parents are better able to evaluate the future return on the investment in their children education, and can expect this return to be higher with respect to less educated parents. As a result they will tend to invest more in education, other things being equal.

Our results point out to strong policy implications, suggesting the importance of re-balancing policies favouring investment in housing towards the ones fostering investment in children's human capital.

References

- Altonji, J. G., Hayashi, F., and Kotlikoff, L. J. (1997). Parental altruism and inter vivos transfers: Theory and evidence. *Journal of Political Economy*, 105(6):1121–66.
- Ando, A., Guiso, L., and Terlizzese, D. (1993). *Dissaving by the elderly, transfer motives and liquidity constraints*. Number 4569 in NBER working paper series. Nat. Bureau of Economic Research, Cambridge, Mass.
- Baland, J.-M. and Robinson, J. A. (2000). Is child labor inefficient? *Journal of Political Economy*, 108(4):663–679.
- Barca, F., Guiso, L., and Cannari, L. (1992). *Bequests and saving for retirement : what impels the accumulation of wealth?* Banca d'Italia.
- Becker, G. S. (1974). A theory of social interactions. *Journal of Political Economy*, 82(6):1063–1093.
- Becker, G. S. (1991). *A Treatise on the Family*. Harvard University Press.
- Bernheim, B. D., Lemke, R. J., and Scholz, J. K. (2004). Do estate and gift taxes affect the timing of private transfers? *Journal of Public Economics*, 88(12):2617–2634.
- Checchi, D. and Flabbi, L. (2007). Intergenerational mobility and schooling decisions in germany and italy: The impact of secondary school tracks. IZA Discussion Papers 2876, Institute for the Study of Labor (IZA).
- Checchi, D., Ichino, A., and Rustichini, A. (1999). More equal but less mobile?: Education financing and intergenerational mobility in italy and in the us. *Journal of Public Economics*, 74(3):351–393.
- Cox, D. (1987). Motives for private income transfers. *Journal of Political Economy*, 95(3):508–546.
- Hurd, M. D. (1989). Mortality risk and bequests. *Econometrica*, 57(4):779–813.
- Kao, Y. E., Hong, G.-S., and Widdows, R. (1997). Bequest expectations: Evidence from the 1989 survey of consumer finances. *Journal of Family and Economic Issues*, 18:357–377.
- Kopczuk, W. and Lupton, J. (2007). To leave or not to leave: The distribution of bequest motives. *Review of Economic Studies*, 74(1):207–235.
- Kotlikoff, L. J. and Summers, L. H. (1981). The role of intergenerational transfers in aggregate capital accumulation. *Journal of Political Economy*, 89(4):706–732.

- Laitner, J. and Juster, F. T. (1996). New evidence on altruism: A study of taaa-cref retirees. *The American Economic Review*, 86(4):893–908.
- Laitner, J. and Ohlsson, H. (2001). Bequest motives: a comparison of sweden and the united states. *Journal of Public Economics*, 79(1):205 – 236.
- Maddala, G. S. (1986). *Limited-Dependent and Qualitative Variables in Econometrics (Econometric Society Monographs)*. Cambridge University Press.
- Modigliani, F. (1988). The role of intergenerational transfers and life cycle saving in the accumulation of wealth. *Journal of Economic Perspectives*, 2(2):15–40.
- Naticchioni, P., Ricci, A., and Rustichelli, E. (2010). Far away from a skill-biased change: falling educational wage premia in italy. *Applied Economics*, 42(26):3383–3400.
- Nordblom, K. and Ohlsson, H. (2002). Bequests, gifts, and education swedish evidence on parents transfer behavior. Working Papers in Economics 69, Gteborg University, Department of Economics.
- Nordblom, K. and Ohlsson, H. (2011). Bequests, gifts, and education: links between intergenerational transfers. *Empirical Economics*, 40:343–358.
- Page, B. R. (2003). Bequest taxes, inter vivos gifts, and the bequest motive. *Journal of Public Economics*, 87(5-6):1219–1229.
- Wolff, E. N. (2000). Recent trends in wealth ownership, 1983-1998. Macroeconomics 0004047, EconWPA.

Table 1: Distribution of higher education and bequest received over time: 1993-2008.

	1993	1995	1998	2000	2002	2004	2006	2008	Total
High edu	10.66	10.10	10.34	10.26	8.20	11.86	9.46	10.81	10.22
Bequest or gift received	18.14	12.08	16.67	17.13	16.30	19.12	19.63	24.30	18.51
Obs	7551								

Sample: SHIW 1993-2008.

Table 2: Summary statistics

Variable	Mean	Std. Dev.	N
No edu	0.011	0.104	7551
Compuls edu	0.507	0.5	7551
Second edu	0.379	0.485	7551
College or higher	0.102	0.303	7551
Home Ownership	0.649	0.477	7551
Bequest **	0.059	0.236	7551
Bequest (residence)	0.139	0.346	7551
Any Bequest	0.185	0.388	7551
Bequest value (residence)	129638.6	127232.8	7551
Wealth	188148.887	397535.175	7551
Real wealth	143590.127	216616.228	7551
Share of real w	0.662	3.296	7551
Woman	0.485	0.5	7551
Age	42.576	6.83	7551
Father blue collar	0.55	0.498	7551
Father white collar	0.435	0.496	7551
Father not employed	0.015	0.122	7551
Mother blue collar	0.141	0.348	7551
Mother white collar	0.156	0.363	7551
Mother not employed	0.703	0.457	7551
Father no edu	0.203	0.402	7551
Father compuls edu	0.692	0.461	7551
Father second edu	0.074	0.262	7551
Father college or higher	0.031	0.172	7551
Mother no edu	0.259	0.438	7551
Mother compuls edu	0.67	0.47	7551
Mother second edu	0.059	0.237	7551
Mother college or higher	0.011	0.106	7551
Size munic 0-20,000	0.289	0.453	7551
Size munic 20,000-40,000	0.194	0.396	7551
Size munic 40,000-50,0000	0.423	0.494	7551
Size munic 500,000+	0.094	0.292	7551
Number siblings	2.53	2.178	7551
North east	0.248	0.432	7551
North west	0.205	0.404	7551
Centre	0.184	0.388	7551
South	0.252	0.434	7551
Island	0.11	0.313	7551

* Home ownership by household

** Other real estates inherited

Table 3: Higher education by quantiles of bequest value.

Bequest value 6-quantiles	Probability higher education
1	.2383094
2	.0869471
3	.0834764
4	.0977007
5	.1303173
6	.1817685

Table 4: Endogenous switching regression model.

	Bequest	High Edu	High Edu
		No Bequest	Bequest
Bequest value			-0.0173** (0.0086)
2 Bequests			0.3080** (0.1449)
Hous prices at age 19	0.0038*** (0.0013)		
Age	0.0142*** (0.0033)	0.0129** (0.0059)	0.0015 (0.0093)
Woman	-0.1333*** (0.0354)	-0.0614 (0.0601)	0.2144*** (0.0673)
Father blue collar	-0.1615*** (0.0399)	-0.3785*** (0.0725)	-0.1615 (0.1589)
Father not employed	-0.1982 (0.1516)	-0.1476 (0.2203)	0.2803 (0.2479)
Mother blue collar	-0.1221* (0.0680)	-0.0816 (0.1076)	-0.0018 (0.1308)
Mother not employed	-0.1699*** (0.0518)	-0.0351 (0.0842)	0.2196*** (0.0834)
Mother compulsory edu	0.0514 (0.0585)	0.2260** (0.0975)	0.2347 (0.1861)
Mother secondary edu	0.0644 (0.1020)	0.5122*** (0.1393)	0.4735* (0.2857)
Mother college or higher	0.1233 (0.1773)	0.7685*** (0.2397)	0.7295* (0.3879)
Father compulsory edu	0.0272 (0.0630)	0.3890*** (0.1186)	0.2603 (0.1878)
Father secondary edu	0.0626 (0.0951)	1.0076*** (0.1464)	0.3405 (0.2303)
Father college or higher	0.4846*** (0.1273)	1.4994*** (0.2414)	0.3486 (0.3242)
Number siblings	-0.0931*** (0.0098)	-0.1363*** (0.0268)	0.0365 (0.0334)
Size munic 20000-40000	-0.1158** (0.0505)	0.0841 (0.0882)	0.2411** (0.0982)
Size munic 40000-500000	-0.2701*** (0.0445)	0.2830*** (0.0885)	0.2922*** (0.0784)
Size munic 500000+	-0.3932*** (0.0745)	0.4633*** (0.1221)	0.5113*** (0.1221)
N	7551		
LogL	-5300.92		
ρ_1		-0.1065 (0.5858)	
ρ_2			-0.9051*** (0.1111)

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.001$

Additional regressors: regional and time dummies.

Table 5: Simulation. Higher education (%).

	No Bequest (Regime 1)	Bequest (Regime 2)
Actual	9.15	14.95
Predicted	9.13	14.95
Predicted increasing bequest value by 70%		14.58

Table 6: Simulation. Higher Education (%) by quantiles of bequest

Bequest value 6-quantiles	Actual	Predicted
1	.2383094	.2394366
2	.0869471	.0900901
3	.0834764	.0726496
4	.0977007	.0991379
5	.1303173	.1148936
6	.1817685	.2034632