Chapter 5. Empirical analysis

5.1 The data and sample selection

Data from the Survey on Health, Ageing and Retirement in Europe (SHARE) are used to test claims that emanate from the family tradition approach to bequest behavior. The SHARE is of individuals aged 50 and more who live in 14 European countries and in Israel. The first wave (wave 1) of data collection took place in Austria, Belgium, Denmark, France, Germany, Greece, Italy, the Netherlands, Spain, Sweden, and Switzerland in 2004/2005, and in Israel in 2005/2006. The second wave (wave 2) of data collection in 2006/2007 was released for the countries that took part in wave 1 except for Israel. In 2006/2007 the Czech Republic, Ireland, and Poland joined the survey. The most recent release of the data from both waves (release 2.3.1 of July 29, 2010) is used.

5.1.1 Sample size

The SHARE data provide information suitable for the empirical inquiry. Since individuals younger than 50 are not likely to have had a parent die, the sample of individuals aged 50 and more is ready-made for the purposes of this dissertation. The sample was limited to individuals who might have experienced inheriting. In the case of married individuals, an inheritance might have been received from parents-in-law. Therefore, the research sample consists of individuals who fulfill all the following conditions simultaneously:

- death of at least one parent or a parent-in-law;
- presence of at least one child;
- information on chances to bequeath;
- information on the experience of inheriting.

In the data, there are two types of individuals: (1) those who were interviewed in two waves and (2) those who were interviewed in one wave. Individuals of the first type constitute a balanced panel research sample of 8,287 respondents from 10 European countries,

---

[13] Quoted from Shakespeare, William (1623). "Timon of Athenes." In William Shakespeare *The complete works of William Shakespeare*. New York: Gramercy Books. (1997 Edition), p. 746.

interviewed in 2004/2005 and 2006/2007. Individuals of the other type constitute a cross-section research sample of 15,488 individuals interviewed only once either in wave 1:

- 5,612 respondents who took part in 2004/2005, but decided to quit from the survey in 2006/2007;

- 1,137 respondents from Israel interviewed in 2005/2006, as data on Israel wave 2 were not released as of July 29, 2010;

or in wave 2:

- 2,097 respondents who were enrolled in the survey in 2004/2005, but decided to join the survey only in 2006/2007;

- 3,249 respondents who turned 50 in 2005/2006 and were enrolled in the survey in 2006/2007 in the countries that participated in wave 1 (the refresher sample);

- 3,393 respondents from the countries that joined the survey only in 2006/2007 (the Czech Republic, Ireland, and Poland).

Considering the different features of the panel sample and the cross-section sample, the data from the two research samples are analyzed separately.

5.1.2 Heirs and non-heirs

In order to test empirically whether the family tradition to bequeath affects bequest behavior, it is necessary to distinguish between individuals who acquired the family tradition to bequeath and those who did not. Since the family tradition to bequeath is set by the experience of inheriting, heirs can acquire a family tradition to bequeath, and non-heirs cannot. In SHARE, there are two questions concerning the receipt of inheritances. In order to distinguish heirs from non-heirs, responses to both questions are used.

The first question is: "Not counting any large gift we have already talked about, have you ever received a gift or inherited money, goods, or property worth more than 5,000 Euro (in local currency)?" For countries with national currencies other than the Euro, the threshold value was replaced by the equivalent amount of purchasing power expressed in the national currency. In the case of married individuals, the question was asked about a large gift or an inheritance received by the respondent or by the spouse of the respondent. The question records no more than five such transfers. Information on the amounts and dates of each of these was also collected. The question does not allow, however, for a clear distinction between large gifts and inheritances for all individuals. The question is preceded by a series of

questions on financial transfers. In interviews conducted for the first time, respondents were asked about financial transfers that took place during the 12 months prior to the interview. In interviews of the panel research sample conducted for the second time in wave 2, data on financial transfers since the last interview were collected. All the financial transfers mentioned in this part of the questionnaire are not covered in the question on the large gifts and inheritances because of the instruction "not counting any large gift we have already talked about." Thus, all the individuals and their partners who received a large gift or inheritance of 5,000 Euro or more in the year of the interview are classified as heirs, since the large gifts from that period are covered in previous questions. Analogously, those who received a large gift or inheritance in the period after the last interview are also classified as heirs, as any large gift received in that period was already covered by the preceding questions. Furthermore, information on the lifespan of a deceased parent, and of a deceased parent-in-law in the case of couples, together with information on the donor and the year of receipt of the large gift or inheritance was used when distinguishing between large gifts and inheritances. Individuals who reported receiving a large gift or an inheritance were excluded from the research samples if an unambiguous distinction between large-gift receivers and inheritance receivers could not be made.

The second question concerning inheritance in SHARE is addressed to owners of a house: "How did you acquire this property?" Respondents could choose one of 5 answers among which inheritances were distinguished from gifts. 13.85% of all house owners in the panel and 14.61% in the cross-section research sample inherited a house. All individuals who inherited a house are classified as heirs.

The need to distinguish between heirs and non-heirs led to the exclusion from the research samples of individuals without precise information on the experience of inheriting. Heirs constitute 16% of wave 2 of the panel research sample, and 11% of the cross-section research sample, as shown in Table 5.1. Even if all those who declared receiving large gifts or inheritances were heirs, the fractions of heirs would not exceed 31%. 30.96% of all SHARE households inherited a house, received a large gift or inheritance of worth 5,000 Euro or more in wave 1. The share of such households among all the households observed in wave 2 is 21.19%. To the best of our knowledge, no administrative data on the fraction of heirs in

European countries are available. According to the US Health and Retirement Study (HRS),[14] 67.18% of all households of individuals aged 50 or more in the US interviewed in 2006 contained an heir. The percentages of heirs in Europe and in the US, however, cannot be compared because of methodological differences: the HRS makes a clear distinction between inheritances and inter-vivos transfers ever received without setting any threshold amount of inheritances, which is not the case with SHARE.

	Panel			Cross-section		
	All	Without living parents		All	Without living parents	
Austria	14.14	14.99		11.15	12.15	
Belgium	13.42	14.54	**	10.12	11.15	*
Czech Republic				12.68	13.39	*
Denmark	7.22	8.21	*	7.09	7.18	
France	15.77	17.71	**	10.68	10.24	
Germany	15.70	15.96		9.87	10.41	*
Greece	16.59	18.04	***	18.50	18.27	
Ireland				11.92	13.69	***
Israel				5.84	6.57	
Italy	20.51	20.06		14.30	14.76	
Netherlands	5.92	6.39		4.27	4.55	
Poland				9.95	10.16	
Spain	17.30	17.64		13.21	14.64	**
Sweden	12.06	13.17		11.23	12.04	
Switzerland	13.83	16.16	***	14.33	14.26	
All	16.02	16.58	***	11.23	11.72	***
Number of individuals	8,287	6,902		15,488	12,086	

Table 5.1: Percentages of heirs in the panel and the cross-section research samples by country

Source: Author's own calculations based upon SHARE waves 1 and 2, release 2.3.1.
*Note: For the panel research sample, wave 2 values are reported. * p < 0.10. ** p < 0.05. *** p < 0.01.*

The percentages of heirs within the research samples differ across countries, as shown in Table 5.1. The highest percentage of heirs within the population of individuals aged 50+ with at least one parent deceased and at least one child, is observed in Italy (20%) in the panel research sample and in Greece (18%) in the cross-section research sample. The lowest percentage of heirs is in the Netherlands, both in the panel and in the cross-section research samples (6% and 4%, respectively). These differences reflect country-specific characteristics, including the composition of assets.

---

[14] HRS is a Longitudinal Study of Health, Retirement, and Aging collecting data about Americans above the age of 50 every two years. The survey is carried out by the University of Michigan.

The type of assets that are bequeathed may play a significant role as far as the timing of leaving a bequest is concerned. In the case of assets owned jointly by the couple, it is likely that the asset will be transferred after both spouses die. This applies especially to undividable property such as a house. Therefore, individuals with one living parent (a surviving parent) might be less likely to be heirs if their parents have made a decision to bequeath a house. The percentage of heirs is larger among individuals who do not have any living parents or parents-in-law than among individuals with one living parent or parent-in-law, as shown in Table 5.1. This pattern is observed in all the analyzed countries, but only in a few it is highly statistically significant. The number of individuals with a surviving parent or surviving parent-in-law is relatively low compared with the total number of individuals in the research samples. Therefore, the selection into research samples of individuals with at least one parent or parent-in-law deceased is suitable for the purpose of this dissertation.

5.1.3 Selection into groups of heirs and non-heirs

Whether an individual becomes an heir or not depends on his or her parents' bequest behavior. The family tradition approach to bequest behavior explains parental bequest behavior and thereby why some respondents are heirs, others are not. The SHARE data are limited as far as the information on deceased parents is concerned, thus direct tests whether or not parents bequeathed following the family tradition model cannot be conducted: there is no information if deceased parents experienced inheritance or not. Nonetheless, there are data on the deceased and surviving parents of individuals covered by the survey. These data are helpful to examine the probability of receiving an inheritance by individuals from the research samples.

Differences between heirs and non-heirs were observed with regard to the lifespan of their deceased biological parents, as shown in Table 5.2. Parents of heirs lived longer than parents of non-heirs on average. The lifespan edge of about two years was observed both in the panel and in the cross-section research samples. Mothers lived longer than fathers in both groups of heirs and non-heirs. These differences are highly statistically significant. Though two years do not seem to make much of a difference as far as lifetime wealth is concerned, parents of heirs had on average two more years that could be spent amassing wealth for bequests. The longer lifespan might reflect better health of the parents of heirs than of the parents of non-heirs.

General health might affect lifetime income. Unfortunately, there is no information on the lifelong health of deceased parents.

	Panel			Cross-section		
	Heirs	Non-heirs		Heirs	Non-heirs	
	Deceased mothers					
Lifespan	76.65	74.38	***	75.51	73.68	***
Standard error	(13.78)	(14.60)		(14.34)	(14.55)	
Number of deceased mothers	983	4,547		1,314	9,771	
	Deceased fathers					
Lifespan	72.52	70.26	***	73.06	70.10	***
Standard error	(14.07)	(14.60)		(13.70)	(14.36)	
Number of deceased fathers	1,142	5,341		1,514	11,447	

Table 5.2: Lifespan of deceased parents of heirs and non-heirs in the panel and the cross-section research samples

Source: Author's own calculations based upon SHARE waves 1 and 2, release 2.3.1.
*Note: For the panel research sample, wave 2 values are reported. * p < 0.10. ** p < 0.05. *** p < 0.01.*

In the SHARE data, there is no information about the deceased parents of respondents other than their lifespan. The survey collected data on the last occupation of the deceased mothers and fathers, but these data are not available in official releases. We were allowed to access the raw data on the last occupation of deceased parents collected in wave 2. These descriptions of the last occupation were coded into variables created according to the International Standard Classification of Occupations (ISCO). The last occupation of 5,293 deceased fathers and of 5,408 deceased mothers of individuals from the research samples is thus known to us.

25.38% of the heirs of the deceased fathers whose last occupation is known, and 22.95% of the non-heirs of the deceased fathers whose last occupation is known are classified as market-oriented skilled agricultural workers. The next most popular occupations among deceased fathers of heirs are: building and related trades workers, excluding electricians (12.27%); legal, social, cultural, and related associate professionals (8.40%); agricultural, forestry, and fishery laborers (8.40%); and metal, machinery, and related trades workers (7.73%). Only slightly different most popular occupations were observed for the deceased fathers of non-heirs. These are: building and related trades workers, excluding electricians (13.11% of non-heirs' deceased fathers); agricultural, forestry, and fishery laborers (10.38%); social, cultural, and related associate professionals (7.35%); and metal, machinery, and related trades workers (7.07%). Even though the ranking is statistically significantly different, the five most common

occupations are the same for heirs' and non-heirs' deceased fathers. This suggests that the overall occupational structure of the deceased fathers is similar for the fathers of heirs and the fathers of non-heirs.

It is plausible to assume that fathers were the main breadwinners, since deceased mothers of the respondents were often housewives (37.50% of the heirs' mothers and 46.57% of the non-heirs' mothers whose last occupation is known). Working women contribute to household income. Deceased mothers who were not housewives worked largely as agricultural workers, either "individual" (19.00%) or "market-oriented" (14.41%). Thus, a substantial fraction of deceased parents of heirs and of non-heirs were agricultural workers. There were more working women among deceased mothers of heirs than among deceased mothers of non-heirs, which might also cause differentiation in household income. Since there is no information on inheritance that deceased parents might have received or of any other components of the deceased parents' wealth, the two main forces on which being an heir depends (that is, a parental family tradition to bequeath and parental wealth) will not offer a clue on why some respondents are heirs while others are not.

The insight into the picture of deceased parents is incomplete due to the unavailability of adequate data. The information on the surviving parents may shed some light on the issue. Data on age, health, frequency of contact, and distance between respondents and their parents for surviving mothers and surviving fathers of respondents are presented in Tables 5.3 and 5.4, respectively. 31% of the 2,157 individuals in the panel sample who had a living parent in wave 1 experienced death of that parent before wave 2 of the survey. In the panel research sample, wave 1 data are used instead of the most recent wave 2. Three categories of health status reported by the respondents for their living parent are presented: very good or good (good), fair, and poor or very poor (poor). The frequency of contact is grouped into four categories: daily, several times a week or about once a week (weekly), about every two weeks or about once a month (monthly), and less than once a month or never (less than once a month). If the respondent did not live in the same household or building with the surviving parent, the distance between the places of residence of the respondent and his or her parent was measured using the following ranges: less than 1 km, 1–5 km, 6–25 km, 26–100 km, 101–500 km, above 500 km, and above 500 km in another country. Tables 5.3 and 5.4 present percentages of parents by the following aggregated categories of distance from the place of

residence of the respondent: in the same building, 0–25 km, 26–100 km, and above 100 km away.

	Panel			Cross-section		
	Heirs	Non-heirs		Heirs	Non-heirs	
Average age	84.46	83.16	***	82.87	81.82	***
Health						
Very good	31.52	38.27	**	25.71	22.55	
Good	33.94	40.78	**	35.11	33.57	
Poor	34.54	20.95	***	39.11	43.88	
Contact with a respondent						
Daily	34.14	25.95	**	31.65	25.70	**
Weekly	49.71	54.88		49.79	53.24	
Monthly	8.78	12.68	*	13.50	13.39	
Less than once a month	7.19	6.49		5.06	7.67	*
Distance from a respondent						
Same building	13.77	5.30	***	16.33	4.63	***
0–25 km	34.73	36.08		35.51	35.52	
26–100 km	30.54	38.00	**	35.10	35.72	*
100 km and more	20.96	20.62		13.06	20.13	***
Number of mothers	167	1,358		245	2,548	

Table 5.3: Descriptive statistics of surviving mothers of heirs and non-heirs in the panel and the cross-section research samples

Source: Author's own calculations based upon SHARE waves 1 and 2, release 2.3.1.
Note: For the panel research sample, wave 1 values and percentages are reported. $* p < 0.10$. $** p < 0.05$.
$*** p < 0.01$.

The pattern observed in the case of deceased parents holds also for surviving parents as parents of heirs are on average older than parents of non-heirs. This difference is statistically significant in both research samples apart from fathers in the cross-section research sample. There are more surviving mothers of heirs in poor health than mothers of non-heirs in such a condition in the panel research sample, and this difference is statistically significant. The percentage of surviving fathers in poor health does not statistically significantly differ between the groups of heirs and non-heirs in both research samples. Comparisons of the health status of parents of heirs and parents of non-heirs should be made carefully, bearing in mind the parents' age. It is not surprising that surviving fathers are more often in better health condition than surviving mothers.

According to the data presented in Tables 5.3 and 5.4, there is little differentiation between the living parents of heirs and non-heirs. The surviving parent of the sampled individuals is

more often a mother than a father. This fact may partially result from the longer life expectancy of women. Most of the individuals live less than 100 km away from their surviving parents and are in touch with their parents at least once a week. This is similar for heirs and non-heirs. Mothers of heirs live in the same building with their children substantially more often than mothers of non-heirs. This relation is highly statistically significant in both research samples. More heirs than non-heirs are in daily contact with their mothers. Such differences between heirs and non-heirs are not statistically significant as far as contact with fathers is concerned. The worse health status of surviving mothers might be a reason for a more intensive relationship with them than with surviving fathers.

	Panel			Cross-section		
	Heirs	Non-heirs		Heirs	Non-heirs	
Average age	87.79	84.01	***	84.58	83.27	
Health						
Very good	47.37	51.35		27.27	28.87	
Good	31.58	30.63		31.82	29.92	
Poor	21.05	18.02		40.91	41.21	
Contact with a respondent						
Daily	27.03	23.02		21.73	22.29	
Weekly	59.46	46.90	*	39.13	45.81	
Monthly	8.10	15.04		19.57	16.56	
Less than once a month	5.41	15.04	*	19.57	15.34	
Distance from a respondent						
Same building	2.63	3.52		2.17	4.24	
0–25 km	28.95	37.89		45.65	34.95	*
26–100 km	47.37	38.77		30.43	41.21	*
100 km and more	21.05	19.82		21.75	19.60	
Number of fathers	38	226		46	495	

Table 5.4: Descriptive statistics of surviving fathers of heirs and non-heirs in the panel and the cross-section research samples

Source: Author's own calculations based upon SHARE waves 1 and 2, release 2.3.1.
*Note: For the panel research sample, wave 1 values and percentages are reported. * p < 0.10. ** p < 0.05. *** p < 0.01.*

The relations described above between respondents and their surviving mothers are strong, and become even stronger in the groups of heirs. If unhealthy widows decide to live with their children, one may expect that there has been a good relationship between the widow and her children for a long time. This might suggest that heirs are more altruistic towards their surviving mothers than non-heirs. According to the strategic considerations model, surviving

parents encourage children to take care of them by promising bequests conditional on the provision of care. Since heirs have already received an inheritance and non-heirs have not, the former should be less likely to provide care, as the marginal utility of additional bequests for them is lower than the marginal utility of additional bequests for non-heirs, keeping other factors constant. This observation supports the rejection of the strategic consideration as a motive for bequeathing.

In sum: The deceased and surviving parents of heirs and non-heirs do not differ substantially as far as the characteristics observed in the SHARE data are concerned. Parents of heirs lived longer than parents of non-heirs and fewer of them worked as laborers or remained inactive. The surviving mothers of heirs live closer and contact their children more often than surviving mothers of non-heirs. The one-dimensional comparisons presented above cannot fully explain why some of the deceased parents decided to bequeath and other did not. Nonetheless, it revealed that there is some differentiation between parents of heirs and non-heirs.

5.2 The econometric procedure

The impact of the experience of inheriting on bequest behavior is investigated by testing the claims derived from the theoretical model. The data available in SHARE allow testing six of the seven claims presented in the theory part. Two econometric approaches are used.

One approach assumes that heirs and non-heirs do not systematically differ with respect to relevant variables, except for the experience of inheriting. This approach uses the simplest estimation methods: random effects (RE) estimation chosen over fixed effects (FE) according to the Hausman test for the panel data, and ordinary least squares (OLS) estimation for the cross-section data.

The other approach allows and then controls for systematic differences between heirs and non-heirs with respect to relevant variables. This approach uses more advanced methods of a difference-in-differences (DD) estimation for the panel data (Ashenfelter and Card, 1985; Imbens and Wooldridge, 2009a) and propensity score matching (PSM) for the cross-section data (Rosenbaum and Rubin, 1983; Imbens and Wooldridge, 2009b).

All the individuals from the research samples belong to one of the two groups: heirs (H_P in the panel research sample, and H_C in the cross-section research sample) and non-heirs (N_P and N_C, respectively). The impact of inheriting on bequest behavior can be examined by testing whether the results obtained for heirs differ significantly from the results obtained for non-heirs. If the selection into the groups of heirs or non-heirs is random, the estimates obtained in OLS and RE estimations properly describe the impact of inheriting on bequest behavior not only for those who actually are heirs but also for any individual from the population of interest that might become an heir (Wooldridge, 2002). If the selection is not random, the impact of the experience of inheriting differs between actual heirs and individuals from the population of interest who could become heirs (Imbens and Angrist, 1994). Descriptive statistics presented in Section 5.3 points to systematic differences between heirs and non-heirs. Thus, DD and PSM methods are used as they deal with estimation of the mean effects of treatment on the treated and on persons randomly selected from the population of interest (Rubin, 1974). The experience of receiving inheritance constitutes the treatment, and the population of interest consists of heirs and non-heirs aged at least 50 and having a child, and at least one deceased parent or at least one deceased parent-in-law in the 15 SHARE countries.

The assumptions of the DD and PSM methods are presented below.

The method of DD can be applied to all individuals $k = 1, 2, 3, ..., K$ from the panel research sample who were not heirs when they were interviewed for the first time at $t=1$. Their status of non-heirs can be transitory, as some of them had become heirs when interviewed for the second time at $t=2$ ($k = 1, 2, 3, ..., m$), whereas others remain non-heirs ($k = m+1, m+2, ..., K_{DD}$). Let us refer to the first group of individuals as H_{DD} and to the latter as N_{DD}. It is assumed that becoming an heir is uncorrelated with the idiosyncratic errors of the adjustments of planned bequests. The fixed effects (FE) estimation conducted for the balanced panel for the two groups H_{DD} and N_{DD} allows to compare the change of bequest behavior between the two groups due to the experience of inheriting (Wooldridge, 2005). Using this method, the pure effect of becoming an heir can be separated from other effects that might arise due to biased comparisons between heirs and non-heirs observed during the

second interview, or due to biases resulting from permanent differences between H_{DD} and N_{DD}.

H_{DD} consists of 143 individuals, and N_{DD} consists of 2,014 individuals. The DD estimation is efficient for relatively large samples. Therefore, the results obtained by the DD method for heirs might be inefficient and insufficient for investigation of the link between the experience of inheriting and planned bequests.

The PSM method can be applied provided that the selection into the groups of heirs and non-heirs depends only on observables (the unconfoundedness assumption). The theoretical model developed in Chapter 4 indicates that a child becoming an heir depends on the observable characteristics defined by the variables in the utility function of consumption and planned bequests for the parent. No other unobservable factors affect being an heir. Thus, it is assumed that the distribution of bequest behavior is the same for heirs and non-heirs conditional on the variables that explain being an heir. It is assumed that for every individual from the cross-section research sample, propensity score is larger than 0 and smaller than 1. It is also assumed that being an heir affects only the heir's bequest behavior, which is in line with the theoretical framework presented in Chapter 4.

The propensity score PS_l is the probability that an individual l is an heir. The PS_l was obtained using logistic estimation (Rosenbaum and Rubin, 1983) over the following explanatory variables: gender, being an only child, age at death of the deceased father, dummies for the last occupation of the deceased father, dummies for the last occupation of the deceased mother, dummies for the level of completed education, and dummies for countries. The gender and level of completed education are proxies for the respondents' income at the time when they received inheritance, which is considered exogenous to the planned bequests. The estimate of the propensity score is used to obtain the predicted propensity score. The coefficients on the explanatory variables obtained in the estimation of PS_l do not have a theoretical interpretation. Thus, the problem of omitted variables regarding the deceased parents' experience of inheriting, although severe, does not delegitimize the use of the PSM method. The predicted propensity score is positive and smaller than 1 for each individual.

In the cross-section research sample, individuals are interviewed only once ($t=1$) and their membership in the group of heirs or non-heirs is static. The estimated propensity score is used to select individuals into groups of heirs and non-heirs (Hirano et al., 2003). This allows obtaining group H_{PSM} of heirs $l = 1, 2, 3, ..., n$, and group N_{PSM} of non-heirs $l = n+1, n+2, ..., L_{PSM}$ such that the most severe biases (Heckman, 1990) between OLS estimates for heirs and for non-heirs are removed (Rubin, 1990).

The pairs of groups of individuals H_S and N_S defined for each of the estimation methods create four research samples $S = \{P, C, DD, PSM\}$. Comparisons of bequest behavior are made between the two groups within each research sample, using the respective estimation method. The estimations are conducted using the vector of J explanatory variables $\mathbf{x}^{G_s}$ in each of the four methods, separately for the two groups $G_S = \{H_S, N_S\}$, according to the following equation:

$$P_{it}^{G_S} = \mathbf{x}_{it}^{G_S} \boldsymbol{\beta}^{G_S} + \varepsilon_{it}^{G_S}, \quad \text{for} \quad \text{individual} \quad i = \begin{cases} k & \text{if } S = \{P, DD\} \\ l & \text{if } S = \{C, PSM\} \end{cases} \quad \text{observed} \quad t \quad \text{times}$$

$$t = \begin{cases} 1,2 & \text{if } S = \{P, DD\} \\ 1 & \text{if } S = \{C, PSM\} \end{cases},$$

where $P_{it}^{G_S}$ are chances to bequeath 50,000 Euro or more for individual i observed at time t from group G_S,

$\beta_j^{G_S}$ is a coefficient on the impact of variable j on the chances to bequeath 50,000 Euro or more in group G_S,

$\varepsilon_{it}^{G_S}$ is an identically and independently distributed random term for individual i observed at time t in group G_S.

Suppressing time subscripts, vector $\mathbf{x}_i^{G_S}$ consists of the following explanatory variables:

$x_{0i}^{G_S} = 1$,

$x_{1i}^{G_S}$ - the log net wealth of individual i in group G_S,

$x_{2i}^{G_S}$ - the inheritance tax rate faced by individual i in group G_S,

$x_{3i}^{G_S} - x_{7i}^{G_S}$ - dummies for education levels 2–6 as of the International Standard Classification of Education (ISCED) of the least educated child of individual i in group G_S,

$x_{8i}^{G_S} - x_{12i}^{G_S}$ - dummies for the education levels of the least educated child of individual i in group G_S if the child is a daughter,

$x_{13i}^{G_S} - x_{Ji}^{G_S}$ - the socio-demographic characteristics of individual i in group G_S.

The ISCED education levels (lower secondary education, upper secondary education, post-secondary non-tertiary education, first stage of tertiary education, and second stage of tertiary education) and the gender of the least educated child are proxies for the child's income. The socio-demographic characteristics of individual i that turn out to be statistically significant are controlled for, so the constant term can be interpreted as the sum of strengths of the hold of the family tradition to bequeath and of altruism.

In order to study empirically the hypothesis that "the experience of inheriting affects bequest in a predictable manner," we test whether or not the manner in which a family tradition affects bequest behavior is consistent with the theoretical implications. This is done by investigating the significance of the signs and the relations between the coefficients, as indicated by the following claims:

Claim 1. The stronger the role that adherence to family tradition plays in shaping utility (the stronger the hold of family tradition), the larger the (optimal) planned bequest: $\beta_0^{H_S} > \beta_0^{N_S}$.

Claim 2. The larger the inheritance, the larger the (optimal) planned bequest: $\beta_1^{G_S} > 0$ for $G_S = \{H_S, N_S\}$.

Claim 3. The positive impact of the inheritance on the (optimal) planned bequest is more pronounced in the presence of family tradition than in its absence: $\beta_1^{H_S} > \beta_1^{N_S}$.

Claim 4. The larger the child's income, the smaller the (optimal) planned bequest:
The child's income is proxied by the gender and education of the least educated child. It is assumed that the child's income comes entirely from labor. Additional levels of completed education of the child yield larger income, that in turn reduces the planned bequest to the child. Thus, the coefficients on completed education levels are negative: $\beta_j^{G_S} < 0$ for $j = \{3, 4, ..., 7\}$ and $G_S = \{H_S, N_S\}$. Due to a gender gap in wages, the coefficients of completed education levels for the least educated daughter are estimated as a sum $\beta_j^{G_S} + \beta_{j+5}^{G_S}$ for $j = \{3, 4, ..., 7\}$. Assuming that wages of women are lower than wages of equally educated

men, so are the incomes, which consequently results in a larger bequest left to a daughter than to an equally educated son. Thus, $\beta_{j+5}^{G_S} > 0$ for $j = \{3,4,...,7\}$ and $G_S = \{H_S, N_S\}$.

Claim 5. The negative impact of the child's income on the (optimal) planned bequest is less pronounced in the presence of family tradition than in its absence:

Since education and gender are the proxies for child's income, we test for sons if $\beta_j^{H_S} > \beta_j^{N_S}$ and for daughters if $\beta_j^{H_S} + \beta_{j+5}^{H_S} > \beta_j^{N_S} + \beta_{j+5}^{N_S}$, $j = \{3,4,...,7\}$.

Claim 7. The negative impact of taxes on the (optimal) planned bequest is less pronounced in the presence of family tradition than in its absence: $\beta_2^{H_S} > \beta_2^{N_S}$.

(Claim 6 cannot be tested as there are no data on the lifelong consumption in SHARE.)

None of the methods used in testing the claims solves all the econometric problems that are likely to arise. If the assumption that becoming an heir is uncorrelated with the idiosyncratic errors of the adjustments of planned bequests does not hold, then the FE estimators in the DD method are inconsistent (Bertrand et al., 2004). There is no direct test verifying whether the unconfoundedness assumption in the PSM is fulfilled. If there is an imperfect overlap of the propensity scores within the groups of heirs and non-heirs, the results are biased.

Moreover, the missing data severely limit the number of individuals taken into account in the estimations. If the incidence of missing is not random, the results are biased. The problem is addressed by using multiple imputations on net wealth in the estimations. Imputations are generated according to the approximate Bayesian bootstrap method (Rubin and Schenker, 1986; Juster and Smith, 2000). Imputations rely on the information provided by the respondents who either refused to reveal or did not know the exact amount of their wealth components, but indicated an interval to which the amounts belong. Different entry points to unfolding brackets were used in different countries (Christelis et al., 2005).

5.3 Descriptive statistics

The purpose of this Section is to skim through the raw data in order to find out whether there are systematic differences between heirs and non-heirs as could be expected on the basis of

our theory. We draw on two research samples: (1) the panel research sample, and (2) the cross-section research sample.

5.3.1 Planned bequests

There are three variables in the SHARE dataset that contain information on planned bequests:
- chances to bequeath anything;
- chances to bequeath 50,000 Euro or more;
- chances to bequeath 150,000 Euro or more.[15]

Respondents were first asked: "Including property and other valuables, what are the chances that you will leave an inheritance totaling 50,000 Euro or more (in local currency)?" In the case of individuals having a spouse, the wording changed to "… what are the chances that you or your spouse will leave an inheritance?" Depending on the answer, one of the two follow-up questions of chances to bequeath was asked. If a respondent declared zero chances to bequeath at least 50,000 Euro or did not answer at all, the question: "What are the chances that you will leave any inheritance?" followed. If a respondent declared positive chances to bequeath 50,000 Euro or more, the question about the chances to bequeath 150,000 Euro or more was asked. The sequence of questions results in a lower number of observations in the two follow-up questions on the chances to bequeath.

The following Tables present percentages of heirs and non-heirs who plan to bequeath and who do not plan to bequeath in the panel research sample (Table 5.5), and in the cross-section research sample (Table 5.6).

	Plan to bequeath	Do not plan to bequeath
Heirs	94.39	5.61
Non-heirs	82.64	17.36

Table 5.5: Percentages of heirs and non-heirs who plan and do not plan to bequeath in the panel research sample

Source: Author's own calculations based upon SHARE waves 1 and 2, release 2.3.1.
Note: Wave 2 percentages are reported. Number of heirs: 1,191, and non-heirs: 7,096.

---

[15] For the countries with national currencies the thresholds were replaced by the equivalent amounts of purchasing power expressed in the national currency.

	Plan to bequeath	Do not plan to bequeath
Heirs	92.79	7.21
Non-heirs	78.66	21.34

Table 5.6: Percentages of heirs and non-heirs who plan and do not plan to bequeath in the cross-section research sample

Source: Author's own calculations based upon SHARE waves 1 and 2, release 2.3.1.
Note: Number of heirs: 1,719, and non-heirs: 13,769.

The differences between heirs and non-heirs are in line with the family tradition approach to bequest behavior: the larger numbers are those along the main diagonal. The percentages of individuals planning to bequeath are larger for heirs than for non-heirs by 12 percentage points in the panel, and by 14 percentage points in the cross-section research sample. Interestingly, a somewhat similar edge of 18 percentage points was observed for individuals aged 50+ with at least one parent deceased in the US (Cox and Stark, 2005b).

Respondents could declare a figure ranged from 0 to 100 as an answer to the questions on the chances to bequeath. Respondents usually rounded the chances to multiples of 10 or 5. However, the most polarized answers are detailed and exact. 50 was a relatively frequent answer given to all three questions on the chances to bequeath. Therefore, in Table 5.7 answers are grouped into the following categories: 0, 1–49, 50, 51–99, and 100. Fractions of individuals who gave answers belonging to the above categories are presented in Table 5.7.

Differences with respect to the chances to bequeath between heirs and non-heirs are observed for all five categories of answers, but are especially strong for the polar categories of answers. The percentages of individuals declaring certainty of leaving a bequest are larger within the groups of heirs than non-heirs and are statistically insignificant only in the case of the question on chances to bequeath anything in the cross-section research sample. Furthermore, the percentages of individuals declaring certainty of leaving no bequest are smaller within the groups of heirs than non-heirs. This relation is statistically significant in all cases except for the question on the chances to bequeath 150,000 Euro or more in the cross-section research sample. Apparently, heirs are more willing to bequeath than non-heirs.

	Panel			Cross-section		
	Heirs	Non-heirs		Heirs	Non-heirs	
Chances to bequeath anything						
0	26.12	43.02	***	30.98	51.80	***
1−49	6.04	11.20	***	3.60	10.99	***
50	9.30	7.99	***	5.58	8.42	***
51−99	13.86	7.86		9.46	6.93	
100	44.69	29.93	**	50.39	21.86	
Number of individuals	222	2,360		327	5,171	
Chances to bequeath ≥ 50,000 Euro						
0	20.79	39.71	***	20.99	40.82	***
1−49	5.94	8.99	***	7.09	8.31	**
50	7.06	7.00		7.89	7.18	
51−99	15.48	11.03	***	15.72	11.42	***
100	50.73	33.27	***	48.31	32.28	***
Number of individuals	1,174	6,934		1,682	13,476	
Chances to bequeath ≥ 150,000 Euro						
0	20.65	26.65	**	21.74	29.68	
1−49	11.57	14.67		10.62	12.36	***
50	9.42	8.22	***	9.46	8.24	**
51−99	15.56	13.61	***	14.94	13.17	***
100	42.80	36.85	***	43.24	36.55	***
Number of individuals	942	4,563		1,360	8,213	

Table 5.7: Percentages of heirs and non-heirs by the chances to bequeath anything, 50,000 Euro or more, and 150,000 Euro or more in the panel and the cross-section research samples

Source: Author's own calculations based upon SHARE waves 1 and 2, release 2.3.1.
*Note: For the panel research sample, wave 2 values are reported. * $p < 0.10$. ** $p < 0.05$. *** $p < 0.01$. 179 respondents in the panel and 330 in the cross-section research sample answered the question on the chances to bequeath anything and did not answer the question on the chances to bequeath 50,000 Euro or more.*

5.3.2 Inheritances and other components of wealth

We have that 67.93% of all heirs in the panel research sample and 58.64% in the cross-section research sample provided information on the amount of inheritance received. Table 5.8 shows the average amount of inheritance in the panel and the cross-section research samples. Within the framework of the family tradition approach, the family traditions instilled in the heirs set the average threshold of planned bequests at 236,615 Euro in the panel research sample and at 190,646 Euro in the cross-section research sample. The average amounts are estimated with large standard errors, especially for the panel research sample. Thus, the average amounts are imprecise estimation of the average threshold above which planned bequests "honor" the family tradition.

	Panel	Cross-section
Average (Euro)	236,615	190,646
Standard error	(797,600)	(334,325)
Number of individuals	809	1,008

Table 5.8: Average reported value of inheritances for heirs in the panel and the cross-section research samples

Source: Author's own calculations based upon SHARE waves 1 and 2, release 2.3.1.
Note: For the panel research sample, wave 2 values are reported. Outliers above 99.5 percentile excluded.

Furthermore, the average value may be misleading if inheritances are not normally distributed in the research samples. Since the distributions of inheritance are strongly right-skewed, the natural logarithmic transformation of inheritance is employed. The distributions of inheritance are depicted in Figure 5.1. Note that inheritances below 5,000 Euro left in other form than a house are not covered by the SHARE data. All heirs with a family tradition to bequeath less than 5,000 Euro are assumed in what follows to have a family tradition to bequeath 2,500 Euro.
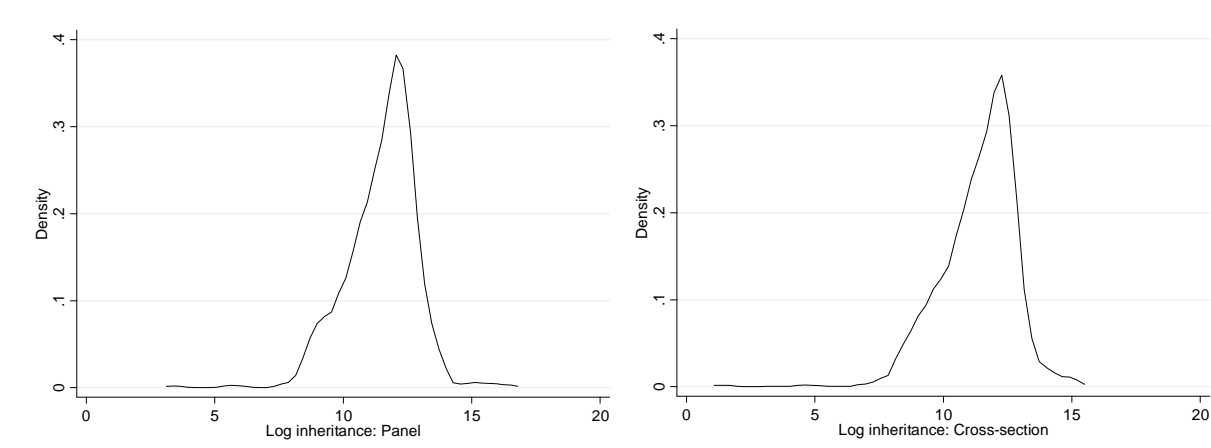

Figure 5.1: Kernel densities of log inheritance in the panel and the cross-section research samples

Source: Author's own analysis based upon SHARE waves 1 and 2, release 2.3.1.
Note: Inheritance measured in Euro. From left: panel, cross-section. For the panel research sample, wave 2 values are reported. Outliers above 99.5 percentile excluded.

The amount of received inheritance is important as it sets the threshold for bequests adhering to the family tradition to bequeath. The SHARE data allow analysis of the form of wealth that was inherited, and a comparison of the amount inherited with other components of wealth. Table 5.9 shows the percentages of heirs who inherited a house and the percentage of house

owners who inherited a house among respondents who provided information on these variables in the panel and in the cross-section research samples. These data are of interest to us because the timing of leaving a bequest might depend on the form of bequests. This applies especially to houses.

	Panel		Cross-section	
	Heirs who inherited a house	House owners who inherited a house	Heirs who inherited a house	House owners who inherited a house
Austria	96.47	15.36	93.05	17.93
Belgium	69.08	6.82	88.19	6.84
Czech Republic			81.80	19.79
Denmark	26.91	1.65	13.91	1.83
France	67.46	10.37	75.39	13.19
Germany	88.23	19.06	88.19	17.91
Greece	95.57	14.79	86.17	19.60
Ireland			88.24	12.61
Israel			65.59	5.65
Italy	93.10	18.61	84.78	17.12
Netherlands	43.22	2.14	18.09	1.31
Poland			95.60	15.30
Spain	79.62	9.49	83.18	13.30
Sweden	34.47	6.10	30.38	4.98
Switzerland	58.59	8.32	58.48	14.51
All	83.55	13.85	81.58	14.61
Number of individuals	743	5,329	1,627	9,631

Table 5.9: Percentages of heirs who inherited a house and percentage of house owners who inherited a house by country in the panel and the cross-section research samples

Source: Author's own calculations based upon SHARE waves 1 and 2, release 2.3.1.
Note: For the panel research sample, wave 2 percentages are reported.

There is considerable diversity in Europe with regard to house ownership. Among all respondents in the Netherlands who provided information on the type of their house ownership, 48% in the panel, and 50% in the cross-section research sample, own a house. The corresponding percentages are 69% in Italy in the panel research sample, and 80% in Greece in the cross-section research sample. The largest percentages of house owners who inherited their houses (15% to 20%) are in Austria, the Czech Republic, Germany, Greece, Italy, and Poland, as shown in Table 5.9. Less than 3% of house owners inherited their houses in Denmark and in the Netherlands. In general, only a minor percentage of house owners observed in the research samples inherited their houses.

There is no universal relationship between bequest behavior and house ownership in the analyzed countries. There are countries where the vast majority of bequests include houses. More than 95% of heirs inherited a house in Austria and Greece in the panel research sample, and in Poland in the cross-section research sample, as shown in Table 5.9. Heirs who inherited a house are least frequent in Denmark, Sweden, and the Netherlands (18% to 43%). Thus, a house is a common form of inherited wealth in Austria, Greece, and Poland, whereas in other European countries providing the research samples it is inherited infrequently.

Obviously, a house is only one form of wealth. Net wealth affects planned bequests as it impinges on the budget constraint. The SHARE data do not contain information on total wealth, only on particular components of wealth. Respondents were asked about three types of real assets:

- primary and other residences;
- own businesses;
- vehicles;

seven types of financial assets:

- bank and other transaction accounts;
- government and corporate bonds;
- stocks;
- mutual funds;
- individual retirement accounts;
- contractual savings for housing;
- life insurance policies;

and three types of liabilities:

- mortgages and debts on cars;
- credit cards and liabilities towards banks;
- liabilities towards building societies and other financial institutions.

Information from the responses to questions pertaining to the components of wealth was used to compute the following aggregates: real assets, financial assets, liabilities, and net wealth. Table 5.10 shows the percentage of heirs and non-heirs who provided information sufficient for the computation of the aggregates, that is of those who detailed the amount of wealth components constituting the aggregate or who declared having no such wealth components. The percentages of individuals with computed aggregates do not exceed 59% of all

individuals in the research samples for real assets, and 31% of all individuals in the research samples for financial assets.

	Panel			Cross-section	
	Heirs	Non-heirs		Heirs	Non-heirs
Real assets	58.27	55.15		58.81	48.48
Financial assets	29.47	30.38		28.38	24.25
Liabilities	19.47	15.40		20.53	15.24
Net wealth	27.03	20.78		31.00	20.86
Number of individuals	1,191	7,096		1,719	13,769

Table 5.10: Percentage of heirs and non-heirs with computed wealth aggregates who reported the amount of inheritance in the panel and the cross-section research samples

Source: Author's own calculations based upon SHARE waves 1 and 2, release 2.3.1.
Note: For the panel research sample, wave 2 percentages are reported.

Among the individuals who provided information sufficient for the computation of the aggregates (real assets, financial assets, liabilities, and net wealth) there are individuals with positive, zero, or negative levels of the aggregates. The average amounts presented in Table 5.11 are computed for those individuals who had a positive amount of the respective aggregate. The numbers of such individuals are also reported in Table 5.11.

The standard errors of the estimates of the averages are large. Real assets seem to contribute to wealth most, both for heirs and non-heirs. Heirs have more real assets than non-heirs on average. The average amounts of inheritances are relatively high compared with the average amounts of real assets and net wealth. The average liabilities are the least important component of average net wealth. Even though computed real assets, financial assets, and liabilities are statistically significantly different between the groups of heirs and non-heirs, no statistically significant differentiation of total net wealth is observed between the groups. There are 293 heirs in wave 1 and 250 in wave 2 in the panel research sample, and 484 in the cross-section research sample whose inheritance and net wealth are known. For these individuals, the average percentage of inheritance in the net wealth equals: 72.03%, 74.56%, and 80.60%, respectively. However, the percentages are computed for a minority of heirs as the total number of heirs in the panel research sample equals 843 in wave 1 and 1,191 in wave 2; and 1,719 in the cross-section research sample.

	Panel			Cross-section		
	Heir	Non-heirs		Heirs	Non-heirs	
Real assets						
Average (Euro)	229,454	205,024	***	258,036	197,500	***
Standard error	(217,295)	(233,290)		(336,201)	(321,461)	
Number of individuals	678	3,878		923	5,865	
Financial assets						
Average (Euro)	32,131	25,183	**	37,173	25,055	***
Standard error	(59,590)	(53,723)		(71,950)	(57,447)	
Number of individuals	344	2,132		453	3,020	
Liabilities						
Average (Euro)	65,679	54,133	*	48,071	54,885	**
Standard error	(97,984)	(71,152)		(75,035)	(77,737)	
Number of individuals	230	1,082		318	1,815	
Net wealth						
Average (Euro)	254,565	281,254		248,569	230,455	
Standard error	(295,031)	(284,307)		(320,323)	(299,577)	
Number of individuals	315	1,461		493	2,416	

Table 5.11: Average amounts of computed wealth aggregates for heirs and non-heirs in the panel and the cross-section research samples

Source: Author's own calculations based upon SHARE waves 1 and 2, release 2.3.1.
Note: For the panel research sample, wave 2 values are reported. $* p < 0.10$. $** p < 0.05$. $*** p < 0.01$. Outliers above 99.5 percentile excluded.

The relations observed between the average amounts do not reveal how wealth is distributed over the sampled individuals. The problem of right-skewness of the distributions of wealth aggregates is solved by the logarithmic transformation. Figures 5.2 and 5.3 present densities of natural logarithm of real assets, financial assets, liabilities, and net wealth in the panel and the cross-section research sample, respectively.

Densities of the computed financial assets, real assets, and liabilities differ between heirs and non-heirs in the panel and the cross-section research samples. The real assets are more evenly distributed between heirs than between non-heirs. The distribution of real assets is bi-modal in the group of non-heirs in both research samples. Heirs have more financial assets and slightly more liabilities than non-heirs. As far as the net wealth is concerned, heirs are slightly less wealthy than non-heirs. The preceding preliminary observations on average net wealth and the distribution of net wealth already suggest that net wealth is not a credible contender for an explanation of the larger fraction those who are planning to bequeath among heirs than among non-heirs.
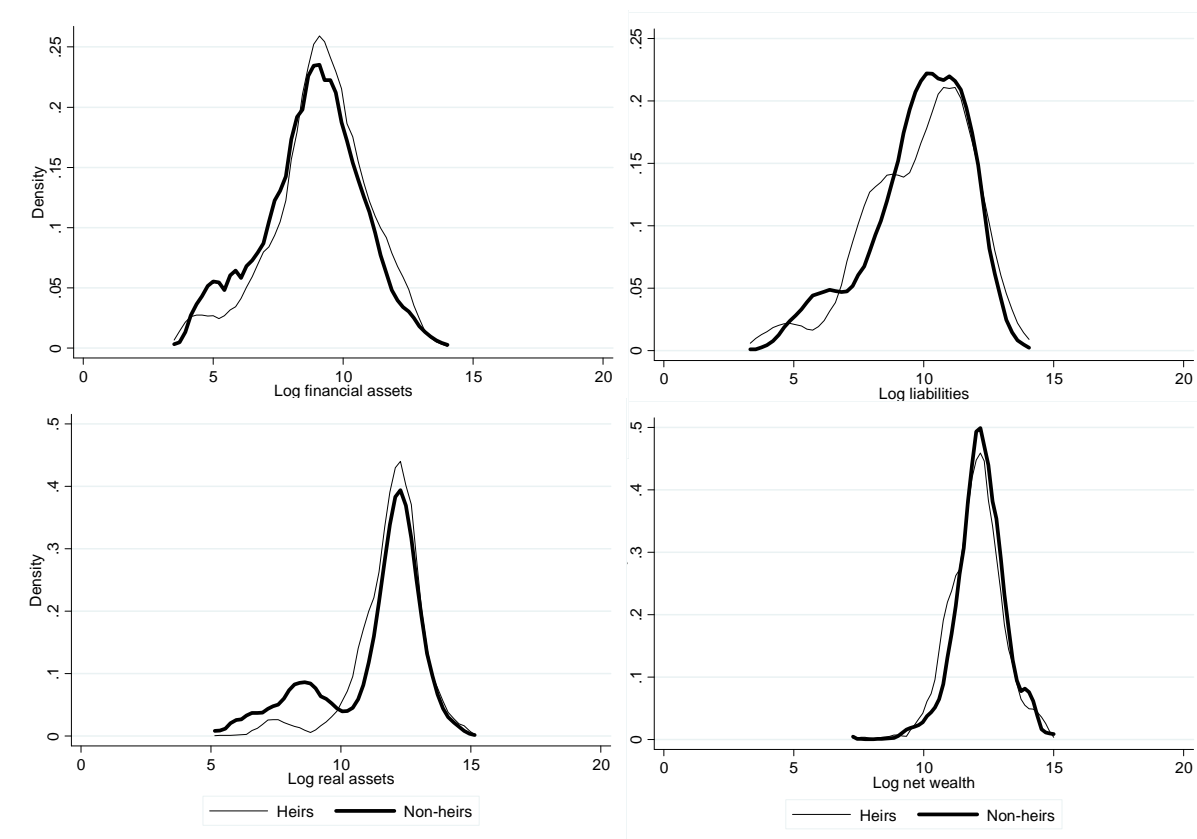
Figure 5.2: Kernel densities of log computed wealth aggregates for heirs and non-heirs in the panel research sample

The edge of non-heirs over heirs in terms of net wealth distribution is not very large in the panel and the cross-section research samples, as shown for the respective panels in Figures 5.2 and 5.3. The non-response to wealth questions is usually positively correlated with wealth. If heirs are located in the top deciles of the wealth distribution, the groups of heirs will be characterized by more missing data on wealth than groups of non-heirs. Empirical studies on the relation between wealth accumulation and the receipt of an inheritance do not support the notion that there is a strong correlation between the two (Gale and Scholz, 1994). However, there are studies showing that inherited wealth makes an important contribution as far as the wealth of the offspring of the very rich is concerned (Bowles and Gintis, 2002). Thus, the problem in the highest deciles will be addressed in the econometric inquiry.
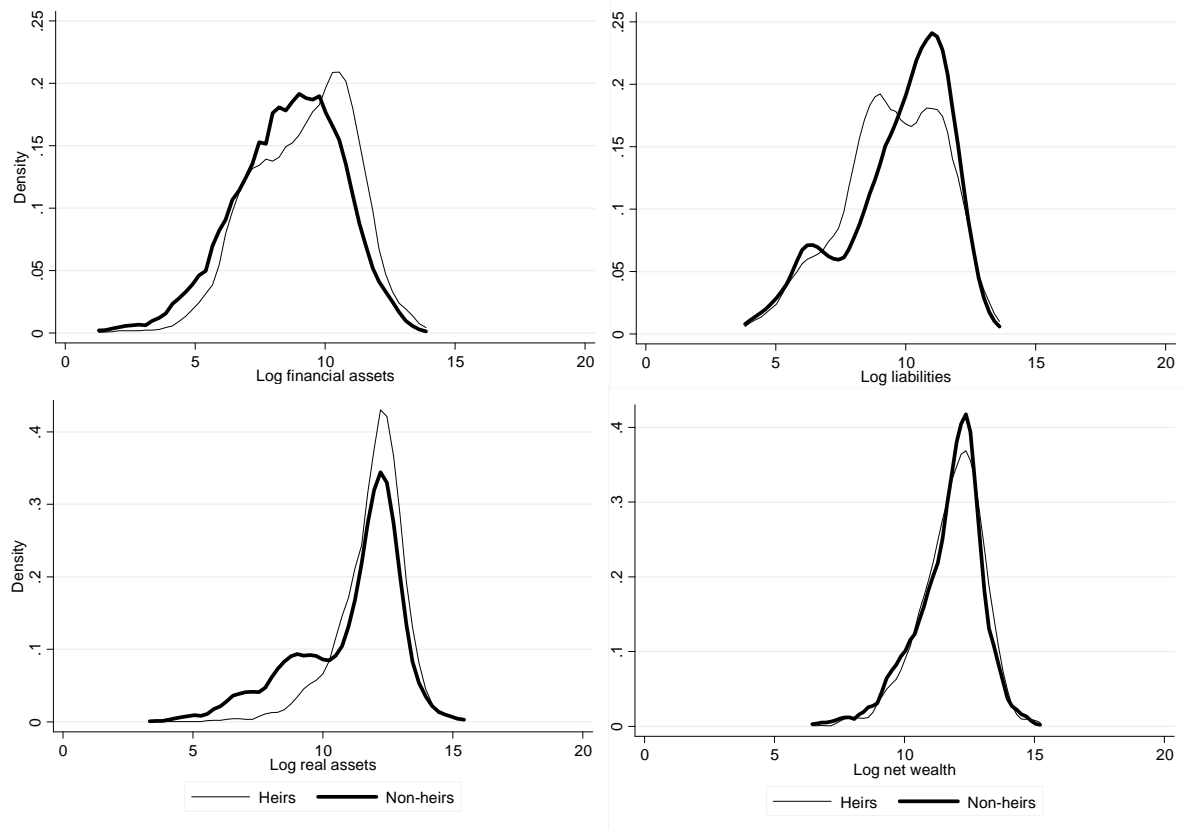
Figure 5.3: Kernel densities of log computed wealth aggregates for heirs and non-heirs in the cross-section research sample

Source: Author's own analysis based upon SHARE waves 1 and 2, release 2.3.1.
Note: Wealth aggregates measured in Euro. Outliers above 99.5 percentile excluded. Clockwise from top left: financial assets, liabilities, net wealth, and real assets.

5.3.3 Characteristics of the respondents and their children

Apart from the composition of wealth, other variables might explain the difference in planned bequests between heirs and non-heirs. Table 5.12 presents average values of age and number of children, and percentages of individuals in the research samples by gender, presence of a living parent or parent-in-law, marital and employment status, and education level. There are three types of marital status: marriage or registered relationship (the married), widowhood (the widowed), and being never married or divorced (the never married or divorced). There are four types of employment: retirement (the retired), employment or self-employment (the working), unemployment (the unemployed), and disability, homemaking or other (the inactive). Completed education is measured using the International Standard Classification of Education (ISCED), regardless of the country-specific or time-specific education systems. The following levels of the classification represent the type of the highest education attained

by an individual: 1 – primary education, 2 – lower secondary education, 3 – upper secondary education, 4 – post-secondary non-tertiary education, 5 – first stage of tertiary education, 6 – second stage of tertiary education.

	Panel			Cross-section		
	Heirs	Non-heirs		Heirs	Non-heirs	
Averages						
Age	67.83	69.10	***	65.79	66.41	***
Number of children	2.31	2.49	***	2.39	2.50	***
Percentages						
Parent alive	11.60	15.19	***	17.74	21.34	***
Female	56.94	60.37		50.42	56.28	***
Married	60.44	54.06	***	66.32	60.86	***
Widowed	31.31	35.25		27.19	27.65	*
Never married or divorced	8.25	10.69	***	6.49	11.49	***
Retired	20.16	18.24	***	26.52	22.90	***
Working	55.22	57.25	***	49.64	52.93	***
Unemployed	3.23	3.10		2.24	3.70	**
Inactive	24.62	24.51		23.84	24.17	
No education	4.61	7.61	***	6.01	6.53	
ISCED level 1	29.17	26.46		29.02	30.05	***
ISCED level 2	16.25	18.72	**	16.27	16.24	
ISCED level 3	31.20	29.61		31.30	31.33	
ISCED level 4	1.49	1.44		3.03	2.08	***
ISCED level 5	15.73	15.68	**	13.43	13.35	***
ISCED level 6	1.55	0.48	**	0.94	0.42	
Number of individuals	1,191	7,096		1,719	13,769	

Table 5.12: Descriptive statistics of heirs and non-heirs in the panel and the cross-section research samples

As seen in Table 5.12, more than 79% of the individuals in the panel and the cross-section research samples do not have living parents. The percentage of women among heirs is lower than among non-heirs. This can be attributable to two phenomena. First, since non-heirs are on average older than heirs, the longer life expectancy of women would lead to the lower percentage of women among heirs. Second, under the custom of giving a dowry to daughters and bequeathing to sons, sons would outnumber daughters in the groups of heirs in populations large enough to exhibit equal shares of sons and daughters.

Heirs are less active in the labor market than non-heirs. There are more retired heirs than non-heirs and less heirs are employed or self-employed than non-heirs. The difference in the two types of employment status mentioned above is highly statistically significant. The difference in employment status does not correspond with the difference in the level of completed education. Only a minor edge of heirs over non-heirs with tertiary education was observed. These findings are somewhat surprising, especially if one takes into account the fact that heirs are on average younger than non-heirs. One possible explanation of this phenomenon is that once the wealth amassed by heirs is large enough to provide the traditional amount of bequests, heirs do not find it necessary to continue to work. In the case of non-heirs, there is no limit to wealth amassing set by the family tradition to bequeath, thus the motivation to work does not decline.

Even though heirs are more often married than non-heirs, they have on average fewer children than non-heirs. This difference cannot be explained by the fact that heirs are slightly younger than non-heirs, since the number of children is not likely to rise significantly with time for individuals aged at least 50 that provide the research samples. The preceding distinctions are statistically significant in both the panel and the cross-section research sample. Possibly, heirs choose the number of children such that they can afford to supply traditionally mandated bequests to all their children. This consideration does not feature in the fertility decisions of non-heirs.

If the planned bequests to children are altruistic, they depend on children's needs for financial support. Therefore, the bequest behavior of heirs might differ from the bequest behavior of non-heirs due to differences in the needs of the children. Differences between the groups of heirs and non-heirs within the research sample concerning the children are shown in Table 5.13. Percentages of married children are reported in Table 5.13. The remaining children are widowed, divorced or never married. There are two types of children in employment: employed or self-employed (the working), and retired (the retired). The remaining children are in full time-education (students) or homemakers, permanently sick or disabled. Education is classified according to the ISCED levels only for the children who completed full-time education.

All characteristics of children examined, except for the gender of a child and percentage of working children, differ statistically significantly between heirs and non-heirs. Children of

heirs are slightly younger on average than children of non-heirs, which can be partially attributed to the differences in the age and education of their parents. Children of heirs attain higher levels of education more often than children of non-heirs, sf. Table 5.13. Also the fraction of children who were continuing education when the interview took place was larger in the group of heirs than non-heirs. There are weak similarities between the education of parents and the education of children. Education of children can be used as a proxy for their wages. If heirs and non-heirs are equally wealthy and wages are reasonable proxies for the incomes of children, the better educated children of heirs do not need financial support as much as the less educated children of non-heirs. If altruism were the only motive for bequeathing, fewer heirs than non-heirs would plan to bequeath, which is not what we observe in the raw data. Therefore, compensatory nature of bequests is not confirmed by the raw data, which may indicate that a motivation for bequeathing other than altruism operates. The family tradition to bequeath is such a motive, weakening the negative impact of children's income on planned bequests.

	Panel			Cross-section		
	Heirs	Non-heirs		Heirs	Non-heirs	
Averages						
Age	38.07	40.06	***	35.37	36.76	***
Fractions						
Daughters	50.81	50.57		50.98	50.58	
Married	59.63	61.85	**	58.61	60.11	**
Students	7.59	5.59	***	8.62	6.89	***
Retired	2.43	3.17	**	1.70	2.22	**
Working	77.97	76.94		75.87	75.97	
No education	0.68	1.43	***	0.75	1.41	***
ISCED level 1	3.62	5.64	***	5.54	5.91	
ISCED level 2	13.38	17.50	***	14.57	16.06	***
ISCED level 3	44.28	42.36	**	43.19	44.71	**
ISCED level 4	4.38	3.53	**	4.85	4.06	***
ISCED level 5	32.08	28.59	***	30.14	27.16	***
ISCED level 6	1.58	0.95	***	0.95	0.69	**
Number of children	2,787	13,331		3,878	31,687	

Table 5.13: Descriptive statistics of children of heirs and non-heirs in the panel and the cross-section research samples

The differences in age and education between the children of heirs and non-heirs are also reflected in their marital status. Younger and better educated or still studying children of heirs are less frequently married or being in a registered partnership than children of non-heirs. The percentage of retired children is low, but statistically significantly larger within the groups of non-heirs than heirs. This observation is interesting as the reverse relationship was observed for parents. This does not mean that children do not mimic parental behavior as far as retirement is concerned since the majority of children have not reached the retirement age yet.

In sum, the picture that emerges from looking at the raw data from the research samples is as follows: substantially more heirs plan to bequeath than non-heirs. Heirs report chances to bequeath that are statistically significantly larger than those of non-heirs. The distributions of net wealth do not differ between heirs and non-heirs, but there is differentiation between heirs and non-heirs as far as the components of net wealth are concerned: heirs have more financial assets and slightly more liabilities than non-heirs on average. Heirs are in work less frequently than non-heirs. The percentage of female heirs is lower than the percentage of female non-heirs. Heirs are slightly younger than non-heirs and have on average fewer children. The children of heirs are younger and better educated than the children of non-heirs on average. The children of heirs seem to perform better in the labor market. This is in line with the family tradition approach to bequest behavior because the receipt of an inheritance allows a more intensive engagement in the acquisition of human capital. These observations and those discussed in Subsection 5.1.3 suggest that there are differences between dynasties with heirs and dynasties without heirs, but the differences are not very sharp. An econometric inquiry is needed to estimate the impact of the experience of inheriting on bequest behavior controlling for other relevant factors.

5.4 Econometric results

The purpose of this Section is to empirically test claims emanating from the family tradition approach to bequest behavior. We ask whether the experience of inheriting affects bequest behavior as predicted by the claims derived from the theoretical model:

1. The stronger the role that adherence to family tradition plays in shaping utility (the stronger the hold of family tradition), the larger the (optimal) planned bequest.

2. The larger the inheritance, the larger the (optimal) planned bequest.

3. The positive impact of the inheritance on the (optimal) planned bequest is more pronounced in the presence of family tradition than in its absence.

4. The larger the child's income, the smaller the (optimal) planned bequest.

5. The negative impact of the child's income on the (optimal) planned bequest to the child is less pronounced in the presence of family tradition than in its absence.

6. The stronger the role that adherence to family tradition plays in shaping utility (the stronger the hold of family tradition), the more will the parent curtail his or her optimal consumption.

7. The negative impact of taxes on the (optimal) planned bequest is less pronounced in the presence of family tradition than in its absence.

The SHARE data include variables necessary for testing claims 1, 2, 3, 4, 5, and 7.

In addition to testing the claims, two preliminary analyses are conducted: a logistic estimation of the decision whether to bequeath or not, and estimation of the impact of the experience of inheriting on planned bequests, assuming that all the coefficients except for the constant term are equal for heirs and non-heirs. The results of preliminary analyses presented in Subsection 5.4.1 reveal that there is a statically significant and positive impact of the experience of inheriting on planned bequests.

Planned bequests are operationalized as "the chances" (the term used in the questionnaire) to bequeath 50,000 Euro or more, data for which are given for all the sampled individuals. The variable of the chances to bequeath 50,000 Euro or more is quasi-continuous and has an upper and lower bound. Thus, log-linear estimations are conducted. Since all the claims concern interior solutions to the optimization problem, only positive values of the variable are employed when testing the claims. Estimations are conducted separately for heirs and for non-heirs. This allows testing whether behavior statistically significantly differs between heirs and non-heirs. The results are presented in Subsection 5.4.2.

There are two approaches to the econometric analysis. One approach examines the impact of the experience of inheriting, assuming that the impact is the same for the treated and for a random person; that is, for actual and potential heirs. The other approach distinguishes between the impacts of the experience of inheriting on the treated, that is, on actual heirs, and on a random person, that is, on any individual that might be an heir. Both approaches involve analyses of the cross-section and the panel data. The two original research samples (the cross-

section and the panel) are used in the estimations of the impact without making a distinction between the treated and a random person. The impact of the experience of inheriting is estimated using a log-linear estimation of planned bequests on the cross-section research sample, and using random effects (RE) estimation on the panel research sample.

Two other research samples are used in the estimations that distinguish the impact on the treated from the impact on a random person. These research samples are generated from the original research samples. The individuals selected by the propensity score matching (PSM) from the cross-section research sample constitute the PSM research sample. The observations selected from the panel research sample of individuals whose parent, surviving at the time of wave 1, died between the waves constitute the DD research sample. The impact of the experience of inheriting is evaluated using a log-linear estimation on the PSM research sample and using a difference-in-differences (DD) estimation on the DD research sample.

Since the SHARE data do not provide information on the income of children, the ISCED level of completed education and gender of the least educated child are used as a proxy of children's income. The number of children and a dummy for having a daughter are technical controls necessary for the consistency of the estimates on education of the least educated child. The initial set of socio-demographic characteristics that were controlled for in the estimation of planned bequests consists of age, gender, being married, being widowed, being retired, and working. The set was restricted to being retired and working with the use of the general-to-specific method. Therefore, neither age or gender, nor marital statuses statistically significantly affect bequest behavior of individuals within the research samples. The same vector of explanatory variables was employed in all the estimations used in testing the claims in the main inquiry.

The research samples contain a relatively large number of individuals for whom data on net wealth are missing. The SHARE dataset contains imputed data in addition to the data collected directly during the interviews. The research samples can be extended to include the imputed variables. Thus, the use of the imputed information on net wealth is worth considering. Subsection 5.4.2 presents the results obtained using the imputed information on net wealth. There it is shown that heirs have statistically significantly larger chances to bequeath 50,000 Euro or more than non-heirs *controlling* for net wealth and for other relevant variables.

Each of the four methods of estimation was conducted over two variants of the respective research sample: with and without the imputed information on net wealth. The coefficients estimated over the research samples with the imputed information on net wealth are similar to those obtained over the research samples without the imputed data. However, the results obtained without the imputed data on net wealth are often statistically insignificant. The analyses appear to nearly exceed the capacity of the data: the number of individuals observed is relatively small in comparison with the number of the controlled characteristics. This may result in a non-negligible bias of the estimates and in insufficient degrees of freedom disabling post-estimation diagnostics. This concerns especially the most sophisticated methods of estimation (PSM and DD). The results of the PSM and DD analyses conducted over the research samples without the imputed data on net wealth proved the dataset to contain insufficient information for more extensive analyses of bequest behavior. The results obtained without the imputed data do not allow testing the claims and, consequently, do not bring any additional insight to the study. For this reason, we decided not to report them in Section 5.4.2. The results of the log-linear, RE, PSM, and DD estimations over the research samples without the imputed data are available upon request.

Not all the claims could be tested using the SHARE data. Subsection 5.4.3 provides alternative methods for testing Claims 1, 2, and 3. The data on the average traditionalism of individuals from the selected countries are used as a proxy for the average adherence to tradition, including the family tradition to bequeath. This information is used in testing how the strength of the hold of the family tradition to bequeath impacts on the planned bequests to heirs. Additional tests of Claims 2 and 3 are conducted by means of the estimation of planned bequests over the vector of explanatory variables supplemented by the amount of received inheritance. The results lend support for the Claims.

Controlling for net wealth and other relative covariates specified by the theoretical model, the econometric analysis reveals a positive impact of the experience of inheriting. The results confirm that the larger the role that adherence to family tradition plays in shaping utility, the larger the planned bequest, and that the larger the inheritance, the larger the planned bequest. Claim 3 that the positive impact of the inheritance on planned bequest is more pronounced in the presence of family tradition than in its absence is rejected. We explain this result and why it does not align with the results obtained from the tests of Claims 1 and 2. Claim 7 stating that the negative impact of the inheritance tax on the planned bequest is more pronounced in

the presence of family tradition than in its absence is rejected in one estimation and is not supported in the remaining estimations. Subsection 5.4.4 summarizes the results that are presented in Section 5.4.

5.4.1 Introductory insights regarding the impact of the experience of inheriting on bequest behavior

We estimate the impact of the experience of inheriting on the decision to bequeath. The dependent binary variable equals one if the respondent meets at least one of the following two conditions:

- strictly positive chances to bequeath 50,000 Euro or more;
- certainty to bequeath anything.

The dependent variable is explained by a set of variables including a dummy for the experience of inheriting. Logistic estimations could not be conducted over the DD research sample due to the low number of individuals observed. Therefore, Table 5.14 reports selected results obtained for the panel, the cross-section, and the PSM research samples. Numeric technique was employed in order to obtain unbiased statistics in the PSM estimation. Complete results are presented in Table A.1 in the Appendix.

Decision to bequeath	Panel (RE)			Cross-section			PSM		
	Coeff.	S.e.		Coeff.	S.e.		Coeff.	Numeric s.e.	
Log net wealth	0.383	(0.048)	***	0.442	(0.042)	***	0.602	(0.086)	***
Experience of inheriting	0.189	(0.163)		0.412	(0.154)	***	0.413	(0.272)	
Log likelihood	-1127.44			-1309.84			-423.44		
Wald test	136.47		***	200.33		***	887.16		***
Number of individuals	3,732			3,423			1,143		

Table 5.14: Average impact of the experience of inheriting on the decision to bequeath

Source: Author's own analysis based upon SHARE waves 1 and 2, release 2.3.1. PSM: 7 random draws.
*Note: * $p < 0.10$. ** $p < 0.05$. *** $p < 0.01$. Ref. group: The inactive or unemployed with at most ISCED level 1 of the least educated child. Estimations with constant term control for: inheritance tax rate, number of children, having a daughter, education level of the least educated child, working, and being retired. Numeric bootstrap: 1,000 replications.*

The impact of the experience of inheriting is estimated controlling for the logarithm of net wealth and for other covariates. The results obtained from the cross-section research sample show that heirs are highly statistically significantly more likely to leave bequests than non-heirs, controlling for net wealth. The estimates on the logarithm of net wealth and experience

of inheriting have similar magnitude of 0.442 and 0.412, respectively. Therefore, the experience of inheriting increases heirs' chances to bequeath in addition to the positive impact arising from the increase of net wealth in the wake of inheriting.

The impact of the experience of inheriting is estimated also for the panel and the PSM research samples. The Hausman test indicated random effects (RE) as the correct specification for the panel data. The RE and PSM do not confirm that the experience of inheriting affects the decision to bequeath in a statistically significant way, as shown in Table 5.14. The RE results rely on the data on the inheritance tax rate exhibiting the highest variability between countries and over time. This may lead to the lack of statistical significance of other explanatory variables.

The lack of statistical significance in the PSM estimation for heirs and non-heirs may result from the relatively small number of individuals capturing low variability of the experience of inheriting. The PSM estimation of the impact of the experience of inheriting on the treated only, that is, on actual heirs, is conducted. The results confirm that the experience of inheriting highly statistically significantly enhances the decision to bequeath. The impact estimated using kernel weighting and nearest neighbor matching equals, respectively, 0.193 (with numeric standard error equal 0.013) and 0.180 (0.030). These results rely on the propensity score estimation and on the matching technique.

The PSM results are estimated using a sample obtained with the use of the predicted propensity score. The propensity score was estimated using the following variables: gender, being an only child in the family, education, country, father's lifespan, and selected last occupations of father and mother. Detailed results of the logistic regression of being an heir are presented in Appendix Table A.2. The only variable that deserves interpretation is gender, as it turned out to be statistically insignificant. This implies that gender-wise, children are equally likely to receive an inheritance. Gender is found to be statistically insignificant in the estimation of the logarithm of the chances to bequeath 50,000 Euro or more, that is, bequest behavior does not differ between men and women, keeping other factors constant. The statistical insignificance of gender indicates that the larger fraction of men among heirs than non-heirs cannot be attributed to different patterns of bequeathing to sons and to daughters.

The predicted propensity score for non-heirs ranges from 1.04% to 49.79%, and for heirs from 2.31% to 42.56%. Since the predicted propensity scores of non-heirs fully overlap those of heirs, each heir is randomly matched with 7 non-heirs with the predicted propensity score within the 2.31–42.56% range. Due to missing data, the number of non-heirs included in the estimation is not exactly 7 times the number of heirs.

Other matching techniques were also considered. These are: nearest neighbor (matching each heir with a non-heir whose predicted propensity score was closest to the propensity score of the heir), one random draw, and kernel weighting (matching all heirs with all non-heirs using weights according to the difference between the heirs' and non-heirs' predicted propensity scores). The nearest neighbor technique is sensitive to the sequence of matching and does not take full advantage of the large number of non-heirs. A random draw of one non-heir matched with an heir also does not exploit the relatively large number of individuals in the group of non-heirs. Kernel weighting involves numeric procedures of calculation of standard errors that are more complicated than those of other techniques. For these reasons, the results obtained using matching techniques other than 7 random draws are not reported. A comparison of the results obtained using different matching techniques is shown in Appendix Table A.3. The PSM method performs at least as good as the log-linear estimations over the cross-section research sample, provided that the imputed data on net wealth are used.

In sum: the log-linear estimation shows that the experience of inheriting statistically significantly affects the decision to bequeath controlling for the logarithm of net wealth. The PSM estimation of the impact on actual heirs controlling for the logarithm of net wealth also confirms that the experience of inheriting reinforces the decision to bequeath.

We next investigate the impact of the experience of inheriting on the chances to bequeath 50,000 Euro or more for those who decided to bequeath. The impact is estimated by testing whether a coefficient on a dummy for the experience of inheriting in the estimation of the chances to bequeath 50,000 Euro or more is statistically significantly positive. The selected results obtained using the panel and the cross-section research samples are presented in Table 5.15. In the case of the panel research sample, random effects (RE) estimations were chosen over fixed effects (FE) according to the results of the Hausman test. The full results are presented in Appendix Table A.4.

The coefficient on a dummy for the experience of inheriting is positive in all the estimations. It is statistically significant in the RE estimation over the panel research sample at 5% significance level and insignificant in the other estimation. It is noteworthy that the statistically significant coefficient is obtained in an estimation controlling for the whole set of explanatory variables, including the logarithm of net wealth. The result means that the experience of inheriting increases the chances to bequeath 50,000 Euro or more by 7.4%, on top of the increase arising from the increase of net wealth.

Log chances to bequeath ≥ 50,000 Euro	Panel (RE)			Cross-section		
	Coeff.	S.e.		Coeff.	S.e.	
Log net wealth	0.089	(0.010)	***	0.055	(0.012)	***
Experience of inheriting	0.074	(0.032)	**	0.008	(0.032)	
R-squared	0.036			0.030		
Wald test	116.25		***	15.99		***
Number of individuals	3,099			2,653		

Table 5.15: Average impact of the experience of inheriting on the positive chances to bequeath 50,000 Euro or more in log-linear and RE estimations

Source: Author's own analysis based upon SHARE waves 1 and 2, release 2.3.1.
*Note: * $p < 0.10$. ** $p < 0.05$. *** $p < 0.01$. Ref. group: The inactive or unemployed with at most ISCED level 1 of the least educated child. Estimations with constant term control for: inheritance tax rate, number of children, having a daughter, education level of the least educated child, working, and being retired.*

An additional PSM estimation of the average impact of treatment on the treated confirms that the experience of inheriting statistically significantly increases the chances to bequeath 50,000 Euro or more. According to the PSM estimation using kernel weights, the average impact of the experience of inheriting on the treated, that is, on actual heirs, equals 0.143 (with the numerically calculated standard error of 0.022). The other matching technique (nearest neighbor) yields a similar result: 0.140 (0.053). The PSM estimation of the impact of the experience of the inheritance is substantially larger than the one obtained for the panel research sample. The latter estimation does not distinguish between the impact on the treated person and a random person. The more sophisticated PSM method is more appropriate for the estimation of the average impact on the treated.

The preliminary analyses imply then that heirs are not only more likely to make a decision to bequeath than non-heirs, but are also more likely to bequeath 50,000 Euro or more.

5.4.2 The impact of the experience of inheriting estimated using multiple imputations

The problem of missing data on net wealth is severe and may result in inconsistent estimates if the incidence of missing data is not random. The following estimations use five imputed values of net wealth for each individual. The multiplicity of imputations ensures consistency, not only of the first but also of the second moment of the distribution of net wealth. The imputations are generated for all individuals whose exact net wealth was not known, that is:
- individuals who provided no information on at least one of the wealth components;
- individuals who provided imprecise information on at least one of the wealth components (these individuals indicated a range within which the amount of the particular wealth component falls rather than the precise amount).

Table 5.16 reports results of log-linear regressions of the chances to bequeath 50,000 Euro or more for heirs and non-heirs controlling for the vector of explanatory variables using the imputed data. Notably, the results depend not only on the assumptions made by the methods of estimation, but also on the set of assumptions made in the imputation. Furthermore, the use of imputed data causes technical problems in the computation of the fit statistics and numeric standard errors. Nonetheless, the usage of imputed data yields reliable results, and weakens the problems of a low number of individuals observed and non-response to wealth questions. Therefore, we believe that the results obtained from the research samples extended with the imputed data on net wealth yield an outcome worth reporting.

The most important finding presented in Table 5.16 is that in all the estimations, the constant terms for heirs are substantially larger than for non-heirs. The difference is statistically significant as far as the estimations over the cross-section and the PSM research samples are concerned. Adherence to family tradition entails a positive, major, and highly statistically significant impact on planned bequests, keeping net wealth and other relevant factors constant. In other words, heirs have on average higher chances to bequeath 50,000 Euro or more than non-heirs, controlling for net wealth. This relationship is statistically significant at 1% significance level for the log-linear estimation in the cross-section research sample, and at 5% significance level for the PSM estimation. Therefore, individuals with the same net wealth and other relevant characteristic who experienced inheritance have larger planned bequests than individuals who did not experience inheritance. This finding supports Claim 1 (the stronger the hold of family tradition, the larger the planned bequest).

96

Log chances to bequeath ≥ 50,000 Euro	Panel (RE)				Cross-section				DD (FE)				PSM			
	Heirs		Non-heirs		Heirs		Non-heirs		Heirs		Non-heirs		Heirs		Non-heirs	
Log net wealth	0.034	***	0.070	***	0.027	***	0.060	***	0.035	**	0.053	***	0.029	***	0.052	***
Inheritance tax rate	0.004	**	0.008	***	-0.010	**	0.005	***	0.002		0.000		0.003		0.002	
Number of children	-0.031	**	-0.031	***	0.000		0.000	**	-0.009		-0.003		0.000	**	0.000	
Having a daughter	0.023		0.027		0.044		0.025		0.124		-0.059		0.037		0.072	
Education of the least educated child – son																
ISCED level 2	0.239	**	-0.052		0.226	*	0.135	*			0.163		0.113		0.023	
ISCED level 3	0.024		0.082	**	-0.049		0.043		-0.046		-0.059		-0.005		0.036	
ISCED level 4	-0.032		-0.003		0.132	*	0.038		-0.987	***	-0.854	***	0.162	**	0.054	
ISCED level 5	0.095		0.007		-0.088		0.008		1.206	***	0.775	**	-0.401	***	-0.065	
ISCED level 6	0.070		0.213		0.170	**	0.210	**	0.034		0.337		0.135	*	0.383	***
Education of the least educated child – daughter																
ISCED level 2	0.084		0.044		-0.141	**	0.008		-0.043		0.130		-0.176	**	-0.009	
ISCED level 3	-0.010		-0.083	**	0.026		-0.006		-0.067		0.016		0.114		-0.045	
ISCED level 4	0.121		0.056		-0.202		-0.171		1.090	**	0.092		-0.358	*	0.015	
ISCED level 5	-0.202		-0.044		0.299	*	0.178		-1.202	**	-0.033		0.575	**	0.085	
ISCED level 6	0.178		0.006		-0.045		-0.114								-0.414	**
Working	0.075	**	0.028		-0.044		-0.003		0.158		0.288	***	-0.005		0.008	
Retired	0.056		-0.040	*	-0.015		-0.056	*	0.115		0.063		0.037		-0.081	*
Constant	3.573	***	3.309	***	3.946	***	3.258	***	3.784	***	3.281	***	4.056	***	3.474	***
Wald test	3.21	***	24.87	***	6.86	***	12.13	***	1.61	*	3.95	***	2.64	***	34.93	***
Number of individuals	1,490		8,279		855		4,820		138		489		459		2,451	

Table 5.16: Results of log-linear estimations of the chances to bequeath 50,000 Euro or more using 5 imputations of net wealth

*Note: * $p < 0.10$. ** $p < 0.05$. *** $p < 0.01$. Ref. group: The inactive with at most ISCED level 1 of the least educated child. Diff.: Coeff. $p < 0.10$. <u>Coeff.</u> $p < 0.05$. **Coeff.** $p < 0.01$. Numeric bootstrap: 1,000 replications.*

An increase of net wealth by 1% increases the chances to bequeath 50,000 Euro or more from 2.7% to 3.4% for heirs, and from 5.2% to 7.0% for non-heirs, depending on the method of estimation, cf. Table 5.16. The positive impact of net wealth on the chances to bequeath 50,000 Euro or more is statistically significant. This finding supports Claim 2 (the larger the inheritance, the larger the planned bequest) as the net wealth includes inheritances. If the net wealth of heirs is replaced with inheritances, Claim 2 holds as well.

The other statistically significant difference between the planned bequest of heirs and non-heirs' shown in Table 5.16 is the impact of net wealth on the chances to bequeath 50,000 Euro or more. It is found in all the estimations except for the DD, that the coefficients on the logarithm of net wealth are statistically significantly larger for non-heirs than for heirs. Therefore, the impact of net wealth is less pronounced in the presence of the family tradition to bequeath than in its absence. In other words, planned bequests of heirs are less sensitive to changes in net wealth than planned bequests of non-heirs.

The estimates of the impact of net wealth on planned bequests can be used in testing of Claim 3 as inheritances are part of one's net wealth. However, if net wealth consists of inheritances in relatively small part, its unique impact is negligible compared to the impact of other components of net wealth. This might be a reason for which estimates on net wealth of heirs and non-heirs do not exhibit the relation postulated in Claim 3.

One may observe cases of statistically significant differences between heirs and non-heirs as far as the impact of the highest completed ISCED level of the least educated child is concerned. In all these cases, the impact of the least educated child is more pronounced for heirs than for non-heirs. Most importantly, no consistent pattern of the relation between the education of the least educated child and planned bequests emerges from the results presented in Table 5.16. This suggests that the assumption that the education and gender of the least educated child perform well as a proxy of children's income is too strong. Thus, we do not think that the results obtained in the estimation of the chances to bequeath 50,000 Euro or more are sufficient to test Claim 5 about the impact of the child's income on the planned bequest.

Other statistically significant differences between heirs and non-heirs are observed in Table 5.16, but no inter-method consistent pattern emerges. The negative coefficient on the

inheritance tax rate for heirs is statistically significantly smaller than the positive coefficient on the inheritance tax rate for non-heirs in the cross-section research sample. This finding is not aligned with Claim 7 (the negative impact of inheritance taxes on the planned bequest is less pronounced in the presence of family tradition than in its absence). In all the estimations except for the one mentioned above, the coefficients on the inheritance tax rate are very small and positive. They are statistically insignificant for the DD and the PSM research samples. The lack of statistical significance implies that the inheritance tax rate does not affect planned bequests. These results do not support Claim 7.

The positive and statistically significant impact of the inheritance tax rate in the panel research sample may be caused by the substantial increase of taxation in Belgium that took place during the analyzed period, as displayed in Table 5.17.

| | Effective inheritance tax rate | | | |
	2004	2005	2006	2007
Austria	4.51	4.51	4.51	4.51
Belgium	8.00	8.00	21.90	21.90
Czech Republic	0.00	0.00	0.00	0.00
Denmark	3.46	3.46	3.46	3.46
France	6.53	8.03	8.03	7.57
Germany	4.47	4.47	4.47	4.47
Greece	17.00	17.00	16.42	15.70
Ireland	0.00	0.00	0.00	0.00
Israel	0.00	0.00	0.00	0.00
Italy	0.00	0.00	0.00	0.00
Netherlands	21.27	15.62	15.53	15.41
Poland	6.99	6.99	6.99	0.00
Spain	14.53	14.53	14.53	14.53
Sweden	0.00	0.00	0.00	0.00
Switzerland	0.00	0.00	0.00	0.00

Table 5.17: Effective inheritance tax rates in the SHARE countries in years 2004-2007

Sources: AGN International, Amihoud Borochov Law Office, Dziennik Ustaw, Global Property Guide.
Note: The effective tax rates are calculated for bequests consisted of a house (worth 600,000 Euro), cash (1,000,000 Euro), company quoted (300,000 Euro) and unquoted (700,000 Euro) shares left intestate to a wife and two children on January 1st. Additionally, it is assumed for Poland that the apartment price is 2,000 Euro/sq. m and the heirs do not own any other houses or apartments. No tax is levied on the value of the house or apartment up to 110 sq. m in Poland pursuant to Subsections 16.1−8 of the Act of July 28, 1983.

All the findings obtained for the panel data should be interpreted carefully, as they rely on a variable containing information on the inheritance tax rate. The highest variability in the

inheritance tax rate over time is observed in Belgium. It is worth mentioning that the positive coefficients on the inheritance tax rate obtained for heirs and non-heirs in the panel research sample become insignificant after the exclusion of Belgium. Furthermore, the positive sign of the coefficient on the inheritance tax rate can be attributed to the increased inheritance tax rates of which individuals might have been unaware in the short term and to which they did not adjust their behavior instantaneously.

Information on the effective rate of inheritance tax was obtained for most countries in the Inheritance Tax Survey conducted by the association of independent accounting and consulting firms, the AGN International. When this source was wanting, the effective tax rates were calculated according to the assumptions made by the AGN International using other data sources. Due to translation difficulties, legal bills were not used as a source of information on the inheritance tax for any country other than Poland. The rates presented in Table 5.17 are computed for a particular situation where bequests (comprising of a house, cash, and company shares) are left intestate to a wife and two children. The actual tax rate may depend on the relatedness of the donor to the heirs, on the type of the bequeathed wealth, and on the value of the bequests. Furthermore, there might be a regional differentiation of inheritance tax rates within a country.

The results obtained from the cross-section data are more credible than those obtained from the panel data, especially in the case of the relatively larger groups of non-heirs. Additionally, the Wald test revealed that the set of explanatory variables affects planned bequests in the DD estimation at a statistical significance level of 10%, as shown in Table 5.16, but not lower. The DD method is the least reliable, bearing in mind the insufficient number of individuals in the DD research sample.

In sum: estimations with the imputed data confirm that planned bequests are statistically significantly larger for heirs than for non-heirs controlling for net wealth, in support of Claim 1. Claim 2 of a positive relationship between planned bequests and inheritances is also supported. Furthermore, the impact of net wealth on the planned bequests is statistically significantly more pronounced for heirs than for non-heirs.

5.4.3 Extensions of the main econometric estimations

The analyses carried out in this Subsection address three claims derived from the theoretical model. The vector of explanatory variables defined by the theoretical model and operationalized as in the main econometric inquiry is extended with an additional variable. This additional explanatory variable is the percentage of traditionalists in selected countries added when testing Claim 1 on the impact of the strength of adherence to the family tradition to bequeath on planned bequests. In the case of testing Claims 2 and 3 on the impact of inheritances on planned bequests, the additional explanatory variable is the amount of inheritances received by heirs. The claims are tested for heirs only.

The data on the traditionalism come from the World Values Survey (WVS) conducted in years 2005–2007.[16] The information on the percentage of respondents from each country who declared that tradition is very important to them (Strong Traditionalists) or important (Weak Traditionalists) is reported in Table 5.18. The traditionalism investigated by WVS is not observed however for all the countries covered by SHARE.

	Percentage of Traditionalists			Number of individuals
	Strong	Weak	All	
France	34.70	50.56	85.35	1,001
Germany	16.56	27.18	43.74	4,090
Poland	24.09	29.03	53.12	1,050
Spain	11.51	18.39	29.90	5,130
Sweden	12.15	19.82	31.97	3,027
Switzerland	11.95	18.58	30.53	3,858

Table 5.18: Percentage of Traditionalists in the SHARE countries in years 2005–2007

Source: Author's own calculations based upon WVS wave 5.

Table 5.19 reports selected results of the log-linear estimations controlling for the percentage of Strong Traditionalists (traditionalism). The additional explanatory variable captures the average strength of adherence to traditions including the family tradition to bequeath in a given country. The statistically significant and positive coefficients on the variable controlling for the strength of traditionalism in the analyzed countries support Claim 1 (the stronger the

---

[16] The WVS is a worldwide network collecting data on social and political issues since 1981 through representative national surveys in 67 countries. The WVS covers a full range of societies differentiated with respect to wealth, political systems, and culture.

hold of family tradition, the larger the planned bequest). The more traditionalistic the culture an heir lives in, the larger the planned bequests.

Log chances to bequeath ≥ 50,000 Euro	Panel (RE)			Cross-section		
	Coeff.	S.e.		Coeff.	S.e.	
Log net wealth	0.069	(0.030)	**	0.146	(0.049)	***
Traditionalism	0.152	(0.090)	*	0.291	(0.128)	**
R-squared	0.224			0.133		
Wald test	45.82		***	2.38		***
Number of individuals	175			162		

Table 5.19: Impact of the traditionalism on the positive chances to bequeath 50,000 Euro or more in log-linear and RE estimations using 5 imputations of net wealth

Source: Author's own analysis based upon SHARE waves 1 and 2, release 2.3.1 and WVS wave 5.
Note: $* p < 0.10$. $** p < 0.05$. $*** p < 0.01$. Ref group: Inactive or unemployed with at most ISCED level 1 of least educated child. Estimations with constant term control for: inheritance tax rate, number of children, having a daughter, education levels of least educated child, working, and being retired.

Table 5.20 reports selected results from an estimation controlling for both net wealth and inheritances. The strong correlation between net wealth and inheritances (77%) causes large standard errors of the estimates of the impact of net wealth and inheritances, if both variables are controlled for. Nonetheless, the positive impact of inheritances on planned bequests is statistically significant at the 5% significance level, controlling for the net wealth in the log-linear estimation over the cross-section research sample, as shown in Table 5.20. This finding supports Claim 2 (the larger the inheritance, other things held constant, the larger the planned bequest) and Claim 3 (the positive impact of the inheritance on the planned bequest is more pronounced in the presence of family tradition than in its absence).

Log chances to bequeath ≥ 50,000 Euro	Panel (RE)			Cross-section		
	Coeff.	S.e.		Coeff.	S.e.	
Log net wealth	0.028	(0.010)	***	0.032	(0.009)	***
Log inheritance	0.010	(0.009)		0.042	(0.016)	**
Wald test	2.31		***	3.19		
Number of individuals	1,490			855		

Table 5.20: Impact of inheritances on the positive chances to bequeath 50,000 Euro or more in log-linear and RE estimations using 5 imputations of net wealth

Source: Author's own analysis based upon SHARE waves 1 and 2, release 2.3.1.
Note: $* p < 0.10$. $** p < 0.05$. $*** p < 0.01$. Ref. group: The inactive or unemployed with at most ISCED level 1 of the least educated child. Estimations with constant term control for: inheritance tax rate, number of children, having a daughter, education levels of the least educated child, working, and being retired.

The statistically insignificant coefficient on the inheritances in the RE estimation arises, most likely, from the large standard error that yields imprecise t-statistics. The other results of the estimations using an extended vector of the explanatory variables conducted over all research samples do not yield additional insights. These results are available on request.

To sum up: the additional estimations employed for testing Claims 1, 2, and 3 are in line with the results obtained in the main inquiry. Heirs from more traditionalistic countries have statistically significantly larger planned bequests than heirs from less traditionalistic countries. Also heirs who received larger inheritance report larger planned bequests than heirs who received smaller inheritance, controlling for the net wealth. Inheritances positively impact on the planned bequests of heirs on the top of the positive impact of net wealth. This relation is statistically significant over the cross-section research sample using imputed data on net wealth.

5.4.4 Summary

The econometric results presented in Section 5.4 test three of the seven claims derived from the theoretical model. Moreover, the results allow establishing whether there is a statistically significant impact of the experience of inheriting on planned bequests and on the decision to bequeath. Some estimation methods do not perform well due to insufficient data, especially when imputed net wealth is not used.

The introductory analyses point to positive and statistically significant impact of the experience of inheriting on the decision to bequeath, and on planned bequests for a random person and for actual heirs. Planned bequests are statistically significantly larger for heirs than for non-heirs, controlling for net wealth, which supports Claim 1. Claim 2 of a positive relationship between planned bequests and inheritances is also supported by the data.

Even though not all the claims derived from the theoretical model could be tested using the SHARE data, the empirical results indicate that there is a positive impact of the experience of inheriting on planned bequests, controlling for net wealth. It is not the case that the wealthier necessarily bequeath more because there is more around to be bequeathed. Further research

examining the differences between planned bequests of individuals with and without a family tradition to bequeath is warranted, albeit using more refined data.

5.5 Discussion of the econometric results and final remarks

The descriptive statistics shows that individuals without a family tradition to bequeath are less likely to bequeath than holders of a family tradition to bequeath. The results of the introductory econometric inquiry show that the experience of inheriting statistically significantly enhances the intension or plan to bequeath. A PSM estimation of the impact of the experience of inheriting on planned bequests by actual heirs reveals that heirs are statistically significantly more likely to leave bequests than non-heirs. These results are obtained in estimations that control for net wealth. Therefore, the positive and statistically significant coefficient on a dummy for being an heir can be interpreted as the pure effect of the experience of inheriting, distinct from an increase of net wealth due to inheritance.

One may interpret the impact of the family tradition to bequeath on bequest behavior either dynamically or statically. The impact can be viewed dynamically as a change of planned bequests due to the experience of inheriting. The static approach focuses on a difference between the bequest behavior of two identical individuals of whom one acquired and the other did not acquire the family tradition to bequeath. Both the dynamic and the static approaches are investigated empirically in this dissertation.

Subsection 5.5.1 discusses results of the tests of the claims that were derived from the theoretical model. The claims concern internal solutions, that is positive planned bequests. Subsection 5.5.2 discusses the impact on planned bequests of the two motives for bequeathing, namely altruism and the family tradition to bequeath. Subsection 5.5.3 lists policy implications and discusses limitations of the econometric inquiry.

5.5.1 Discussion of the econometric results

The econometric results confirm that the larger the inheritance, the larger the optimal bequest. The increase of net wealth, regardless of the source of the increase, positively affects planned bequests. One source of the increase of net wealth is the receipt of an inheritance.

An inheritance is postulated to affect bequest behavior in a unique manner compared to other sources of net wealth, as the experience of inheriting shapes individual preferences by setting a family tradition to bequeath. The static interpretation of the presence of a family tradition concerns the difference between heirs and non-heirs, that is, individuals with and without a family tradition to bequeath. The heirs' response to a given increase of net wealth coming from an inheritance is expected to be stronger than the non-heirs' response to the same increase of net wealth. The static interpretation can be examined by testing whether the coefficients on net wealth are statistically significantly larger for heirs than for non-heirs.

The dynamic interpretation concerns only heirs that is the holders of family tradition. The positive impact of inheritance on the planned bequests of heirs is expected to be larger than the positive impact of other sources of net wealth as the impact of inheritance consists of the family tradition effect in addition to the wealth effect. An additional estimation conducted for heirs only controls for both net wealth and the size of the inheritance. The results reveal a positive impact of the inheritances on the planned bequests of heirs on top of the positive impact of net wealth. These impacts are statistically significant in the cross-section research sample despite the large standard errors of the estimates due to collinearity between net wealth and inheritances.

The econometric results confirm the dynamic interpretation in the cross-section research sample, but they do not align with the static interpretation in three of the four estimations. Further investigation is needed, especially into the static interpretation.

The econometric results imply that adherence to family tradition positively affects planned bequests. Since the adherence to the family tradition to bequeath is unobservable, one cannot conduct a direct test of its impact on planned bequests. Two alternative operationalizations of the adherence to family tradition are used. If all observable relevant variables are controlled for, the constant term captures altruism and adherence to the family tradition to bequeath. Assuming that parents are equally altruistic towards their children, the adherence to the family tradition to bequeath is responsible for a difference between constant terms obtained for heirs and non-heirs. The other operationalization uses the percentage of Strong Traditionalists in a country as a measure of the mean strength of adherence to traditions, including the family tradition to bequeath. Although the estimations discussed above fail to control for the individual strength of adherence to the family tradition to bequeath, they are suitable for

testing the relation between the strength of adherence to the family tradition and bequest behavior.

The econometric results obtained in seven of the eight estimations imply a positive impact of the inheritance tax rate on planned bequests: an increase of the inheritance tax rate results in an increase of planned bequests. The coefficient on the inheritance tax rate is negative only for heirs in the cross-section research sample. This is also the only estimation with statistically significant difference between the heirs' and non-heirs' coefficients on the inheritance tax rate. The effective inheritance tax rates employed in the estimations might be an imperfect measure of the actual inheritance tax rates one anticipates if the assumptions on the family structure and composition of wealth do not match the actual situation of individuals in the research samples. Moreover, the impact of the observed increase of the inheritance tax rate can be delayed and observed only in future waves of the survey. Notably, the alleged difference between the negative impact of the inheritance tax rate on heirs and on non-heirs is not supported, mainly due to the rejection of a negative relation between the inheritance tax rates and planned bequests. The adherence to family tradition reduces the negative impact of the inheritance tax on planned bequests. Therefore, the positive coefficients on the inheritance tax rate might be credited to the family tradition component of heirs' utility function. Further tests are needed once data from upcoming waves and possibly more countries characterized by different inheritance tax rates become available.

In sum, the econometric results confirm that there is a powerful link between the experience of inheriting and bequest behavior, controlling for net wealth. The hypothesis "the experience of inheriting affects bequest behavior in a predictable manner" is partially supported, notwithstanding that not all the claims derived from the theoretical model being confirmed by econometric results.

5.5.2 Altruism and family tradition to bequeath

Suppose we find out that individuals who inherit more tend to bequeath more. Such behavior does not seem to be naturally related to altruism, even though we cannot rule out the possibility that children who witness their parents' inheriting react to the boost in their parents' wealth by treating their parents better which, in turn, could strengthen the parents' altruism and thereby their inclination to bequeath to their children. We return to the

distinction between the roles of family tradition and altruism in predicting bequest behavior momentarily. And if individuals with the same level of wealth report bequest plans that correlate with their inheritance experience, a variation in bequest plans cannot be attributed to a variation in the level of wealth either. If mere wealth were the determinant of planned bequests, then an increase in wealth arising from a surge in the value of assets or savings that occur because of, say, a stock market boom or because of inheritance, should have the same impact on planned bequests. But if it is the *source* of the wealth that matters, then we will not observe the same impact. Upon receipt of an inheritance, individuals may interpret their role towards their children differently than upon amassing the same amount by means of their own toil; they could consider it only fair not to leave less than they received themselves, or they could interpret their role as custodians, i.e. recipients, holders, and "transferors," of the dynastic wealth, humbly asserting that they live only for a fraction of time of the "lifetime" of the dynasty, and have a moral duty to act as intertemporal purveyors or conveyers of the dynastic assets.

We would like to emphasize that highlighting the role of family traditions in bequest behavior should not be interpreted as negating the role that altruism plays in prompting bequests. Yet, even if altruism takes the center stage, the prediction of altruism for bequest behavior is modified, in a clearly discernible way, when family traditions are taken into account.

Consider the following simple way of incorporating the impact of the family tradition effect into a model of altruistic bequests, and of highlighting the difference between the prediction to which an unconstrained altruistic model gives rise and the prediction that emanates from an altruistic *cum* family traditions model. Let the utility function of an individual take the form of $U(c,b) = (1-\alpha)\ln c + \alpha \ln b$, where $U(\cdot)$ is twice differentiable and concave, $0 < \alpha < 1$ is the altruism weight, c is the individual's lifetime consumption, b is the bequest that the individual leaves, and $w = c + b$ is the individual's wealth, where all variables are expressed in present value terms. Since $\frac{\partial U}{\partial b} = -\frac{1-\alpha}{c} + \frac{a}{b}$ (and $\frac{\partial^2 U}{\partial b^2} = -\frac{1-\alpha}{c^2} - \frac{\alpha}{b^2} < 0$), it follows that b^*, the optimal level of b, is $b^* = \alpha w$. If the initial level of w is w_0, bequests are set at b_0^*, and if the level of wealth declines to w_1, bequests are set at b_1^*.
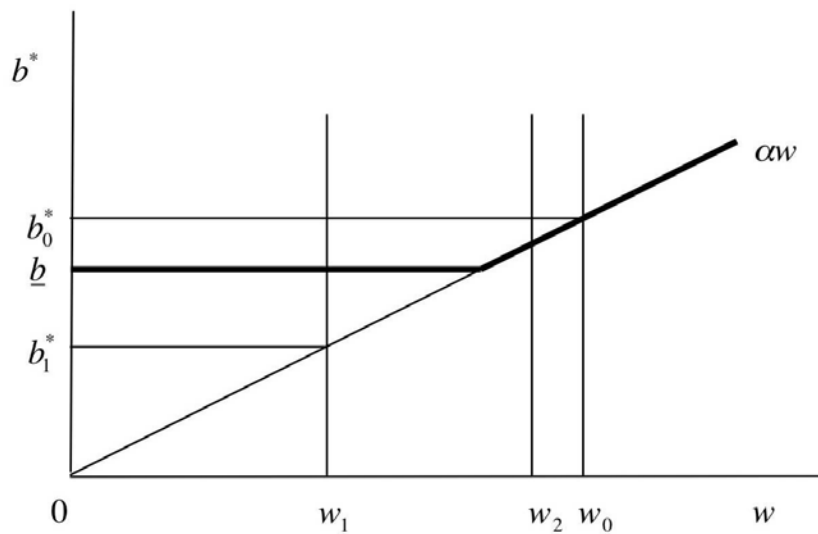
Figure 5.4: Altruism, replication, and bequests

The family tradition effect places a floor on bequests, say at $\underline{b}$. With the effect present, a wealth decline from w_0 to w_1 entails a decline in bequests by less than $\alpha\Delta w$, that is, only to $\underline{b}$. Of course, attenuation of the decline in the level of bequests will not arise for all reductions in wealth; it will not follow if wealth were to decline from w_0 to w_2, for example.

To further contrast the distinct roles of altruism and family traditions, suppose that the children's income is vulnerable to shocks, and that the impact of the shocks is long-lasting. If parents' bequests are motivated by altruism, a negative income shock for the children will likely result in a larger bequest, and a positive shock will likely result in a smaller bequest. Suppose, however, that bequests are governed by the family tradition effect. If the resources needed to "replicate" have not as yet been amassed, a positive income shock to the children's income will not diminish the effort to marshal the needed resources. Bequests will be less sensitive to a surge in the children's wealth when bequests are motivated by family traditions than when bequests are motivated by altruism.

One reason for the giving of bequests being conditioned by the receipt of inheritance could be dynastic altruism. If altruism is a trait that individuals receive and pass on (somewhat akin to a gene), then the altruism that guided t in bequeathing to t+1 will likewise guide t+1 in bequeathing to t+2. While the possibility of altruism being an intergenerational inclination

cannot be ignored (Stark, 1999), it is hard to see why altruism should consistently manifest itself in the specific form of bequests: we would expect altruism to give rise to t giving to t+1, not to a particular type of giving by t. Moreover, if a high degree of dynastic altruism results in a dynasty creating and accumulating more wealth than a low degree of dynastic altruism (Falk and Stark, 2001) then altruism, wealth, and bequests will covary. Yet, our data suggest that the correlation between the inheritance experience and the intention to bequeath is neither confined to nor more pronounced at high levels of wealth.

5.5.3 Policy implications and other remarks

An interesting result obtained in the econometric inquiry is a statistically significant relation between retirement and bequest behavior. The negative impact of retirement on planned bequests is statistically significant in three of the four estimations conducted for non-heirs, whereas it is statistically insignificant for heirs. Heirs are slightly more likely to be retired than non-heirs and retired heirs are more likely to bequeath than retired non-heirs. One may presume that heirs continue to work long enough to amass resources sufficient to provide bequests not falling below the threshold of the family tradition set by the received inheritance. The larger the inheritance received, the longer the time needed for amassing such resources, keeping other factors constant. Once the threshold is reached, there is an incentive to retire. This mechanism does not concern non-heirs, whose labor activity is not related to planned bequests through the threshold of bequests set by the family tradition to bequeath.

The effect of the receipt of an inheritance on the retirement decision was investigated by Brown, Coile, and Weisbenner (2010), who found that the receipt and size of an inheritance significantly affect retirement behavior. The results obtained in this dissertation are in line with their findings. However, the family tradition approach to bequest behavior implies that the positive impact of the experience of inheriting on the decision to retire is conditional on amassing resources sufficient for fulfilling the family tradition. This should be taken into account when instruments enhancing the economic activity of the elderly are constructed. Heirs who amassed resources sufficient to provide bequests consistent with the family tradition are expected to be less prone to incentives enhancing labor activity than non-heirs and heirs without resources needed for bequeathing in line with the family tradition.

The results concerning the impact of the inheritance tax rate suggest that individuals do not adapt their planned bequests instantaneously to changes in inheritance tax rates. Further research is needed to asses how much time is needed for the adjustment of planned bequests to changes in inheritance tax rates. The impact of the inheritance tax rate on planned bequests is minor compared with the impact of the experience of inheriting. Even if the reaction to changes in inheritance tax rates is more pronounced for heirs than for non-heirs, planned bequests of heirs remain larger than those of non-heirs due to the presence of the family tradition to bequeath, keeping other factors constant. This is relevant to formulating inheritance tax policies. Keeping other factors constant, changes of the inheritance tax rate would impact more strongly on the planned bequests of non-heirs than on the planned bequests of heirs.

For now, the SHARE dataset is the most appropriate source of information among the available datasets as far as the investigation of bequest behavior in Europe is concerned. Nonetheless, it is not void of weaknesses. Most importantly, the way in which individuals were asked about the bequests that they plan to leave makes it impossible to derive the unconditional distribution of planned bequests. The conditional distribution of planned bequests could be estimated based upon the collected information only if additional assumptions are made. We decided that the dependent variable, namely planned bequests, should contain only information directly observed during the interview. Furthermore, respondents were not asked directly about their net wealth. The available information on the components of net wealth often falls short of the information needed for the computation of net wealth. Moreover, no information on the income of children is available. Also, there is poor information on deceased parents of individuals. Finally, the panel data contain information collected in two waves only. Some of these problems were partially solved by using multiple imputations on net wealth and unreleased data on the last occupation of deceased parents. The problem of unobserved income of children was addressed by using a proxy (gender and education of the least educated child). The proxy failed to solve the problem. The research samples selected from the raw dataset performed best if the imputed data on net wealth were used. The simplest methods of estimation (a log-linear estimation using the cross-section research sample) performed best.