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THE ECONOMIC CONSEQUENCES OF MUTUAL HELP IN EXTENDED FAMILIES[†]

Abstract

In the absence of well-developed markets for credit and insurance, extended families play a major role as a traditional systems of mutual help. However these arrangements have important consequences on economic choices. In this paper, we use first hand data from Western Cameroon to explore this question. We find that the large majority of transfers follow a given pattern whereby elder siblings support their younger siblings in the early stages of their lives who in turn reciprocate by supporting their elder siblings when they have children. We interpret this pattern as a generalized system of reciprocal credit within the extended family. We propose a simple overlapping generation model to investigate its welfare properties. We then explore the implications of this pattern on labour market outcomes and find evidence of large disincentive effects. This pattern of transfers also implies that younger siblings are more educated but have fewer and less educated children.

JEL Classification: D13, O1 and O17
Keywords: Cameroon, extended families, informal credit and redistribution

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1 Introduction

In the absence of well-developed markets for credit and insurance, interpersonal transfers for risk-sharing and redistributive purposes are of primary importance (Cox and Fafchamps, 2007, Barr et. al., 2008). In sub-saharan Africa traditional systems of mutual help operate mostly within the extended family network. The long-lasting and multiplex nature of family relationships provide a natural setting to enforce such informal agreements (Coate and Ravaillon, 1993) or promote collective action (Carter and Castillo, 2002). In addition, these solidarity arrangements are reinforced by the presence of altruism within the family (Alesina and Guiliano, 2010).

These arrangements have important consequences on economic choices. As stressed by Kennedy (1988) and Platteau (1991), the taxation implicit in the redistributive system implies large disincentive effects, in particular on effort and investment (see also Lewis, 1955). More recently, Hadnes et al. (2013) run an interesting experiment among the tailors' community in Burkina Faso. By varying the channel through which these tailors are informed about a new work opportunity, they show that expected family obligations reduce entrepreneurial activity and productivity (see also Grimm et al., 2013). Family taxation may also affect educational outcomes, expenditure patterns (DiFalco and Bulte, 2011, 2013) or the structure of family firms (Alby and Auriol, 2010). A major challenge of these more descriptive studies is to identify exogenous measures of taxation, since the use of realized transfers may lead to severe simultaneity biases. Moreover these arrangements are also prone to moral hazard problems, as theoretically argued by Alger and Weibull (2010). Recent empirical studies show that individuals develop sophisticated and costly strategies in order to hide income and avoid their obligations (Baland et al., 2011, Dupas and Robinson 2011, Jakiela and Ozier, 2012).[1]

In this paper we use first hand data from Western Cameroon to investigate the structure of family obligations and transfers. We collected systematic information on all transfers given and received by a respondent with respect to his extended family and find that the large majority of transfers are directed towards his direct siblings (and their children). Transfers are distributed

[1] As reported by one of our respondents, "Here we hide money a lot. I hide money from my brothers and my husband. When they know I have money, they come with new demands".

asymmetrically across the extended family: elder siblings give help to their younger siblings who reciprocate at a later stage by supporting them when they have children. We interpret this pattern as a generalized system of reciprocal credit within extended families and develop a simple overlapping generation model to identify the conditions under which such arrangements increase the welfare of all participants and affect labor choices.

We then explore empirically the implications of this pattern for employment choices as well as fertility and education outcomes. We argue that family obligations have strong and systematic effects on labour decisions as recipients of family support reduce their labor participation and their working time. Our estimates indicate that the presence of an older sibling reduces his younger siblings propensity to work by 13% and to engage in an independent occupation by 10%. The children of these older siblings partially outweigh these effects, which is consistent with the temporal structure of the transfers. Additionnally, as this structure favor younger siblings and the children of elder siblings, we show that these individuals are systematically more educated. Since younger siblings have to reciprocate at the time they have children themselves, they also tend to have less children.

Our interpretation of intra-family transfers is consistent with the anthropological evidence which highlights the importance of "the sibling chain of educational assistance" (Simon, 1994, 26). Elder children provide "improved oppurtunities for the late born. Once they begin to work, early born children continue to send or bring resources back to the family... When obligations are strong, credit constraints help produce large inter-temporal transfers among siblings." (Parish and Willis, 1993, 868-869). In Kinshasa, Shapiro and Tambashe (2001) find clear evidence of substantial transfers among siblings and nephews for educational purposes, which closely parallels our story. Caldwell (1965), in his study of extended family obligations in Ghana, finds that students who receive assistance from their extended family expect to support several of their younger siblings, nephews and nieces in the future. Child fostering in Africa has also been interpreted along similar lines. For example, Isiugo-Abanihe (1985) argues that fostering is largely a consequence of the need to reallocate resources within the extended family to maximize its welfare. When they become adults, fostered children are expected to provide formal education to young members of the kin as

a compensation for their own education.

Taken together our analysis sheds a new light on the roles of intra-family transfers as the economic literature mainly focuses on their redistributive and risk sharing properties (e. g., Cox and Fafchamps, 2007, see however La Ferrara, 2003). We show that these transfers may also be part of an implicit credit contract, whereby richer and older members help their younger siblings in financial needs under the understanding that they will reciprocate later. These return transfers take place when older siblings face more charges, particularly with respect to the education of their children. In the specific context of our study, this system of reciprocal credit allows income smoothing over the life-cycle.

2 Survey and data

We collected first hand data in the city of Bafoussam, the capital of the West region of Cameroon. The population is essentially from the Bamileke ethnic group. This group is well known for its economic dynamism and dominates the economic life of the country controlling more than half of the registered firms (while accounting for a third of the total population) (INS, 2008, Warnier, 1993, Yana, 1997). Bamileke distinguish themselves as entrepreneurs who encourage individual success and accumulation. They are also significantly more educated than the rest of the population. The nuclear family constitutes their basic social unit, although strong social and economic ties link members of the same extended family (Yana, 1997).

The survey took place in the spring of 2010 under the field supervision of the authors and in collaboration with the National Institute of Statistics which has long experience in administering large scale household surveys. Using the Bafoussam census, we selected a random sample of 315 households and administered 548 individual questionnaires separately to each spouse (in the absence of the other spouse).[2] Given the focus of our enquiry, we designed our survey to best capture transfers within the extended family. The questionnaire started with a complete description of the

[2]In the analysis, we exclude 20 individuals who do not have direct siblings.

extended family of the respondent over three generations. Specifically we listed the parents of the respondent, the co-spouses of the father and the number of uncles and aunts. We then listed the siblings of the respondents (and their spouses) and all his/her nephews and nieces individually. We also recorded the total number of half-brothers and sisters for each co-spouse of the father. For each of these extended family members, we first registered basic demographic, occupational and educational characteristics and then recorded all the transfers made or received over the past two months and all the educational transfers (in numbers of years of school fee paid) made over the life time of the respondent. In addition, we asked respondents whether they had other relatives or friends in charge. For each of them we similarly recorded all present and past transfers as well as personal characteristics. Finally we asked about any other transfer made or received over the past two months and the characteristics of the person concerned. As a result, while our questionnaire included a systematic listing of all flows between parents, siblings and nephews by enumerating them separately, transfers to more distant relatives and friends were elicited in a more traditional manner. Our survey does not therefore guarantee exhaustive information about these last types of transfers. The survey then included detailed modules on labour market participation, consumption expenditures, education decision and savings strategies.

As shown in Table 1, individuals in our sample have on average 4.1 full siblings (2.6 younger siblings and 1.6 older siblings) and 7.7 nephews (3.2 from younger siblings and 4.5 from older ones). Respondents are well educated, with an average of 9.0 years of education. Most of them are of working age (90% are above 25) and 76% have an income generating activity. Thirty-one percent of them have a regular wage income and 63% an independent activity. They work an average of 34.4 hours per week, earning an average of 32 260 CFA (46 euros) per week, more than half of which originate from independent occupations. Noteworthy is the fact that most extended families live exclusively in an urban setting: only 25% of the respondents have a sibling who lives in a village. This ensures that we compare siblings living under comparable conditions and that our results are not driven by rural-urban migration and remittances.[3]

As commonly observed in the African context, budgets are separate between spouses (Goldstein,

[3]We systematically test the robustness of our analysis by providing estimates on the subsample of urban only extended families.

1999, Duflo and Udry, 2004). Allocation decisions are largely an individual matter and spouses ignore each others income and expenditure. For example, 48% of the respondents are not aware that their spouse have an independent activity when they do. In cross-reporting their spouse income, 35% of respondents do not know its amount while 38% over or underestimate it by more than 30%. Joint ownership of assets is rare, for example only 4% of bank accounts and 7% of houses are jointly owned.

3 The pattern of transfers within the extended family

The vast majority of our respondents make transfers (see Table 2). Over the past two months, 60% of them sent a least one transfer outside their households and 30% received at least one (only 14% of them did not send or receive a transfer over that period). The amounts involved are relatively large as the total transfers sent out represent 20% of their income. Our respondents are largely net donors as the net amounts transferred account for 10% of their income.

Several factors can explain that net transfers are positive in our sample. Despite the care taken in collecting the information, it is possible that respondent under-report the amounts received as recall biases are classically more important for amounts received than for amounts given. More importantly, we focus on established and independent household heads and their spouses, and thereby exclude dependent elderly or poorer adults forced to co-reside with other members of the family.[4] [5]

In this paper, we essentially focus on intra-family transfers made between direct siblings (and their children).[6] Three reasons justify this particular focus. First and foremost they represent the large majority of transfers. For instance, in net amounts, they account for 75% of all transfers made by the respondent. In contrast, transfers to the older generation are relatively small and those to

[4] It is worth noting that these dependent individuals are included in the analyses on the complete sample of siblings, so that a selection bias in our estimates is unlikely.

[5] Net transfers remain positive when we focus exclusively on urban extended families. The positive net outflow we observe cannot therefore be entirely explained by urban-rural remittances.

[6] We therefore exclude respondents who do not report siblings alive.

half siblings are essentially negligible.[7] The spouse family plays a minor role as it represents only 6% of the amounts transferred out by our respondents.[8] Second while almost all respondents (95%) have full siblings alive, only 32% still have both parents alive and 47% have half siblings. Finally, while our questionnaire included a systematic listing of all flows between siblings by enumerating each sibling separately, transfers to more distant relatives were elicited in a more traditional but less reliable manner.[9] Nevertheless, we will test the robustness of our analysis by extending our definition of transfers to include all the transfers reported by the respondent.

To investigate intra-family transfers, birth-order provides an exogenous source of variation. Figure 1 below presents the net transfers (in log) as a function of relative birth rank.[10] Transfers are weakly decreasing in birth rank, even though the difference between an eldest and a youngest sibling is hardly significant.

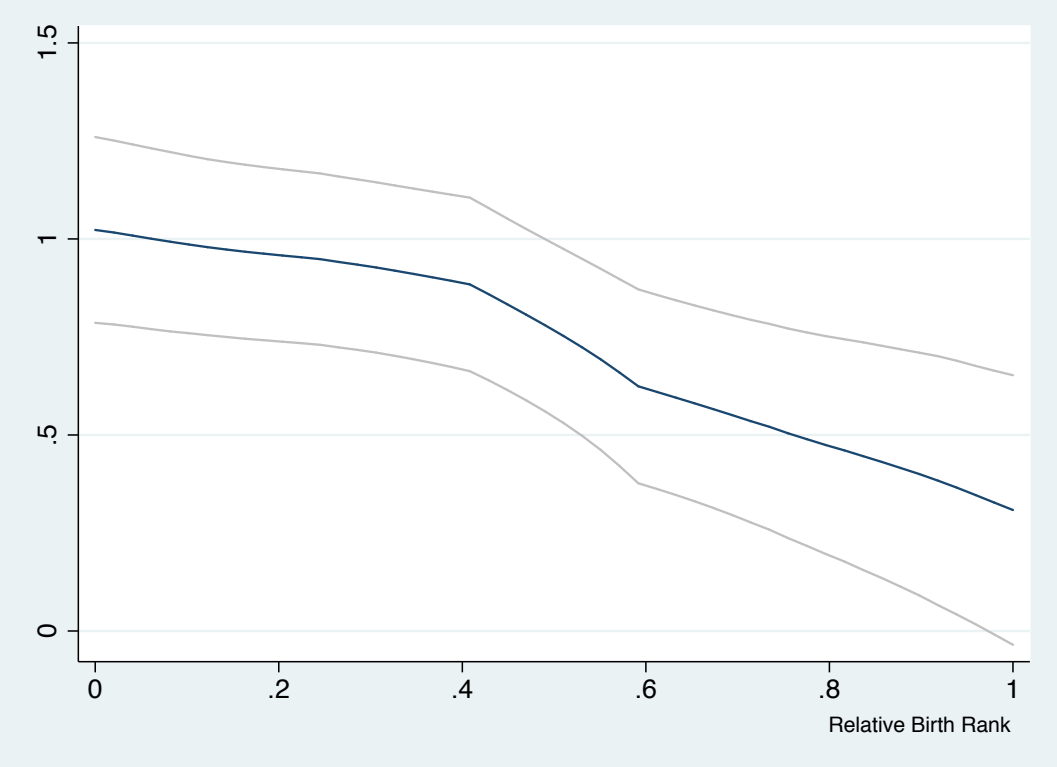
[7] Transfers from parents or uncles are infrequent in our sample of current transfers as they typically took place before the respondent set up an independent household.

[8] This is consistent with the logic of separate budgets.

[9] Specifically, for the latter, the respondent was invited to list the transfers made over the last two months, along with the identity of the relevant person.

[10] Our measure of relative birth rank is equal to $\frac{R-1}{n-1}$ where R is the absolute birth rank and $n > 1$ is the number of siblings. This measure takes value 0 for the eldest and 1 for the youngest sibling.

Figure 1: Net transfers as a function of relative birth rank with the 90% confidence interval (kernel regression)

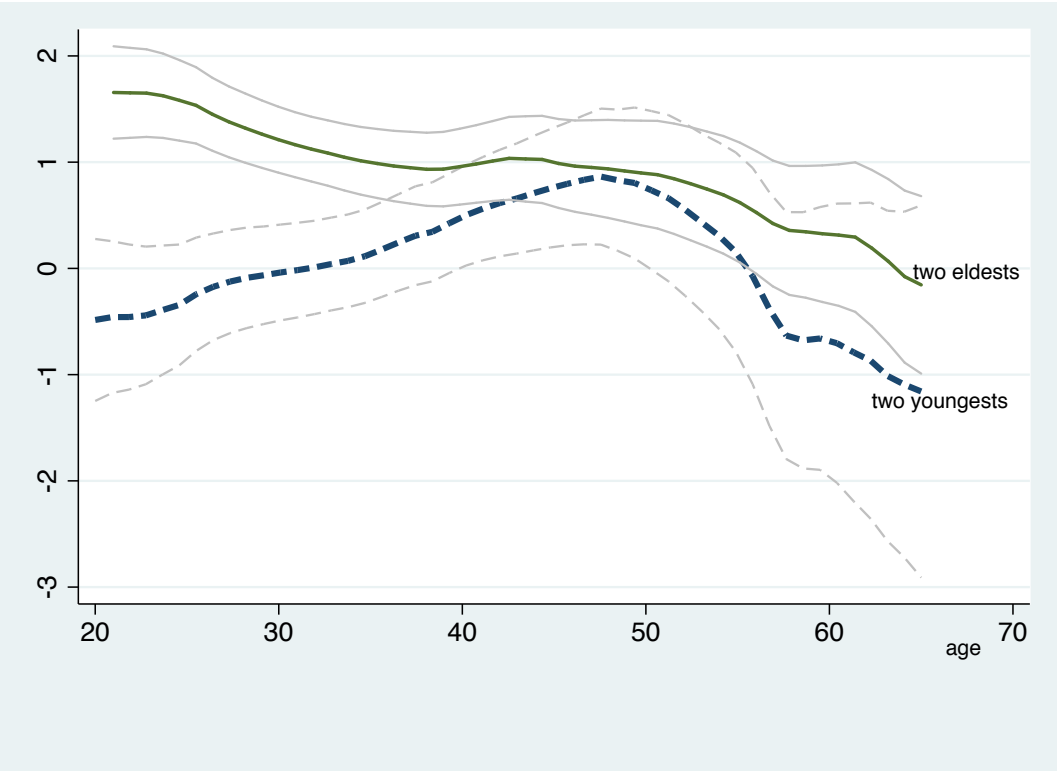


A clearer pattern however emerges when we break down transfers by type of siblings and nephews. In Table 3, we report the average amount transferred by the respondent to different categories of relatives. The vast majority of transfers are made to younger siblings and the children of elder siblings. On average respondents transfer three times more to younger siblings than to older siblings (16.9 versus 4.9) and four times more to the children of older siblings than to the children of younger ones (8.5 versus 1.9). The net transfers follow a similar pattern. Overall transfers to younger siblings and the children of older siblings represent 95% of the net amounts transferred within siblings. This suggests that the pattern of transfers evolves over the life cycle of the family. More specifically, when young, older siblings transfer to younger siblings. Later, the flow of transfers is reversed and younger siblings transfer to their older siblings and their children. To illustrate this point, Figure 2 isolates the two eldest and the two youngest siblings and plots the net transfers

they respectively made to their siblings (and their children) as a function of age (using a kernel smoothing function). Depending on birth order, transfers follow strikingly different patterns during one's life. Between 20 and 50, eldest siblings tend to transfer less and less, while younger siblings transfer more with age. Beyond 50, transfers are decreasing with age for all respondents.

Figure 2 also indicates that, over their lifecyle, elder siblings tend to transfer net positive amount while the direct transfers of younger siblings never fully compensate the amounts they received earlier. On average, the two eldest siblings transfered 24.3 thousands of CFA over the past two months which is substantially larger than the net amount of 15.3 thousands of CFA transfered by the two youngest (recall that our respondents are on average net donors). Over the lifecycle these transfers are roughly balanced as older siblings are more likely to receive support from the previous generation. We do not have complete information about historical monetary flows, but as detailed in Section 5, we have the full historical record of school years paid by the extended family. Again comparing the two eldest and the two youngest siblings, it turns out that an elder sibling receives 1.6 more years of education paid by the previous generation. In turn, he finances 2.1 years of education for his two youngest siblings and later receives a total of 0.8 years of education for his own children.

Figure 2: Net transfers by age for respondents among the two eldests or two youngests in their family with 90% confidence intervals (kernel regression)

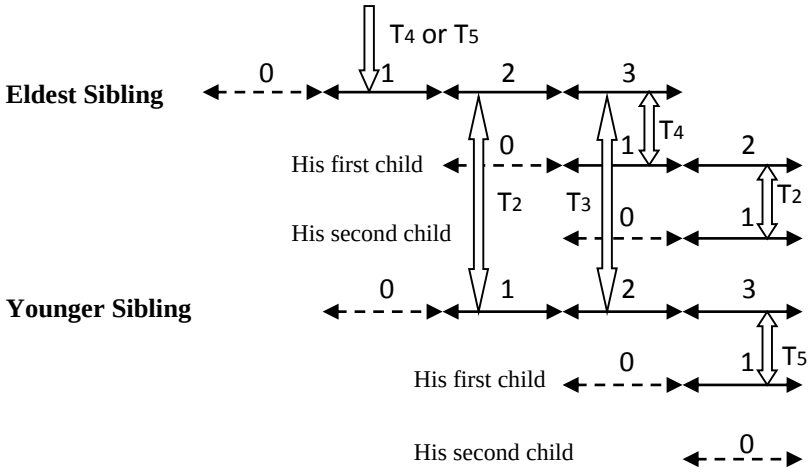


4 A model of intrafamily transfers

We develop a simple overlapping generation model to explore the role of birth rank in determining the flows of transfers across siblings. We assume that each individual has one sibling and two children, and has no access to credit or saving facilities. We distinguish four stages in the life of an individual.[11] In stage 0, he is a child and lives with his parent. In stage 1, he leaves his parent and earns a low wage w_L(per unit of time worked). In stage 2, he has a first child and has a high wage w_H. In stage 3, his first child has left, he has a second child and, again, earns w_H. He dies after stage 3 when his second child becomes independent. This structure is repeated over generations

[11] Individuals may be of either gender. In the following, we use 'he' generically.

Figure 3: Temporal sequence of intrafamily transfers



and implies that, in each period, the two siblings are always in different stages of their lives. There is no capital market so that individuals can neither save nor borrow. In each period, transfers are allowed between siblings and between an independent child and his parent.

Consider an eldest child who is in stage 1 at time t. The only person with whom he can transfer is his parent (who still lives with his younger sibling). At time $t+1$, he is in stage 2, his parent has died and he can make transfers with his younger sibling who is in stage 1 of his life. At time $t+2$, he can in addition make transfers with his eldest child. At time $t+3$, he has died and his younger sibling can in turn make transfers with his own eldest child. In Figure (3), we represent the temporal sequence of those transfers over the life time of two siblings. The horizontal arrows correspond to life stages of each individual while the vertical arrows represent the transfers T_1, T_2, T_3, T_4 and T_5 defined below.

Each generation is composed of four representative individuals: two children of an eldest brother

and two children of a youngest one. In stage 0, utility is zero. In stages 1 to 3, each individual has L^T units of time that he can allocate between work and leisure and his utility depends on consumption and leisure. The discount rate is nil. The direct utility of an individual of rank $i = E, Y$, born from a parent of rank $j = E, Y$, is given by:

$$U^{ji} = u(C_1^{ji}, L_1^{ji}) + u(C_2^{ji}, L_2^{ji}) + u(C_3^{ji}, L_3^{ji})$$

with $u(.)$ increasing and strictly concave in both arguments and $u_{C,L}(.) = 0$. To simplify the exposition, we assume:

$$u(C_t^{ji}, L_t^{ji}) = \gamma log(C_t^{ji}) + \delta log(L_t^{ji}) \tag{1}$$

Consumption is equal to income net of transfers and, before transfers, income is equal to the wage rate times the amount of time worked. The four representative agents - eldest and youngest children of eldest and youngest parents (U^{EE}, U^{EY}, U^{YE} and U^{YY}) - face the following budgets constraints: $C_1^{jE} \leq w_L(L^T - L_1^{jE}) + T_1^j, C_2^{jE} \leq w_H(L^T - L_2^{jE}) - T_2, C_3^{jE} \leq w_H(L^T - L_3^{jE}) + T_3 - T_4$, and $C_1^{jY} \leq w_L(L^T - L_1^{jY}) + T_2, C_2^{jY} \leq w_H(L^T - L_2^{jY}) - T_3, C_3^{jY} \leq w_H(L^T - L_3^{jY}) - T_5$ for an eldest and a youngest agent respectively. Transfers T_1, T_4 and T_5 correspond to the intergenerational transfers and T_2 and T_3 to the intersibling transfers described above. All transfers can be either positive or negative. In the following we restrict our attention to stationary transfer schemes and therefore assume that the transfer the eldest child receive remains constant across generations, given the birth rank of his parent $T_1^E = T_4$ and $T_1^Y = T_5$. This implies that, given parental birth rank, the same transfer scheme can be reproduced across generation. The transfer received by the eldest child in period 1 is the main difference between being born from an eldest or a youngest parent.

We assume that each individual is altruistic with respect to the future representative generations. As a result, the total lifetime utility of each agent is given by $U^{ji} + \sum_{g=1}^{\infty} \alpha^g [U^{EE} + U^{EY} + U^{YE} + U^{YY}]$ where α measures the degree of altruism towards the next representative generation. As a benchmark, we first describe the equilibrium levels of leisure and consumption in the absence of transfers. Since no savings and credit are possible, the first order conditions in period t are given

by:

$$w_t * u_c(w_t(L^T - L_t^{ji}), L_t^{ji}) - u_L(w_t(L^T - L_t^{ji}), L_t^{ji}) = 0, \tag{2}$$

for each agent of birth rank i and each parent's birth rank j. Using equation (1), in the absence of transfers, the optimal level of leisure, L_t^{ji*}, is constant across periods and equal to $\frac{\delta}{\gamma+\delta}L^T$ and the level of consumption is lower in period 1 than in the two other periods:$C_2^{*ji} = C_3^{*ji} > C_1^{*ji}$.

We now allow for non zero transfers, and adopt the viewpoint of a benevolent planer who chooses the level of transfers (T_2, T_3, T_4 and T_5) that maximizes the direct utility of the four different agents of a particular generation $U^{EE} + U^{EY} + U^{YE} + U^{YY}$. Since these four types of agents are in equal number in each generation, the first order conditions are identical if we instead choose to maximize the lifetime utility of a representative agent of a particular generation. Moreover, since the amount of resources available to an individual in stage 2 and 3 does not depend on his parent's birth rank, we write $C_t^{Ei} = C_t^{Yi} = C_t^i$ and $L_t^{Ei} = L_t^{Yi} = L_t^i$ for $i = E, Y$ and $t = 2, 3$. The first order conditions with respect to transfers are as follows:

$$2u_c(w_L(L^T - L_1^Y) + T_2, L_1^Y) - 2u_c(w_H(L^T - L_2^E) - T_2, L_2^E) = 0, \tag{3}$$

$$2u_c(w_H(L^T - L_3^E) + T_3 - T_4, L_3^E) - 2u_c(w_H(L^T - L_2^Y) - T_3, L_2^Y) = 0, \tag{4}$$

$$u_c(w_L(L^T - L_1^{EE}) + T_4, L_1^{EE}) - 2u_c(w_H(L^T - L_3^E) + T_3 - T_4, L_3^E) = 0, \tag{5}$$

$$u_c(w_L(L^T - L_1^{YE}) + T_5, L_1^{YE}) - 2u_c(w_H(L^T - L_3^Y) - T_5, L_3^Y) = 0, \tag{6}$$

The first order condition with respect to leisure at any given period t for an agent of birth rank i with a parent of birth rank j:

$$w_t * u_c(w_t(L^T - L_t^{ji}) + T_t, L_t^{ji}) - u_L(w_H(L^T - L_t^{ji}) + T_t, L_t^{ji}) = 0. \tag{7}$$

Solving the first order conditions we obtain:

Proposition 1. *The optimal transfer scheme is such that:* $T_2^* = \frac{L^T(w_H - w_L)}{2}$, $T_4^* = \frac{2L^T(w_H - 2w_L)}{5}$, $T_5^* = \frac{5}{6}T_4^*$ *and* $T_3^* = \frac{T_4^*}{2}$, *with* $T_2^* > T_4^*$. *In periods 1 and 2, the utility of a youngest sibling is*

always larger than that of his older sibling.

Proof. Rewriting equations (3)-(7) by using the utility function given in equation (1), we have:

(T_2, L_2^E, L_1^Y) are the solutions of the following system:

$$\begin{aligned} \frac{\gamma}{w_L(L^T - L_1^Y) + T_2} &= \frac{\gamma}{w_H(L^T - L_2^E) - T_2}, \\ \frac{\delta}{L_2^E} &= \frac{\gamma w_H}{w_H(L^T - L_2^E) - T_2}, \\ \frac{\delta}{L_1^Y} &= \frac{\gamma w_L}{w_L(L^T - L_1^Y) + T_2}, \end{aligned} \tag{8}$$

$(T_3, T_4, L_3^E, L_1^{EE}, L_2^Y)$ are the solutions of the following system:

$$\begin{aligned} \frac{\gamma}{w_H(L^T - L_3^E) + T_3 - T_4} &= \frac{\gamma}{w_H(L^T - L_2^Y) - T_3}, \\ \frac{\gamma}{w_L(L^T - L_1^{EE}) + T_4} &= \frac{2\gamma}{w_H(L^T - L_3^E) + T_3 - T_4}, \\ \frac{\delta}{L_3^E} &= \frac{\gamma w_H}{w_H(L^T - L_3^E) + T_3 - T_4}, \\ \frac{\delta}{L_2^Y} &= \frac{\gamma w_H}{w_H(L^T - L_2^Y) - T_3}, \\ \frac{\delta}{L_1^{EE}} &= \frac{\gamma w_L}{w_L(L^T - L_1^{EE}) + T_4}, \end{aligned} \tag{9}$$

(T_5, L_3^Y, L_1^{EY}) are the solutions of the following system:

$$\begin{aligned} \frac{\gamma}{w_L(L^T - L_1^{EY}) + T_5} &= \frac{2\gamma}{w_H(L^T - L_2^{EY}) - T_5}, \\ \frac{\delta}{L_3^Y} &= \frac{\gamma w_H}{w_H(L^T - L_3^Y) - T_5}, \\ \frac{\delta}{L_1^{EY}} &= \frac{\gamma w_L}{w_L(L^T - L_1^{EY}) + T_5}, \end{aligned} \tag{10}$$

The optimal transfer scheme is obtained by solving these three sets of equations. Since $T_2^* > T_4^* = 2T_3^*$, the utility of the youngest sibling is greater than that of an older sibling in periods 1 and 2.

□

Given the absence of savings and credit, transfers in a given period are such that they equalize the marginal utilities of the individuals between which those transfers are made. In period 2, an

eldest sibling earns a high income, and can only transfer to his younger sibling who, being in period 1 of his life, earns a low wage. The transfer is therefore relatively large. The intergenerational transfers are lower however. This is because each representative generation includes two eldest members who received only once the transfers T_4 or T_5, depending on whether their own parents are eldest or youngest in their families. However, as parents, they will both transfer T_4 to their eldest children, while their two younger brothers will transfer T_5 to their own eldest children. In other words, these inter-generational transfers are 'received' only once, but must be paid twice to the descendants. This explains why T_4 and T_5 are lower than T_2. T_4 is larger than T_5 because when the older brother makes a transfer to his eldest child, he also receives a direct transfer T_3 from his own brother. As the latter earns the same wage in that period, they split equally the burden of helping this particular child. Clearly, the amount of resources available then is larger than when the youngest brother has to support on his own eldest child. Finally, note also that transfers to children are positive provided the difference in wages is large enough ($w_H > 2w_L$).

The optimal transfers scheme has implications for labor choices:

Proposition 2. *The optimal labour choices are such that a youngest sibling always works less in period 1 and 2 of his life than his older brother in the corresponding periods. In period 3,* $L_3^{E*} < L_3^{Y*}$ *iff* $w_H < 2w_L$. *Across periods,* $L_1^{EE*} > L_3^{E*} > L_3^{Y*}$ *and* $L_1^{Y*} > L_2^{Y*} > L_3^{Y*}$ *iff* $w_H > 2w_L$.

Proof. In period 1: $L_1^{Y*} = \frac{L^T\delta(w_H+w_L)}{2w_L(\gamma+\delta)}$, $L_1^{EE*} = \frac{L^T\delta(2w_H+w_L)}{5w_L(\gamma+\delta)}$ and $L_1^{YE*} = \frac{L^T\delta(w_H+w_L)}{3w_L(\gamma+\delta)}$ with $L_1^{Y*} > L_1^{EE*} > L_1^{YE*}$;

in period 2: $L_2^{Y*} = (\frac{2L^T\delta(2w_H+w_L)}{5w_H(\gamma+\delta)})$ and $L_2^{E*} = \frac{L^T\delta(w_H+w_L)}{2w_H(\gamma+\delta)}$ with $L_2^{Y*} > L_2^{E*}$;

in period 3: $L_3^{E*} = \frac{2L^T\delta(2w_H+w_L)}{5w_H(\gamma+\delta)}$ and $L_3^{Y*} = \frac{2L^T\delta(w_H+w_L)}{3w_H(\gamma+\delta)}$ with $L_3^{E*} > L_3^{Y*}$ iff $w_H > 2w_L$.

Furthermore, iff $w_H > 2w_L$, $L_1^{Y*} > L_2^{Y*} > L_3^{Y*}$ and $L_1^{EE*} > L_3^{E*} > L_2^{E*}$.

□

Transfers play a crucial role in determining the asymmetries of consumption and leisure over time. The results are driven by the fact that, when earning a higher wage, an individual has to work more to finance the consumption of the less productive members of the family. Since the youngest sibling receives more in period 1 and transfers less in period 2 than his older brother, he

also consumes more leisure in both periods. The latter may however enjoy more leisure in period 3 if the difference in wages is large enough. Overall however, the lifetime utility of the younger sibling is always larger:

Proposition 3. *The lifetime utility of the youngest sibling is higher than that of the oldest. The lifetime utility of the eldest son of an eldest sibling is higher than that of the oldest son of a youngest sibling iff* $w_H > 2w_L$.

Proof. Given the optimal transfers and leisure allocations described by the propositions above, we obtain the following indirect utilities.

$$\begin{aligned}
U^{EE} &= (\tfrac{L^T\gamma(2w_H+w_L)}{5(\gamma+\delta)})^\gamma(\tfrac{L^T\delta(2w_H+w_L)}{5w_L(\gamma+\delta)})^\delta + (\tfrac{L^T\gamma(w_H+w_L)}{2(\gamma+\delta)})^\gamma(\tfrac{L^T\delta(w_H+w_L)}{2w_H(\gamma+\delta)})^\delta + \\
&\quad + (\tfrac{2L^T\gamma(2w_H+w_L)}{5(\gamma+\delta)})^\gamma(\tfrac{2L^T\delta(2w_H+w_L)}{5w_H(\gamma+\delta)})^\delta \\
U^{YE} &= (\tfrac{L^T\gamma(w_H+w_L)}{3(\gamma+\delta)})^\gamma(\tfrac{L^T\delta(w_H+w_L)}{3w_L(\gamma+\delta)})^\delta + (\tfrac{L^T\gamma(w_H+w_L)}{2(\gamma+\delta)})^\gamma(\tfrac{L^T\delta(w_H+w_L)}{2w_H(\gamma+\delta)})^\delta + \\
&\quad + (\tfrac{2L^T\gamma(2w_H+w_L)}{5(\gamma+\delta)})^\gamma(\tfrac{2L^T\delta(2w_H+w_L)}{5w_H(\gamma+\delta)})^\delta \\
U^{Y} &= (\tfrac{L^T\gamma(w_H+w_L)}{2(\gamma+\delta)})^\gamma(\tfrac{L^T\delta(w_H+w_L)}{2w_L(\gamma+\delta)})^\delta + (\tfrac{2L^T\gamma(2w_H+w_L)}{5(\gamma+\delta)})^\gamma(\tfrac{5L^T\delta(2w_H+w_L)}{5w_H(\gamma+\delta)})^\delta + \\
&\quad + (\tfrac{2L^T\gamma(w_H+w_L)}{3(\gamma+\delta)})^\gamma(\tfrac{2L^T\delta(w_H+w_L)}{3w_H(\gamma+\delta)})^\delta
\end{aligned} \tag{11}$$

The previous terms can be rewritten as follows:

$$\begin{aligned}
U^{EE} &= A + B + C \\
U^{YE} &= D + B + C \\
U^{Y} &= E + C + F
\end{aligned} \tag{12}$$

We know from the previous propositions that E>A and E>D and that F>B. This proves the first part of the proposition. For $w_H > 2w_L$, A>D.

□

We now investigate the sustainability of the optimal transfer system. In the absence of commit-

ment problems, this system is welfare improving as it allows families to overcome credit constraints to finance, for instance, education. Commitment issues may prevail, however. They are particularly severe in period 2 for the younger brother as the latter has no direct incentives to reciprocate by transferring T_3 to his older brother. By contrast, the first transfer between brothers is easier to enforce as the younger brother partly reciprocates later (and parental altruism facilitates intergenerational transfers). We therefore investigate whether, in the presence of parental altruism, the optimal transfer scheme, and in particular T_3^*, can be supported as an intergenerational Nash equilibrium.

Consider the following strategy by the agents of the next generation: they follow the optimal transfer scheme as long as their parents followed their obligations, and revert to a self-enforcing transfers between parents and children otherwise. More precisely, in the absence of transfers between brothers, some transfers are still being made between the parent and his older child because of altruism. These self-enforcing transfer are given by $T^P = \frac{L^T(\alpha w_H - w_L)}{1+\alpha}$ and do not depend on the birth rank of the parent. [12] By definition, these self-enforcing transfers $S^{'} = (T_2 = 0, T_3 = 0, T_4 = T_P, T_5 = T_P)$ involve a lower total utility for the representative agent of all future generations than the system described in Proposition 1 (S^*). As a result, if the youngest sibling cares enough about future generations, he will follow his obligations towards his older brother in period 2 to ensure that the next generation also adopts the optimal transfer scheme. More formally:

Proposition 4. *There exists $\alpha^* < 1$ such that, if $\alpha > \alpha^*$, the optimal transfer scheme is an intergenerational Nash equilibrium.*

Proof. The net direct gain for the younger brother from defaulting and transferring T^P to his eldest child is given by the difference between his utility in period 3 without optimal transfer scheme:

$$(\delta + \gamma)[log(\frac{L^T(w_H + w_L)}{(\delta+\gamma)(1+\alpha)}) + \gamma log(\gamma) + \delta log(\frac{\delta}{w_H})] \tag{13}$$

and his utility in period 3 under the optimal transfer scheme:

[12] Under this situation, the leisure choices of the parent and his older child become respectively: $L^P = \frac{\delta L^T(w_H+w_L)}{w_H(\delta+\gamma)(1+\alpha)}$ and $L^C = \frac{\delta\alpha L^T(w_H+w_L)}{w_L(\delta+\gamma)(1+\alpha)}$.

$$(\delta+\gamma)[log(\tfrac{L^T(2w_H+2w_L)}{3(\delta+\gamma)})+\gamma log(\gamma)+\delta log(\tfrac{\delta}{w_H})]. \tag{14}$$

This difference is equal to

$$\gamma[log(w_H)-log(\tfrac{4w_H+2w_L}{5})]+\delta[log(w_H)-log(\tfrac{4w_H+2w_L}{5w_L})]+(\delta+\gamma)[log(\tfrac{\delta+\gamma}{1+\alpha})-log(\tfrac{2w_H+2w_L}{5})] \tag{15}$$

which has to be compared with the utility gains from the adoption of the optimal transfer scheme by all future generations: $(\frac{\alpha}{1-\alpha}[U(S^*)-U(S')])$. While the expression in (15) is monotonically decrasing in α, this last expression is monotonically increasing in α and becomes arbitrarily large for large values of α. Hence, the result follows. □

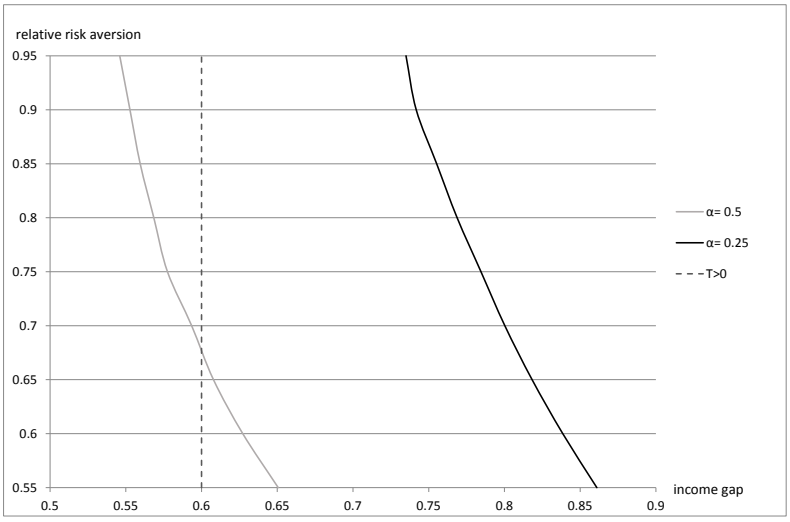
Finally we examine whether the system of transfers is beneficial at all for the eldest siblings. Figure (4) represents the combinations of risk aversion and income gap for which the eldest sibling is indifferent between the optimal transfer scheme and the outside option, for different values of altruism.[13] The outside option is defined as the self-enforcing system of transfers between parent and son (S') described in the above proposition. To the right of these curves, the optimal transfer scheme is strictly Pareto dominating.[14] As expected, a lower income gap requires either a larger risk aversion or more altruism for the scheme to be Pareto dominating. The optimal transfer scheme may also involve negative transfers whereby parents receive transfers from their children (when $w_H < 2w_L$). The dashed line represents the value of the income gap above which transfers are positive.

The main assumptions behind the results are that (1) the income is lower in the early stage of the life and (2) at a given point in time, siblings are at different stages of their life, which requires a large enough age gap between siblings. These two features are empirically supported as the median age gap between the eldest and the youngest sibling in our sample is 14 years. Moreover, the average individual income grows at an annual rate of about 6.4% between age 20 and 55. Figure 5 shows

[13] We impose $w_L+2w_H=20$ and define the income gap as $\frac{[w_H-w_L]}{\frac{(w_L+2w_H)}{3}}$.

[14] It is also sustainable as it satisfies the conditions of Proposition 4.

Figure 4: Pareto dominating transfer schemes in an income gap - risk aversion space



that the average individual income grows monotonically with the respondent's age.

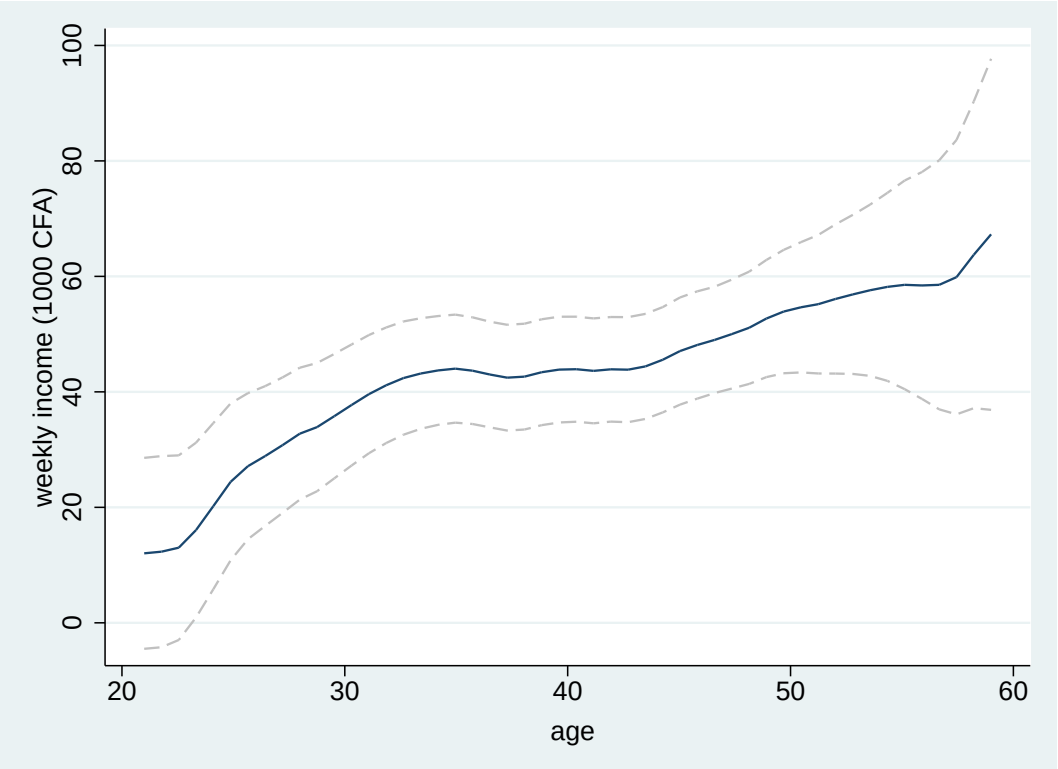
Another important assumption is the absence of capital markets. Allowing individuals to save does not substantially alter our results, since individual income is generally increasing over time (except in the case of the youngest sibling who may wish to save in stage 2). In contrast, a perfect credit market would allow individuals to perfectly smooth their consumption over time and intersibling transfers would not be needed. Credit market imperfections are therefore crucial for our results. In our context, this assumption is justified.

To conclude, one can interpret the structure of these transfers as a general system of reciprocal credit within the extended family. Younger siblings receive help early from their elder siblings and reciprocate later by supporting these siblings when they have children.[15] In this process, the amounts transferred by older siblings decrease over time. In contrast, the amounts transferred by younger siblings increase. These trends closely match the evolution of intersibling transfers

[15]Empirically, younger siblings often directly transfer to their nephews instead of their elder siblings. In terms of our model, it is as if T_1 is in part directly given by the younger sibling to his nephew, instead of being entirely paid by the elder brother (after having received T_3), without affecting the net transfer paid or received by each individual.

described in Figure 2. Our results also imply that the largest transfer is made by the eldest towards the youngest sibling early in life who however never fully reciprocates ($T_2^* > T_3^*$). This again matches the stylized facts described above. It is interesting to note that when supporting his eldest child, the eldest sibling is richer than the youngest one in the same stage (as he also benefits from transfers from his younger sibling).

Figure 5: The life-time evolution of income with the 90% confidence interval (for working respondents)



5 The determinants of transfers

We now provide an econometric analysis of the structure of intra-family transfers. This analysis is carried out at different levels. First we explore the transfers taking place between a respondent and a particular sibling. We thus generate for each respondent as many observations as the number of

siblings he has, which provides us with a total of 2171 observations. By comparing a respondent with each of his siblings, we are able to isolate the effects of individual variations in birth order and number of children using a respondent fixed effect. The latter controls for all the unvarying respondent characteristics, the characteristics of his parents as well as the number and the average characteristics of his siblings (age, gender, education, income,...). The variables used are reported in Tables 1, 2 and 4.

The main variables of interest are whether the sibling is older or younger than the respondent, the number of the sibling's children and the number of the respondent's children. To allow the effect of these children to differ according to birth order, we interact the children variables with the sibling's and the respondent's relative positions. As a result, our baseline specification uses four variables related to one's position in the family: whether the sibling is younger than the respondent (younger sib), his number of children if he is younger (kids younger sib) or older (kids older sib) and the respondent's number of children if the sibling is younger (kids * younger sib). This last variable allows the effect of a respondent's children to depend on his relative position in the family and thereby to mirror the asymmetric pattern of transfers towards nephews. Note that the respondent's number of children is absorbed by the respondent fixed effect. We also provide estimates using an alternative measure of one's position in the family, as defined by the relative birth rank. The corresponding specification includes the sibling's number of children (kids sib), the difference in relative birth rank between the sibling and the respondent (diff RBR), its interaction with the sibling's number of children (kids sib * diff RBR) and with the respondent's number of children (kids * diff RBR).[16]

In addition to these family variables, we control for three characteristics of the sibling: age, gender and whether he is the successor of his father. Regarding age, once we control for birth order and include family fixed effects, age and birth rank are highly collinear. We therefore use age categories instead of age to control for the effect of life cycle. Specifically, we define four sibling's

[16]Given the respondent fixed effect, we can equivalently use diff RBR or simply the sibling's relative birth rank. The difference between these two variables matters when analyzing the role of sibling's children. This role depends on the sibling's position relative to the respondent, which a simple interaction between kids sib and relative birth rank would fail to capture because what matters is the relative position of the sibling with respect to the respondent. This is what the interaction with diff RBR captures (this interaction is not absorbed by the fixed effect).

age intervals (less than 35, 35-45, 45-55 and more than 55) . The variable "sib sex" controls for the sibling's gender. Finally, it is customary to designate one of the son, usually the eldest, as the successor ("héritier") of his father. This son is then traditionally in charge of family affairs and receives a larger share of inheritance, particularly in rural areas. The variable successor represents this particular status.[17]

Table 5 presents the analysis of pairwise transfers made by the respondent towards each of his siblings and their children. Columns 1 and 2 correspond to linear regressions of the propensity to have made or received at least one such transfer over the past two months. Columns 3 and 4 correspond to linear regressions of the total amounts given to and received from that sibling over the same period. Column 5 reports the results of a linear regression of the net amount transferred. Column 6 replicates the same analysis using relative birth ranks. Column 7 and 8 reproduce the results of columns 5 and 6 by using a proxy for fertility. More specifically, as fertility may depend on the structure of the transfers, the use of the actual number of children may yield biased estimates. To address this concern, we replace the number of children in the interaction terms with an indicator of age which takes value one if the individual is older than 35 (m35).[18] This variable is strongly correlated with the number of children with a correlation coefficient equal to 0.54. This specification is presented as a robustness check throughout the paper. All amounts are converted in log.

The results are striking and follow the pattern highlighted above. Respondents are more likely to give to (and less likely to receive from) their younger siblings. The amounts involved are also larger. The impact of a nephew on net transfers is critically dependent on the position of his parent. Transfers are larger if the parent is an older sibling but not if she is a younger sibling. A mirror pattern also holds for the children of the respondent since they increase transfers provided the respondent is older than his sibling. The analysis of net transfers in column (5) summarizes this pattern. The net beneficiaries of intra-family transfers are older siblings with children and younger siblings as long as their older siblings do not have children. The net contributors are older

[17] We also run the same analysis excluding respondents who are designated "héritier" with no change in the results. The variable successor does not play any role in our analysis, which is not surprising given that almost all individuals in our sample live in an urban area.

[18] Given that we independently control for age categories, we cannot introduce simultaneously younger sib * m35 and older sib * m35. We drop the former and the latter then captures the additional effect of being more than 35 if the sibling considered is older than the respondent.

siblings without children and younger siblings with older nephews. The pattern is identical in the alternative specifications based on relative birth ranks and the proxy for fertility. Finally it appears that respondents tend on average to give more transfers to their sisters than to their brothers.

To further investigate the role of gender, we replicate the analysis of net transfers (Table 5, columns (5) and (6)) separately for men and women. We report the estimates for female respondents in the first two columns of Table 6 and for male respondents in the next two columns. Given the reduced sample size coefficients are less precisely estimated but remain very close to the original estimates. An interesting difference between gender emerges from the estimates. Male respondents tend to transfer more to their sisters, while the gender of the sibling has no effect for female respondents. In addition, the effect of own children is not symmetric across gender, as return transfers accrue mostly to mothers.[19]

Finally observed transfers may reflect urban remittances to the country side. In the last two columns of Table 6 we therefore restrict the sample to extended families in which all members live in urban areas (who represent 75% of our sample). Our results are unaffected by this restriction which indicates that the pattern of transfers does not result from migrants' remittances.

We then replicate this analysis using a measure of historical transfers. To this end, we collected information over the payment of all educational expenses among siblings (and their children) in the past. To avoid recall biases, this information was recorded in number of years during which those transfers took place. Educational transfers represent a significant part of total transfers (36% of the amounts transfered by our respondents are reportedly for education purposes). Respondents have financed an average of 1.16 years of school fees per sibling (and their children) and have received 0.16 years from each of their siblings.[20] Table 7 reproduces the specifications adopted in Table 5 on historical transfers. We again find a strong effect of family structure. Columns (3) and (4) show that younger siblings and older siblings with children are again the net beneficiaries of these past transfers.[21]

[19] This suggests a particular role for maternal uncles. Throughout sub-saharan Africa, the anthropological literature stresses the important role of maternal uncles in the education of their nephews (Goody, 1959).

[20] Fourteen percent of our respondents have had their education partly financed by uncles and aunts.

[21] The effects of own children and the children of younger siblings are not significant. This may be due to the fact that most of them are still relatively young and therefore part of the relevant transfers have not yet taken place.

Finally, we check the robustness of the previous results by aggregating the current transfers made to each sibling into a single measure of the transfers made by the respondent to his siblings and their children. We follow the main specification adopted in Table 5 by summing over all siblings of the respondent. For instance the number of younger siblings corresponds to the sum of younger dummies used in the former specification.[22] In addition, we control for the respondent income to isolate the role of family structure from the direct effect of income. Table 8 reports the results. The latter have to be interpreted with caution given the potential simultaneity of income and transfer decisions. In columns (1) to (7) we leave out the interactions between a respondent's own children and the number of older and younger siblings as these variables tend to be correlated with the number of nephews from younger or older siblings.[23] Columns (8) and (9) reveal that these interactions have no significant effects on net transfers. In column (7), we use an alternative definition of net transfers by also including transfers made by the respondent to parents, half siblings and other individuals. We thereby verify that the identified pattern holds when we consider all transfers. One possible worry is that inter-sibling transfers may compensate for transfers made to other members of the family in particular elderly parents. Controls include a set of individual and household characteristics, such as gender, age, education, number of children, spouse income and spouse family size.

Again, compared to an older sibling, the presence of a younger sibling increases the net transfers made by the respondent. The effect of nephews is again asymmetrical: children of older siblings increase the amounts transferred while those of younger ones have the opposite effect. One more result is worth emphasizing. Controlling for age and birth order, the respondent's income is strongly and positively correlated with both the propensity to give and the amount given. This last result suggests that transfers also play a redistribute role within families, as richer individuals tend to transfer more to their siblings.[24] It is interesting to note however that the estimated coefficients

[22] We do not report a specification in terms of relative birth rank because the interaction between the difference in birth ranks and the siblings' number of children has no corresponding measure at the respondent level. In the following sections we use specifications using relative birth rank when our prediction does not depend on the position of nephews (namely Tables 14 and 5).

[23] Thus if younger siblings already have children, the respondent is more likely to also have children. Conversely, if older siblings do not yet have children, the respondent is more likely to be in the same situation.

[24] Relatedly we asked respondents to classify their siblings as being richer, or poorer than themselves. A large majority of transfers are directed towards poorer siblings: 74% of siblings receiving a transfer are declared to be

imply that transfers are more sensitive to family structure. For instance, column (5) indicates that the overall impact of switching one's position from the youngest to the oldest sibling amounts to a 69% increase in transfers.[25] In comparison, a doubling of income results in a 36% average increase in transfers.

6 Occupation and income

We now turn to the consequences of family obligations on current labour decisions. As shown above, birth order and the number of nephews determine whether a respondent is a net donor or recipient of transfers. Proposition 2 indicates that positive transfers reduce incentives to work, since they provide a source of income which is independent of labor efforts.[26] By contrast, transfers given correspond to a lump sum tax on income that increases labour efforts. We therefore expect net donors to work more to fullfill their obligations, while net receivers work less.

Using observed transfers as a measure of family obligations is not appropriate since transfers themselves may also depend on labour market outcomes. Our analysis of transfers identified the receivers and donors as a function of birth order and their children. In the following, we use the corresponding reduced form specification to analyze labor market participation, working time and income. We thereby assume that expected transfers are proportional to the actual ones and can be captured by the family structure. The use of reduced forms does not allow us to perfectly identify the effect of transfers on labour efforts as other mechanisms related to birth order and family structure may play a role. However, the non-monotonic effect we highlight (which closely parallels the time structure of transfers) and, in particular, the asymmetric role of nephews depending on their parent's relative position, cannot be easily reconciled with these alternative mechanisms. We return to this point in the conclusion.

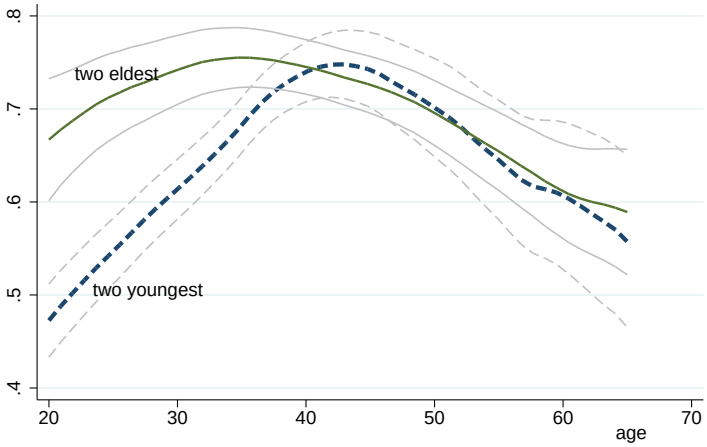
poorer than the respondent, while 69% of the siblings who sent a transfer to the respondent are declared richer.

[25] To compute this figure we sum the effects attached to siblings and nephews by multiplying the corresponding coefficients to the average number of siblings and nephews in our sample.

[26] In addition, net recipients may also have incentives to appear poor to attract more transfers (see e.g. Baland et al, 2011).

We first examine labour market participation of respondents and their siblings, defined as whether the individual is engaged in an income earning activity. Comparing again the two eldest to the two youngest siblings across all families, we find a pattern of participation that closely parallels that of transfers described in Figure 2. As illustrated in Figure 6, younger siblings are significantly less likely to work as young adults. It is only when they reach 40 that their labour market participation becomes similar to that of their elder siblings.

Figure 6: Labour market participation of elder and younger siblings, by age (kernel regression with 90% confidence intervals)



In our estimations we distinguish between regular wage employment and independent occupations. Independent activities include self-employment activities as well as occasional occupations. We expect incentive effects to be more pronounced for these activities, for which the individual has more control over his own level of effort. The first set of results is based on the entire sample of respondents and their siblings. We restrict attention to individuals above 18 to avoid the interference of education decisions (the results are unchanged if we focus on those above 25). The main specification in Table 5 follows the analysis of transfers at the respondent level (Table 8) and includes extended family fixed effects. As the total number of siblings and nephews is absorbed by the fixed effect, we only report coefficients for the number of older siblings and the number of their

children. These coefficients therefore measure the differential effect of having one more older sibling (or one of his children) rather than one younger sibling (or one of his children). We also include the number of own children and its interaction with the number of younger siblings (the other interaction being absorbed by the fixed effects). Additional controls include education, gender and age categories. Column (1) to (3) correspond to the full sample of respondents and their siblings. Columns (4) and (5) split the sample between men and women given their different average rate of participation into the labour market. Column (6) reports the estimates on the sub-sample of urban only extended families. The last three columns present the alternative specification using "more than 35" as a proxy for fertility. All the results are based on a linear probability model.

Extended family structure plays an important role in determining labour market outcomes. As expected, the number of elder siblings reduces the propensity to work, particularly with respect to independent activities. The estimates reported in Columns (1) and (3) indicate that the presence of an additional elder sibing reduces the propensity to work by 13% and to engage in an independent occupation by 10%. The number of children of elder siblings partly counteract these effects since younger siblings are then more likely to be net donors. These results are very similar across gender, and for the urban sub-sample. They are also robust to the use of the fertility proxy. The mirror effect of own children is not precisely estimated. Across siblings, the effects of one's position in the family structure are therefore substantial. This suggests that family obligations have large incentive effects on labour decisions.

We now focus on the sample of respondents for which we have more detailed information about labour market outcomes, such as working time (using a weekly time sheet by activity) and income. We follow the same specification as the one used for the analysis of transfers at the respondent level (Table 8). In Table 10 we analyze the determinants of labour market participation and working time decisions. Columns (1), (2) and (6) present the results of a linear probability model of the decision to work. Columns (3), (4), (5) and (7) report marginal effects of tobit regressions on the total weekly working time, and the time by occupation.[27] The results are strikingly similar to those obtained above. The number of older siblings reduces both the employment decision and the total

[27] In the absence of adequate instruments, we could not carry out a Heckman procedure for these labour decisions. We therefore assume that the determinants of these decisions are identical at the extensive and the intensive margin.

working time, particularly at the level of independent activities. For instance, moving up by one unit in absolute birth rank (i.e. having one more elder and one less younger sibling) reduces working time by 2.42 hours per week, which corresponds to 7.0 % of total working time. Children of older siblings countervail these effects: the negative effect of an elder sibling is fully compensated when the latter has more than three children (which occurs for 37% of elder siblings in our sample).

In Table 11 we further investigate labour income and the propensity to save, using the same specifications. Columns (1) to (5) report the marginal effects of tobit regressions on total income and income by occupation (in log). Column (6) to (8) present marginal effects of a quasi-likelihood estimation of the share of expenditure allocated to savings (controlling for total income).[28] We again find that net recipients of the family transfers save and earn less, particularly in independent activities. The effects are important, as the presence of an older sibling reduces earned income by 22% (column (1)) and it takes 4.5 of his children to compensate this effect. The pattern is identical for the propensity to save, an additional older brother reduces the share of savings by 2.2 percentage points and the effect disappears when he has four children. The fertility proxy estimates reflect the same pattern. We interpret this finding as reflecting the precautionary nature of savings: savings are less necessary when one can expect support from his siblings. This last result is at odd with Di Falco and Bulte (2011) who find an overall negative correlation between savings and family pressure. Our result highlights the importance of identifying donors and receivers in a given network given the asymmetry in their behavior.

7 Education and fertility

The pattern of inter-sibling transfers tends to favor the children of older siblings who are more likely to receive support from their parents' families, whereas the children of younger siblings are at a disadvantage. It is precisely at the time where these children are growing up that their parents have

[28] Specifically, we use the method proposed by Papke and Wooldridge (1996) to handle fractionnal dependent variables with zeros and ones.

to reciprocate and support the children of their older siblings. As a result, the number of children and their level of education may be influenced by their parents' position in the family structure.

With respect to the education of siblings, we expect younger siblings to be more educated, since they receive, when young, more support than their elder siblings (see Proposition 1 above). Regarding the education of their children, we can decompose the effect of transfers into an income and a price effect. First, at the time they have children, younger siblings tend to be poorer as they have to transfer income to their older siblings' families. Second, since a large part of these transfers cover educational expenditure, they also decrease the cost of schooling for children of older siblings. Children of older siblings should therefore be more educated than those of younger siblings.

To test these implications, we use two different samples, one consisting of the respondent and his siblings (above 18) and the other of the children (above 18) of the respondents. We focus on two measures of education, the number of years completed and a categorical variable defined over four levels of education: primary, junior high, senior high school and post-secondary education. The categorical variable allows us to account for the non-linear nature of the schooling process as dropping-out is more likely at the end of each education cycle. Table 12 reports the break-down of the sample of respondents and their siblings (above 18) in each of these categories, distinguishing between parents of low (<0.5) and high relative birth ranks. Mothers of lower birth ranks have more educated children. The effect of father birth rank is slightly weaker. Note that parental birth ranks are completely uncorrelated ($\rho = -0.003$), suggesting no matching in birth order in marriage decisions. This allows us to investigate the role of father and mother birth ranks separately when analyzing joint decisions such as education and fertility.

Table 13 examines the education levels of the respondents and their siblings. Column (1) includes extended family fixed effects and confirms that younger siblings are significantly more educated. Compared to the eldest, the youngest has on average 0.57 years of additional education. In order to investigate the impact of parental birth ranks, we drop the extended family fixed effect in columns (2) to (5), as the characteristics of the parents are invariant across siblings. Controlling for other parental and individual characteristics, mothers of lower birth rank have significantly more educated children. Father birth ranks turn out to be insignificant. Column (3) suggests for example that

compared to an eldest mother, having a youngest mother decreases the number of years of education by 0.77. Column (4) reports the raw coefficients and column (5) the marginal effects of having a post secondary education level (compared to a lower level) from an ordered probit model using the categorical variable defined above. Again the maternal birth rank has a significant impact on her children's education.

In table 14 we repeat the analysis at the level of the respondents' children. Since we focus on children above 18 for whom both parents have been surveyed (so that we have complete information about parental characteristics), this final sample has only 152 observations. In addition to the control variables introduced in the above analysis, we also control for parents' incomes and age categories (given the definition of the sample, we have very few young parents and therefore define unique categories for fathers below 55 and for mothers below 45). Columns (1) and (2) correspond to linear regressions for the number of school years completed, columns (3) and (5) report ordered probit coefficients and columns (4) and (6) the marginal effects for post-secondary education level. Again mother birth order has a significant impact on children education. Thus the child of a youngest mother receives on average 2.7 less years of education (column (2)) than the the child of an eldest mother. Correspondingly, the child of a youngest mother has a 0.44 lower probability of reaching post-secondary education than the child of an oldest mother (column (6)). This effect is much larger than for the previous generation analyzed above. This is to be expected since education level increased substantially across generations, allowing for more variation in education outcomes across children.[29] Father's birth order is significant in the specifications including the number of older and younger siblings (columns (1) and (3)), but not when using relative birth rank. The effect of mother's birth rank is more stable across samples and specifications. This is consistent with the results presented in Table 6 according to which women are relatively more likely to receive support from their younger siblings when they have children.

The educational advantage of younger siblings is in line with Tenikue and Verheyden (2010) study of education levels in Sub-Saharan Africa. Their mechanism relies on the fact that the time at which eldest children enter secondary school corresponds to the time that family resource

[29]Thus parents of the respondents have on average 5.2 years of education, respondents and their siblings 8.9 and the respondents' children (above 18) 11.9.

constraints are tightest. While this other mechanism may explain part of the effect of own birth rank, it cannot account for the effect of parental birth rank. Closely related to our analysis, Di Falco and Bulte (2013) investigate the relationship between the size of the family network and educational outcomes and find a strong negative correlation. In contrast with our approach, the size of the network is imperfectly measured as the number of relatives who stayed significantly in the household over the last month.[30]

We now investigate fertility decisions on the sample of respondents and their siblings. We found above that the quality (education) of children of younger siblings is lower as they receive relatively less support from the extended family. The question remains as to whether younger siblings also adjust their number of children accordingly. Table 5 below reports the results obtained from a regression of total number of children on parental characteristics using extended family fixed effects. Column (1) and column (2) take the whole sample of respondents and their siblings using our two definitions of birth rank. Column (3) and (4) report separate results for men and women. The effect of birth rank is particularly strong. For instance, column (3) indicates that the youngest sibling has on average 1.9 less children than his eldest sibling. In contrast to the results obtained on education, the effect of birth rank on fertility behavior is remarkably similar for mothers and fathers. This effect does not seem to arise from delayed marriage for younger siblings as there is no correlation between birth rank and the age at marriage of our respondents (we do not have the age at marriage for the siblings).

There are two possible confounding mechanisms at work here. First it is possible that younger respondents have not yet completed their fertility. To this end, we provide in column (5) estimates for individuals above 45. Since women are more likely than men to have completed their fertility before 45, we further restric the sample to women above 45 in column (6). [31] Results strongly hold accross these alternative samples. The second concern is that older cohorts may have larger families.

[30] Moreover the causality between transfers and education is not well established as respondent may choose to invite members of their network to stay in the household at the expense of their own children.

[31] In our data 99% of women completed their fertility before 45. Male respondents have children later but 85% of them had their last child before 45

The results obtained by comparing siblings across cohorts may therefore include both a birth rank and a cohort effect. Given the small number of observations, we cannot provide separate estimates by cohort. Instead, we control for age categories (with extended family fixed effects). In addition, it is worth noting that fertility rates in Cameroon declined moderately by 1.37 child per women over the last 35 years. In our sample, the average age gap between the eldest and the youngest is 14 years, suggesting that the cohort effect would imply an average difference of 0.55 children when comparing the youngest to the eldest sibling's fertility. In contrast, column (5) suggests a difference of 2.1 between the youngest and the oldest fertility when restricting the sample to individuals above 45.[32]

Taken together, our results on education and fertility show that younger siblings are more educated and have fewer children, but the latter tend to be less educated. The combination of these results goes against the conventional quality-quantity trade-off but is consistent with the structure of family transfers described in the earlier section.

8 Conclusion

In this paper, we investigate the pattern of informal transfers taking place within extended families in Cameroon. We show that most of these transfers follow a well-defined sequence, whereby elder siblings finance their younger siblings who reciprocate later when their older siblings have children. We propose a simple overlapping generation model and show that, in the absence of a credit market, such arrangements are second-best optimal and affect labour choices. We then analyze the consequences of one's particular position in the family structure on labour market outcomes and find evidence of large effects. In the long term, this structure of transfers implies that both younger siblings and the children of older siblings receive more education. Younger siblings also display a lower fertility, which is consistent with the fact that their fertility decisions are made at a time they

[32] This figure is obtained by multiplying the coefficient of "nb older" by the average number of siblings of our respondents.

are supposed to reciprocate towards their elder siblings.

Our indentification strategy relies on reduced form specifications and we cannot rule out alternative direct effects of birth order on economic outcomes. However our results cannot be easily reconciled with the existing literature on the impacts of birth order. This literature stresses the various advantages enjoyed by eldest children in terms of material resources, parental time and attention and education, which all lead to superior labour market outcomes (Black et al., 2005, Booth and Kee, 2009, Iacovou, 2001). In contrast, in our setting, eldest siblings tend to be less educated but participate more to the labour market in their early adult life while younger sibling are more educated and increase their labour market involvement at later stages in their life. The latter also have fewer and less educated children. We interpret these patterns as resulting from a generalized system of implicit credit within the extended family, motivated by the desire to smooth income over one's lifetime. This system involves asymmetric and non-monotonic effect of one's position in the family on the size and directions of transfers, which translate into non-trivial labor market, education and fertility outcomes.

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Table 3: Average amounts transferred by category of relative (standard deviation in brackets)

	Transfers in	Transfers out	Transfers net	# individuals
Older siblings	5.7 (21.4)	5.0 (22.7)	-0.7 (29.8)	1.6
Older siblings' children	0.4 (3.4)	8.4 (66.4)	8.0 (66.5)	4.5
Younger siblings	4.5 (22.7)	16.8 (159.3)	12.4 (161.0)	2.6
Younger siblings' children	0.3 (2.3)	2.0 (8.5)	1.7 (8.9)	3.2

Table 1: Descriptive Statistics for the Sample of Respondent (n=528): Demographics, Occupation and Income

Variable name	Definition	Mean	Std Dev
Respondent demographic characteristics			
nb younger	number of younger siblings	2.56	1.98
nb older	number of older siblings	1.55	1.63
tot kids of younger	total # of children of younger siblings	3.18	4.08
tot kids of older	total # of children of older siblings	4.51	5.27
nb younger m35	number of younger siblings more than 35 years old	0.69	1.19
nb older m35	number of older siblings more than 35 years old	1.17	1.42
own kids	number of respondent's children	3.87	2.35
couple	= 1 if the respondent lives with a spouse (coresidence)	0.87	0.34
spouse family	spouse's extended family size	15.04	11.61
sex	=1 if women	0.55	0.50
age	age	39.09	11.33
l35	=1 if respondent less than 35 years old	0.44	0.50
35-45	=1 if respondent between 35 and 45	0.30	0.46
45-55	=1 if respondent between 45 and 55	0.17	0.38
successeur	=1 if respondent is the designated successeur of his fatther	0.10	0.30
education	number of years of education	9.03	3.46
urban	=1 if all siblings are living in a city	0.75	0.43
Occupation and income			
work	=1 if respondent has an income generating activity	0.76	0.43
regular wage	=1 if respondent has a regular wage	0.31	0.46
independent	=1 if the respondent has an independent activity	0.63	0.48
working time	total time worked in the last 7 days (hours)	34.40	24.55
time regular wage	time worked in regular wage activities last 7 days	12.42	20.25
time independent	time worked in independent and occasional last 7 days	21.98	26.80
income	total weakly labour income in 1000 of CFA	32.30	67.32
wage income	weekly wage income in 1000 of CFA	13.44	38.85
indep income	weekly independent income in 1000 of CFA	18.87	58.25
log total income	weekly labour income + pensions + rents (in log)	2.37	1.68
log spouse income	spouse weakly labour income + pensions + rents (in log)	2.11	1.77

Table 2: Descriptive Statistics for the Sample of Respondents : Transfers and Parents Characteristics

Variable name	Definition	Mean	Std Dev
Transfers (n=528)			
dummy in	=1 if respondent received a transfer from a full sibling	0.30	0.46
dummy out	=1 if respondent gave a transfer to a full sibling	0.60	0.49
amount in	amount received from full siblings in 1000 of CFA	10.78	31.81
amount out	amount sent to full siblings in 1000 of CFA	32.17	174.38
amount net	net amount received and sent to full siblings in 1000 of CFA	21.40	177.89
total out	amount sent to relatives (including parents and half siblings)	54.89	187.87
total net	net amount to relatives (including parents and half siblings)	34.28	191.75
Respondent Parents Characteristics (n= 435)			
father RBR	relative birth rank of respondent's father	0.30	0.32
mother RBR	relative birth rank of respondent's mother	0.32	0.33
father's sib	# of siblings of respondent's father	4.29	2.47
mother's sib	# of siblings of respondent's mother	4.46	2.28
father's older sib	# of older siblings of respondent's father	1.18	1.35
father's younger sib	# of younger siblings of respondent's father	3.10	2.38
mother's older sib	# of older siblings of respondent's mother	1.40	1.51
mother's younger sib	# of younger siblings of respondent's mother	3.07	2.19
father's educ	father's number of years of education	4.02	3.82
mother's educ	mother's number of years of education	2.56	3.01

Table 4: Descriptive Statistics for Respondents and their Siblings

Variable name	Definition	Mean	Std Dev
Sibling's characteristics (with respect to the respondent), n=2171			
younger sib	=1 if sibling younger than respondent	0.62	0.49
kids younger sib	# of children of sibling if sibling younger	0.77	1.45
kids older sib	# of children of sibling if sibling older	1.10	1.90
diff RBR	difference in relative birth rank of respondent and sibling	0.14	0.55
l35 sib	=1 if sibling below 35	0.55	0.50
35-45 sib	=1 if sibling's age between 35 and 45	0.25	0.43
45-55 sib	=1 if sibling's age between 45 and 55	0.14	0.35
sex sib	=1 if sibling is a women	0.49	0.50
successeur sib	=1 if sibling is the designated successeur of his fatther	0.06	0.23
Transfers between respondent and each sibling, n=2171			
dummy in	=1 if respondent made a transfer to the sibling (past 2 months)	0.10	0.30
dummy out	=1 if respondent recieved a transfer from the sibling (past 2 months)	0.25	0.44
amount in	amount received from the sibling (past 2 months) in 1000 of CFA	2.62	14.61
amount out	amount given to the sibling (past 2 months) in 1000 of CFA	7.82	85.62
amount net	net amount transferred to the sibling (past 2 months) in 1000 of CFA	5.20	86.88
hist dummy in	=1 if respondent (or his kids) ever recieved school fees from the sibling	0.02	0.15
hist dummy out	=1 if respondent ever gave school fees to the sibling (or his kids)	0.23	0.42
hist amount in	# years of school fees received from the siblings	0.16	1.40
hist amount out	# years of school fees given to the siblings	1.16	3.54
hist amount net	net # years of school fees transfered to the siblings	1.00	3.76
Respondent's and Sibling's characteristics, n=2677^			
nb older	total number of older siblings	2.40	2.00
tot kids older	total number of children of older siblings	6.42	6.12
nb older m35	total number of older siblings above 35	1.37	1.55
kids	kids of the individual considered (respondent or sibling)	2.25	2.22
education	years of education of respondents and their siblings	8.80	3.70
<35	=1 if individual considered (respondent or sibling) below 35	0.53	0.50
35-45	=1 if individual considered (respondent or sibling) between 35 and 45	0.26	0.44
45-55	=1 if individual considered (respondent or sibling) between 45 and 55	0.15	0.35
Labour market participation (for those above 18), n=2474			
work	=1 if sibling or respondent works	0.68	0.47
regular wage	=1 if sibling or respondent has a regular wage	0.23	0.42
independent	=1 if sibling or respondent has an independent activiy	0.47	0.50

^ For 23 siblings we have no information on education. We drop them from this sample.

Table 5: Transfers pairwise (respondent fixed effect)

	(1) dummy out	(2) dummy in	(3) log out	(4) log in	(5) log net	(6) log net	(7) log net	(8) log net
younger sib	0.2538***	-0.1110***	0.4084***	-0.2974***	0.7327***	0.6339***		
	(4.41)	(-2.96)	(3.17)	(-3.09)	(4.25)	(5.84)		
kids younger sib	-0.0187**	0.0013	-0.0486**	-0.0042	-0.0460			
	(-1.97)	(0.23)	(-2.01)	(-0.25)	(-1.38)			
kids older sib	0.0237***	0.0014	0.0756***	-0.0075	0.0833**			
	(3.17)	(0.27)	(3.07)	(-0.46)	(2.56)			
m35 older sib						0.4008*		
						(1.93)		
kids * younger sib	-0.0212	0.0164*	-0.0136	0.0481**	-0.0676*			
	(-1.55)	(1.96)	(-0.43)	(2.09)	(-1.68)			
m35 * younger sib						-0.5704**		
						(-2.57)		
diff RBR							1.1249***	1.0865***
							(5.65)	(7.48)
kids sib							0.0384	
							(1.55)	
kids sib * diff RBR							-0.1374***	
							(-3.18)	
m35 sib * diff RBR								-0.7774***
								(-3.88)
kids * diff RBR							-0.0770*	
							(-1.75)	
m35 * diff RBR								-0.5585**
								(-2.54)
sex sib	0.0758***	-0.0066	0.1617***	-0.0078	0.1570**	0.1631**	0.1419*	0.1704**
	(3.69)	(-0.48)	(2.84)	(-0.19)	(2.10)	(2.19)	(1.91)	(2.32)
successeur sib	0.0057	0.0742**	-0.0062	0.2173**	-0.2186	-0.2332	-0.2246	-0.2216
	(0.14)	(2.12)	(-0.06)	(2.12)	(-1.39)	(-1.47)	(-1.43)	(-1.42)
<35 sib	-0.1784***	-0.0479	-0.3463*	-0.1260	-0.2066	0.0917	-0.6309**	-0.3344
	(-2.68)	(-0.79)	(-1.88)	(-0.79)	(-0.92)	(0.35)	(-2.32)	(-1.09)
35-45 sib	-0.1483***	-0.0152	-0.4032**	-0.0137	-0.4077**	-0.2719	-0.6602***	-0.3152
	(-2.64)	(-0.27)	(-2.49)	(-0.10)	(-2.15)	(-1.36)	(-3.03)	(-1.25)
45-55 sib	-0.0744	-0.0179	-0.2049	0.0154	-0.2204	-0.1900	-0.3486**	-0.1762
	(-1.45)	(-0.38)	(-1.37)	(0.13)	(-1.34)	(-1.15)	(-2.01)	(-0.94)
Constant	0.2433***	0.1589***	0.5955***	0.4240***	0.1649	-0.0034	0.6281***	0.3989
	(4.39)	(2.95)	(3.69)	(2.96)	(0.84)	(-0.01)	(2.78)	(1.60)
Observations	2171	2171	2171	2171	2171	2171	2171	2171

t statistics in parentheses; Standard errors clustered at the respondent level; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 6: Transfers pairwise (respondent fixed effect) on specific subsamples

	(1) women log net	(2) women log net	(3) men log net	(4) men log net	(5) urban log net	(6) urban log net
younger sib	0.8226***	0.7064***	0.7005**	0.4706*	0.8563***	0.7345***
	(4.25)	(6.42)	(2.13)	(1.77)	(4.22)	(5.81)
kids younger sib	-0.0198		-0.0713		-0.0635	
	(-0.44)		(-1.44)		(-1.49)	
kids older sib	0.0539		0.1249**		0.0396	
	(1.41)		(2.28)		(1.01)	
m35 older sib		0.6259**		0.2130		0.4576*
		(2.31)		(0.61)		(1.78)
kids * younger sib	-0.0996**		-0.0352		-0.1105**	
	(-2.22)		(-0.48)		(-2.40)	
m35 * younger sib		-0.5370**		-0.5340		-0.5733**
		(-2.10)		(-1.47)		(-2.20)
sex sib	-0.0112	-0.0108	0.3890***	0.3809***	0.1682*	0.1499
	(-0.13)	(-0.13)	(3.11)	(2.96)	(1.80)	(1.64)
successeur sib	-0.4349**	-0.4553**	0.0260	0.0589	-0.2523	-0.2678
	(-2.04)	(-2.16)	(0.11)	(0.25)	(-1.40)	(-1.49)
<35 sib	0.1378	0.6981*	-0.4439	-0.3115	0.0424	0.4293
	(0.43)	(1.73)	(-1.35)	(-0.91)	(0.16)	(1.39)
35-45 sib	-0.1185	0.1324	-0.5633**	-0.5298*	-0.2318	-0.0629
	(-0.42)	(0.44)	(-2.09)	(-1.94)	(-1.07)	(-0.27)
45-55 sib	0.1696	0.2459	-0.4805**	-0.4771**	-0.0838	-0.0249
	(0.69)	(0.98)	(-2.22)	(-2.22)	(-0.45)	(-0.13)
Constant	-0.0948	-0.6434	0.2340	0.4682	0.0128	-0.3662
	(-0.32)	(-1.63)	(0.85)	(1.20)	(0.06)	(-1.17)
Observations	1202	1202	969	969	1571	1571

t statistics in parentheses; Standard errors clustered at the respondent level;

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 7: Historic transfers between siblings (respondent fixed effect)

	(1)	(2)	(3)	(4)	(5)	(6)
	log out	log in	log net	log net	log net	log net
younger sib	0.2892***	-0.0158	0.2996***	0.2167***		
	(3.69)	(-0.47)	(3.49)	(4.88)		
kids younger sib	-0.0200	-0.0134	-0.0065			
	(-0.91)	(-1.26)	(-0.33)			
kids older sib	0.0531***	0.0027	0.0481***			
	(4.04)	(0.34)	(3.09)			
m35 older sib				0.0930		
				(0.85)		
kids * younger sib	-0.0008	0.0112	-0.0109			
	(-0.04)	(0.95)	(-0.46)			
m35 * younger sib				-0.1099		
				(-0.97)		
diff RBR					0.5352***	0.4359***
					(5.45)	(7.18)
kids sib					0.0346**	
					(2.52)	
kids sib * diff RBR					-0.0481**	
					(-2.15)	
m35 sib * diff RBR						-0.1899**
						(-1.99)
kids * diff RBR					-0.0189	
					(-0.78)	
m35 * diff RBR						-0.0646
						(-0.61)
sex sib	0.0601*	0.0031	0.0524	0.0647*	0.0411	0.0643*
	(1.89)	(0.25)	(1.55)	(1.91)	(1.23)	(1.91)
successeur sib	0.0549	0.0355	0.0205	0.0172	0.0132	0.0184
	(0.89)	(0.87)	(0.27)	(0.23)	(0.18)	(0.25)
<35 sib	0.1900	-0.1403*	0.3081**	0.3220**	0.0213	0.0104
	(1.63)	(-1.79)	(2.23)	(1.97)	(0.14)	(0.06)
35-45 sib	0.1315	-0.1039	0.2141*	0.2091*	0.0330	0.0617
	(1.27)	(-1.51)	(1.78)	(1.65)	(0.25)	(0.44)
45-55 sib	0.2114**	-0.0281	0.2379**	0.2257**	0.1436	0.1557
	(2.17)	(-0.49)	(2.15)	(2.03)	(1.25)	(1.32)
Observations	2171	2171	2171	2171	2171	2171

t statistics in parentheses; Standard errors clustered at the respondent level;

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 8: Transfers for full siblings at the respondent level

	(1) dummy out	(2) dummy in	(3) log out	(4) log in	(5) log net	(6) log net	(7) log total net	(8) log net	(9) log net
nb younger	0.0461***	-0.0337***	0.2167***	-0.1390***	0.3704***	0.3165***	0.2650***	0.4267***	0.3155***
	(3.65)	(-2.94)	(5.00)	(-3.27)	(6.01)	(5.05)	(3.31)	(3.80)	(5.02)
nb older	-0.0192	0.0426*	-0.0850	0.1523**	-0.2267*	-0.0267	-0.2138	-0.1617	-0.0300
	(-0.76)	(1.71)	(-0.92)	(2.10)	(-1.70)	(-0.22)	(-1.30)	(-1.02)	(-0.25)
tot kids younger	-0.0111	0.0164**	-0.0611**	0.0632***	-0.1201***		-0.0610	-0.1161***	
	(-1.62)	(2.54)	(-2.39)	(3.13)	(-3.34)		(-1.44)	(-2.96)	
nb younger m35						-0.2691*			-0.2579*
						(-1.78)			(-1.68)
tot kids of older	0.0136*	-0.0024	0.0640**	-0.0184	0.0892**		0.1009**	0.0958**	
	(1.93)	(-0.33)	(2.36)	(-0.86)	(2.27)		(2.24)	(2.36)	
nb older m35						0.0760			0.0449
						(0.50)			(0.26)
kids	-0.0052	0.0050	-0.0360	0.0159	-0.0247		-0.1137*	0.0360	
	(-0.50)	(0.47)	(-0.81)	(0.47)	(-0.43)		(-1.71)	(0.37)	
kids * nb younger								-0.0156	
								(-0.61)	
kids * nb older								-0.0259	
								(-0.74)	
m35 * nb older									0.0775
									(0.43)
sex	0.0167	0.0683	0.1694	0.1286	0.1872	0.1391	-0.2815	0.1925	0.1265
	(0.29)	(1.11)	(0.82)	(0.66)	(0.55)	(0.42)	(-0.72)	(0.57)	(0.38)
successeur	0.0472	0.0738	0.4269	0.1512	0.3521	0.2937	0.7323*	0.3681	0.2881
	(0.66)	(1.00)	(1.48)	(0.60)	(0.90)	(0.73)	(1.82)	(0.93)	(0.72)
education	0.0187***	-0.0084	0.0914***	-0.0152	0.0913***	0.1007***	0.0968**	0.0913***	0.0992***
	(2.94)	(-1.40)	(3.94)	(-0.73)	(2.68)	(2.94)	(2.51)	(2.68)	(2.87)
log total income	0.0669***	-0.0026	0.3545***	-0.0015	0.3627***	0.3736***	0.5305***	0.3645***	0.3738***
	(4.54)	(-0.17)	(6.43)	(-0.03)	(4.18)	(4.25)	(5.19)	(4.19)	(4.25)
couple	-0.0273	0.0280	-0.1644	0.1471	-0.2175	-0.2366	-0.1740	-0.2546	-0.2419
	(-0.31)	(0.34)	(-0.49)	(0.61)	(-0.49)	(-0.53)	(-0.33)	(-0.57)	(-0.54)
log spouse income	0.0200	-0.0070	0.1251**	-0.0261	0.1800**	0.1920**	0.2777***	0.1789*	0.1954**
	(1.30)	(-0.45)	(2.24)	(-0.51)	(1.98)	(2.13)	(2.67)	(1.96)	(2.13)
spouse family	0.0012	-0.0026	0.0013	-0.0086	0.0096	0.0100	0.0159	0.0105	0.0097
	(0.57)	(-1.27)	(0.18)	(-1.25)	(0.89)	(0.90)	(1.21)	(0.96)	(0.88)
<35	0.2109**	0.0517	0.8065*	0.2515	0.0029	0.0505	0.8733	0.0648	0.1397
	(2.12)	(0.53)	(1.68)	(0.75)	(0.01)	(0.09)	(1.52)	(0.13)	(0.25)
35-45	0.1827**	0.0853	0.8885*	0.3729	0.0516	-0.0139	1.1572**	0.1442	-0.0386
	(1.99)	(0.97)	(1.81)	(1.11)	(0.12)	(-0.03)	(2.19)	(0.32)	(-0.08)
45-55	0.1020	0.0387	0.8979*	0.1893	0.2428	0.2514	1.2451**	0.2972	0.2312
	(1.12)	(0.44)	(1.67)	(0.56)	(0.51)	(0.53)	(2.22)	(0.62)	(0.48)
Observations	528	528	528	528	528	528	528	528	528

Marginal effects from tobit regressions in columns (3) and (4) ; t statistics in parentheses;
Standard errors clustered at the respondent level; $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 9: Labour market participation of respondents and their siblings (extended family fixed effects)

	(1) Work	(2) Regular wage	(3) Independent	(4) Work men	(5) Work women	(6) Work urban	(7) Work	(8) Wage	(9) Independent
nb older	-0.1348***	-0.0392***	-0.1001***	-0.1331***	-0.1313***	-0.1377***	-0.1185***	-0.0464***	-0.0774***
	(-9.77)	(-4.07)	(-8.00)	(-6.90)	(-6.21)	(-8.89)	(-9.20)	(-5.65)	(-6.68)
tot kids of older	0.0303***	0.0088**	0.0226***	0.0314***	0.0319***	0.0320***			
	(6.16)	(2.13)	(4.50)	(4.25)	(3.81)	(5.19)			
nb older m35							0.0950***	0.0394**	0.0538**
							(4.69)	(2.09)	(2.52)
kids	0.0549***	0.0279***	0.0390***	0.0719***	0.0416***	0.0461***			
	(6.51)	(3.88)	(3.84)	(5.56)	(2.97)	(4.82)			
kids * nb younger	-0.0046	-0.0016	-0.0038	-0.0062*	-0.0019	-0.0021			
	(-1.63)	(-0.69)	(-1.35)	(-1.75)	(-0.40)	(-0.63)			
m35 * nb younger							-0.0153	-0.0121	-0.0053
							(-0.88)	(-0.91)	(-0.29)
education	0.0088**	0.0408***	-0.0269***	0.0054	0.0164**	0.0004	0.0081**	0.0403***	-0.0274***
	(2.38)	(11.43)	(-6.66)	(0.95)	(2.21)	(0.10)	(2.17)	(11.13)	(-6.80)
sex	-0.2090***	-0.1020***	-0.1142***			-0.1818***	-0.1971***	-0.0907***	-0.1072***
	(-10.51)	(-5.67)	(-5.15)			(-8.30)	(-10.05)	(-5.13)	(-4.93)
<35	0.4236***	0.0251	0.4302***	0.5990***	0.2232*	0.3453***	0.2639***	-0.0973	0.3987***
	(5.09)	(0.34)	(4.80)	(4.91)	(1.76)	(3.58)	(2.66)	(-1.13)	(3.58)
35-45	0.3172***	0.0603	0.2921***	0.4951***	0.1345	0.2580***	0.2581***	0.0020	0.3049***
	(4.59)	(0.95)	(3.99)	(4.65)	(1.35)	(3.27)	(3.45)	(0.03)	(3.68)
45-55	0.1501***	0.0813	0.0928	0.3297***	-0.0012	0.1103*	0.1336**	0.0565	0.1069*
	(2.80)	(1.64)	(1.55)	(4.01)	(-0.02)	(1.88)	(2.42)	(1.19)	(1.68)
Constant	0.3857***	-0.1523**	0.4687***	0.2127*	0.2893***	0.5474***	0.6311***	0.0173	0.5737***
	(5.51)	(-2.37)	(6.52)	(1.90)	(2.82)	(7.01)	(6.32)	(0.22)	(5.27)
Observations	2474	2474	2474	1234	1240	1825	2474	2474	2474

t statistics in parentheses
Standard errors clustered at the respondent level
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 10: Respondents' labour market participation and working time decisions

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Work	Work	Working time	Time regular wage	Time independent	Work	Working time
nb younger	-0.0065	0.0052	-0.1689	0.3449	-0.5222	-0.0073	-0.4720
	(-0.59)	(0.27)	(-0.24)	(0.72)	(-0.71)	(-0.66)	(-0.70)
nb older	-0.0627***	-0.0570**	-2.4218*	1.2931	-4.1535***	-0.0667**	-1.0661
	(-2.78)	(-2.10)	(-1.78)	(1.39)	(-3.06)	(-2.42)	(-0.62)
tot kids of younger	-0.0064	-0.0049	-0.3041	0.0927	-0.2337		
	(-1.17)	(-0.84)	(-0.80)	(0.37)	(-0.62)		
nb younger m35						-0.0151	0.2382
						(-0.64)	(0.18)
tot kids of older	0.0150**	0.0153**	0.9973**	-0.2059	1.2863***		
	(2.36)	(2.42)	(2.33)	(-0.70)	(3.31)		
nb older m35						0.0594**	1.8002
						(2.00)	(0.98)
kids	0.0169*	0.0254	0.0571	-0.7867*	0.8434		
	(1.75)	(1.54)	(0.08)	(-1.85)	(1.33)		
kids * nb younger		-0.0033					
		(-0.72)					
kids * nb older		-0.0018					
		(-0.31)					
sex	-0.2681***	-0.2670***	-20.6166***	-3.6194*	-14.8598***	-0.2551***	-20.8418***
	(-6.25)	(-6.21)	(-7.37)	(-1.80)	(-4.65)	(-5.93)	(-7.37)
successeur	0.0066	0.0094	0.8952	0.7422	-0.1440	0.0116	0.9137
	(0.12)	(0.18)	(0.27)	(0.30)	(-0.04)	(0.22)	(0.28)
education	0.0078	0.0080	-0.3518	1.7451***	-2.4768***	0.0065	-0.3901
	(1.55)	(1.57)	(-1.09)	(8.10)	(-7.17)	(1.26)	(-1.21)
couple	-0.2187***	-0.2199***	-1.9994	-2.7755	0.7657	-0.2044***	-2.2770
	(-2.96)	(-2.93)	(-0.40)	(-0.75)	(0.15)	(-2.65)	(-0.45)
log spouse income	0.0007	0.0007	-0.4417	0.0782	-0.4350	0.0021	-0.4124
	(0.05)	(0.06)	(-0.56)	(0.15)	(-0.51)	(0.15)	(-0.52)
spouse family	0.0011	0.0011	-0.0022	-0.0852	0.0482	0.0016	0.0414
	(0.64)	(0.66)	(-0.02)	(-1.00)	(0.42)	(0.94)	(0.39)
<35	0.2935***	0.3009***	25.2891***	6.2673	21.4094***	0.2418**	27.3849***
	(3.02)	(3.04)	(4.11)	(1.33)	(3.40)	(2.30)	(4.13)
35-45	0.3826***	0.3931***	31.2664***	15.1972**	20.4542***	0.3314***	32.5770***
	(4.31)	(4.30)	(5.08)	(2.57)	(3.07)	(3.52)	(4.98)
45-55	0.3581***	0.3649***	30.2741***	20.3461***	15.1927**	0.3393***	31.1311***
	(4.10)	(4.11)	(4.77)	(2.80)	(2.20)	(3.71)	(4.83)
Observations	528	528	528	528	528	528	528

t statistics in parentheses; Standard errors clustered at the respondent level

Columns (1), (2) and (6) report parameter estimates of OLS regressions. Columns (3), (4), (5) and (7) report marginal effects after tobit regressions.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 11: Income and saving flow

	(1) Income	(2) Income	(3) Wage income	(4) Indep income	(5) Income	(6) Saving prop	(7) Saving prop	(8) Saving prop
nb younger	-0.0225	0.0129	0.0465	-0.0614	-0.0257	-0.0033	0.0072	-0.0020
	(-0.52)	(0.16)	(1.26)	(-1.35)	(-0.59)	(-0.51)	(0.71)	(-0.33)
nb older	-0.2204**	-0.2341**	0.0616	-0.3563***	-0.2981***	-0.0219*	-0.0400**	-0.0451***
	(-2.43)	(-2.08)	(0.86)	(-4.32)	(-2.82)	(-1.76)	(-2.15)	(-3.06)
tot kids of younger	-0.0111	-0.0042	0.0077	-0.0096		0.0033	0.0060*	
	(-0.48)	(-0.17)	(0.41)	(-0.40)		(1.11)	(1.83)	
nb younger m35					0.0098			0.0131
					(0.10)			(1.27)
tot kids of older	0.0496*	0.0468*	-0.0085	0.0897***		0.0061*	0.0045	
	(1.93)	(1.83)	(-0.41)	(4.05)		(1.84)	(1.30)	
nb older m35					0.2790**			0.0486***
					(2.46)			(3.35)
kids	0.0245	0.0341	-0.0428	0.0586*		-0.0032	-0.0057	
	(0.60)	(0.45)	(-1.33)	(1.72)		(-0.63)	(-0.59)	
kids * nb younger		-0.0101					-0.0031	
		(-0.54)					(-1.33)	
kids * nb older		0.0082					0.0073*	
		(0.33)					(1.79)	
sex	-1.5960***	-1.5912***	-0.3572**	-0.9723***	-1.5561***	-0.0802***	-0.0773***	-0.0789***
	(-9.39)	(-9.33)	(-2.25)	(-4.95)	(-8.98)	(-2.95)	(-2.96)	(-3.02)
successeur	0.1097	0.1169	-0.0174	-0.0115	0.1421	-0.0155	-0.0148	-0.0076
	(0.49)	(0.52)	(-0.10)	(-0.05)	(0.63)	(-0.50)	(-0.48)	(-0.24)
education	0.0985***	0.0992***	0.1629***	-0.0943***	0.0938***	0.0001	0.0005	-0.0004
	(4.78)	(4.81)	(9.44)	(-4.36)	(4.59)	(0.04)	(0.18)	(-0.12)
couple	-0.8262***	-0.8042***	-0.3589	-0.2681	-0.7776**	-0.0372	-0.0195	-0.0358
	(-2.73)	(-2.64)	(-1.10)	(-0.84)	(-2.56)	(-0.82)	(-0.44)	(-0.83)
log spouse income	0.0903*	0.0911*	0.0174	0.0262	0.0936*	0.0165**	0.0162**	0.0160**
	(1.67)	(1.69)	(0.43)	(0.44)	(1.75)	(2.39)	(2.39)	(2.33)
spouse family	-0.0003	-0.0008	-0.0038	-0.0026	0.0009	-0.0012	-0.0015	-0.0009
	(-0.05)	(-0.11)	(-0.55)	(-0.40)	(0.14)	(-1.15)	(-1.44)	(-0.90)
log total income						0.0768***	0.0763***	0.0755***
						(9.98)	(10.08)	(9.79)
<35	1.1804***	1.1822***	0.4608	0.9800***	1.2550***	0.0047	0.0007	0.0468
	(3.37)	(3.37)	(1.16)	(2.98)	(3.18)	(0.10)	(0.02)	(0.93)
35-45	1.7324***	1.7296***	1.1543**	1.1161***	1.6779***	0.0081	-0.0029	0.0205
	(5.00)	(4.97)	(2.32)	(3.21)	(4.46)	(0.19)	(-0.07)	(0.44)
45-55	1.8433***	1.8439***	1.7014***	0.7701**	1.8214***	0.0096	0.0036	0.0166
	(4.96)	(4.98)	(2.70)	(2.04)	(4.88)	(0.21)	(0.08)	(0.36)
Observations	525	525	525	525	525	525	525	525

Marginal effects; t statistics in parentheses; Standard errors clustered at the respondent level;
The number of observations drops to 525 in this analysis because in three cases we cannot compute total expenditure (needed to define savings flow).
Columns (1) to (5) report marginal effects at means after tobit regressions.
Columns (6) to (9) report marginal effects after a quasi-ML estimatoins for fractional dependent variables as in Papke and Wooldridge (1996).
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 12: Distribution of respondent and their siblings' education levels^ by parental birth ranks

	Full sample	Mother low RBR	Mother high RBR	Father low RBR	Father high RBR
Primary	23.4%	22.0%	26.0%	22.0%	27.0%
Junior high	32.9%	31.7%	35.3%	33.6%	31.3%
Senior high	30.2%	30.9%	28.7%	29.8%	31.1%
Post secondary	13.5%	15.3%	10.1%	14.6%	10.6%
Total	100%	100%	100%	100%	100%

^ Each category comprises children who did not go beyond that level.

Table 13: Respondents and their siblings' education

	(1) OLS fixed effect nb years education	(2) OLS nb years education	(3) OLS nb years education	(4) Oprobit education level reached	(5) Marg (Post secondary) education level reached
father's older sib		-0.0798			
		(-0.92)			
father's younger sib		-0.0490			
		(-0.95)			
mother's older sib		-0.0860			
		(-1.10)			
mother's younger sib		0.1566**			
		(2.53)			
father RBR			-0.2642	-0.1193	-0.0223
			(-0.68)	(-0.96)	(-0.96)
mother RBR			-0.7730**	-0.2847**	-0.0533**
			(-2.27)	(-2.50)	(-2.50)
father's sib			-0.0470	-0.0127	-0.0024
			(-0.96)	(-0.79)	(-0.79)
mother's sib			0.0808	0.0236	0.0044
			(1.39)	(1.31)	(1.30)
nb younger		-0.1423**			
		(-2.03)			
nb older		0.0048			
		(0.06)			
RBR	0.5680**		0.8201***	0.2028***	0.0379***
	(2.15)		(3.55)	(2.66)	(2.61)
siblings			-0.0718	-0.0325	-0.0061
			(-1.04)	(-1.41)	(-1.43)
father's educ		0.2813***	0.2757***	0.0865***	0.0162***
		(5.82)	(5.77)	(5.70)	(5.42)
mother's educ		0.0895	0.1035*	0.0329*	0.0062*
		(1.46)	(1.72)	(1.76)	(1.76)
sex	-1.0373***	-1.1001***	-1.1028***	-0.3228***	-0.0603***
	(-7.51)	(-7.16)	(-7.18)	(-6.50)	(-5.99)
<35	0.9663*	1.2630***	1.1656**	0.2952**	0.0554**
	(1.69)	(2.66)	(2.45)	(2.06)	(2.05)
35-45	1.0844**	1.7782***	1.7005***	0.4177***	0.0870***
	(2.11)	(3.92)	(3.73)	(3.07)	(2.79)
45-55	0.9673**	1.4572***	1.3940***	0.3243**	0.0694**
	(2.10)	(3.22)	(3.09)	(2.43)	(2.15)
Observations	2042	2042	2042	2042	2042

Marginal effects; t statistics in parentheses; Standard errors clustered at the respondent level;
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 14: Respondents' children education

	(1) OLS	(2) OLS	(3) Oprobit	(4) Marg (Post sec)	(5) Oprobit	(6) Marg (Post sec)
father's older sib	-0.787**		-0.329**	-0.123**		
	(-2.41)		(-2.23)	(-2.21)		
father's younger sib	-0.324*		-0.106	-0.0394		
	(-1.72)		(-1.27)	(-1.26)		
mother's older sib	-0.00471		0.0528	0.0197		
	(-0.02)		(0.42)	(0.42)		
mother's younger sib	0.610***		0.330***	0.123***		
	(2.99)		(3.62)	(3.55)		
father RBR		-1.101			-0.436	-0.162
		(-1.25)			(-1.08)	(-1.08)
mother RBR		-2.711***			-1.187***	-0.440***
		(-3.08)			(-2.94)	(-2.95)
father's sib		-0.396**			-0.132	-0.0489
		(-2.59)			(-1.57)	(-1.57)
mother's sib		0.444***			0.245***	0.0907***
		(4.12)			(4.88)	(4.74)
father <55	0.762	0.816	0.365	0.139	0.351	0.133
	(1.07)	(1.01)	(0.94)	(0.92)	(0.85)	(0.84)
mother <45	-3.335**	-2.386**	-1.646**	-0.406***	-1.042	-0.306**
	(-2.42)	(-2.09)	(-2.14)	(-3.61)	(-1.64)	(-2.30)
mother 45-55	-1.237*	-0.737	-0.660	-0.244	-0.386	-0.143
	(-1.68)	(-1.33)	(-1.57)	(-1.60)	(-1.09)	(-1.10)
father's educ	0.142*	0.155**	0.0369	0.0138	0.0467	0.0173
	(1.76)	(2.02)	(0.81)	(0.82)	(1.19)	(1.19)
mother's educ	0.0145	0.0252	0.0194	0.00721	0.0313	0.0116
	(0.15)	(0.24)	(0.46)	(0.45)	(0.65)	(0.65)
father's income	0.00334	-0.000142	0.0120*	0.00448*	0.0108*	0.00400*
	(0.69)	(-0.03)	(1.93)	(1.81)	(1.96)	(1.85)
mother's income	0.00406	0.00822	0.00369*	0.00138*	0.00556**	0.00206**
	(0.70)	(1.18)	(1.70)	(1.71)	(2.29)	(2.34)
age	0.00775	0.0733	0.00449	0.00167	0.0421	0.0156
	(0.11)	(1.39)	(0.15)	(0.15)	(1.33)	(1.30)
sex	-0.155	-0.140	-0.230	-0.0855	-0.213	-0.0786
	(-0.47)	(-0.41)	(-1.40)	(-1.36)	(-1.30)	(-1.28)
nb older	-0.389**		-0.177*	-0.0659*		
	(-2.16)		(-1.79)	(-1.75)		
nb younger	-0.331**		-0.179**	-0.0665**		
	(-2.07)		(-2.03)	(-1.98)		
siblings		-0.379***			-0.182**	-0.0674**
		(-2.79)			(-2.29)	(-2.25)
RBR		0.450			0.592	0.220
		(0.47)			(0.92)	(0.91)
Observations	152	152	152	152	152	152

Marginal effects; t statistics in parentheses; Standard errors clustered at the household level;

Father and mother variables correspond to our respondents. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 15: Respondents' and their siblings' fertility (extended family fixed effect)

	(1)	(2)	(3)	(4)	(5)	(6)
	All	All	Men	Women	All>45	Women>45
nb older	-0.4126***		-0.3490***	-0.4668***	-0.5003***	-0.7569***
	(-17.94)		(-11.52)	(-13.65)	(-3.22)	(-3.31)
RBR		-1.8899***				
		(-13.72)				
sex	0.6528***	0.6693***			0.2773	
	(9.69)	(9.80)			(0.86)	
education	-0.0427***	-0.0307**	-0.0292	-0.0983***	0.0076	-0.0410
	(-3.08)	(-2.25)	(-1.41)	(-3.70)	(0.19)	(-0.46)
<35	-0.5027	-0.5095	-1.5603***	0.3581		
	(-1.62)	(-1.48)	(-3.75)	(0.66)		
35-45	0.0954	0.2250	-0.5907	0.5826		
	(0.33)	(0.71)	(-1.56)	(1.13)		
45-55	-0.0565	0.0958	-0.5291*	0.0920	0.2020	1.1311
	(-0.21)	(0.34)	(-1.72)	(0.19)	(0.47)	(1.48)
constant	3.5374***	3.3149***	4.0782***	4.1684***	4.0950***	4.3668***
	(12.85)	(11.57)	(11.61)	(8.72)	(9.24)	(6.04)
Observations	2677	2677	1338	1339	565	287

t statistics in parentheses

Standard errors clustered at the household level

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$