Abstract

85% of Italian men aged 18-33 live with their parents. We argue that Italian parents like to live with their children and a rise in their income makes it possible for them to offer their children higher consumption in exchange for their presence at home. Children prefer to live on their own but are willing to exchange some independence for extra consumption. We formalize this intuition with a bargaining model between parents and children. We test the predictions of the model by estimating the effect of parental income on the probability that children live with their parents. The key econometric issue is the endogeneity of parental income. In order to identify the causal effect of parental income on children's living arrangements we use changes in parents' retirement age induced by the 1992 reform of the Italian social security as an instrument for parental income. By raising retirement age, this reform forced some fathers to remain in the labor market longer than the cohort immediately preceding them, therefore raising their income. Our instrumental variable estimates indicate that a rise in parents' income significantly raises the children's propensity to live at home: a $500 increase in annual parental income results in a 3 to 3.5 percentage point rise in the proportion of children living with their parents.

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Keywords: Family structure, Living Arrangements, Two-Sample IV.

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Intergenerational Transfers and Household Structure
Why Do Most Italian Youths Live With Their Parents?

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1. Introduction

Young Italian men are considerably more likely to live with their parents than are their European and American counterparts. 85% of Italian men aged 18-33 live with their parents. In contrast, only 35% of American men of the same age live with their parents (Table 1). The percentage is only slightly higher for French, German and British men. Even among the other Southern European countries, rates of cohabitation are still lower than they are in Italy.

In this paper we analyze the economic determinants of the living arrangements of young Italian men. Obvious explanations for the high fraction of cohabiting Italians are the high youth unemployment rate and housing costs. While we do not rule out the importance of these two factors, we focus on an alternative, less obvious explanation. We argue that a rise in parental income makes it possible for parents to offer their children higher consumption in exchange for their presence at home. We formalize this intuition within the framework of a simple bargaining model between parents and children based on the assumption that cohabitation is a 'good' for parents and a 'bad' for children. In support of this assumption, data from the World Values Survey show that Italian parents are systematically happier if their children live at home while the opposite happens in the US. Our theoretical model predicts that among selfish parents, all else equal, an increase in parental income results in an increase in transfers to cohabiting children, thereby raising the probability that children live with their parents.

We test this hypothesis using data from the individual records of the Bank of Italy Survey of Households' Income and Wealth (SHIW) for 1989 to 1998. The key problem in estimating the effect of parental income on the children's propensity to cohabit is the potential endogeneity of parental income. Parental income is likely endogenous because of the endogeneity of parental labor supply (parents of unemployed children may decide to work more in order to support their cohabiting children) or altruistic behavior of children (if parents suffer negative income or health shocks, their children may invite their parents to live with them). An additional problem arises because data on parental income are available only for cohabiting children. As with most existing household data sets, our data lack information on parental income for non-cohabiting children.

To address the problems of endogeneity and lack of parental income, we use a Two-Sample instrumental variable strategy (Angrist and Krueger, 1992). Under an exclusion

restriction, the two-sample IV generates a consistent estimate of the effect of parental income on children's living arrangements.

Specifically, our instrumental variable strategy is based on the increase in normal retirement age mandated by the 1992 reform of social security. The change in the retirement law potentially forced some cohorts of parents to stay in the labor force longer than they would have stayed otherwise, thereby significantly increasing the disposable income of some cohorts but not others. Since our data can provide information on the age of parents for both cohabiting and non-cohabiting children, we can analyze the effects of the reform on children's living arrangements. Because our instrument is based on a change in retirement eligibility, not on the actual retirement decision, it is arguably exogenous with respect to other determinants of living arrangements. In support of this, we show that the instrument is orthogonal to many observable exogenous characteristics of parents and children.

A feature of the reform is that retirement age increased over time (from 60 at the beginning of the period to 64 at the end). This is useful because it allows to include unrestricted father age effects in the model. Identification comes from the interaction of father age and year of the mandated changes.

Instrumental variables estimates suggest that parents' income is an important determinant of their children's propensity to live at home. A 1 million lira increase in annual parental income (approximately $500) raises the probability of cohabiting by 3 to 3.5 percentage points. The estimates are robust to controls for local labor and housing market conditions, standard socio-economic characteristics, such as parents' education and children's age and school enrolment. Our findings are inconsistent with the hypothesis that parents behave altruistically toward their children.[1]

This work differs in two main respects from the existing empirical literature. First, previous research has focused on youth labor market conditions as important determinants of living arrangements while we focus on the role of parental transfers.[2] For example, Card and Lemieux (2000) compare living arrangement decisions of American and Canadian youths. They find that poor labor market conditions in Canada explain why the fraction of youth living with their parents has increased in Canada relative to the US in recent years. In this

[1] There is remarkably little literature on housing arrangements of young Italians. One exception is Fogli (2000) who proposes an overlapping generation model to study the relationship between family ties and labor market rigidities. Recently Bentolila et al. (2001) propose an empirical test of Fogli's model.

[2] A related stream of literature analyzes the effect of pension and welfare transfers on living arrangements. Costa (1997) and Mcgarry and Shoeni (2000) study the effect of pensions on living arrangement decisions of the elderly. Recently Bitler, Gelbach and Hoynes (2001) study the effect of the US welfare reforms of the 1990s on the living arrangements of children and women.

paper we examine the role of parental transfers in determining the living arrangements by considering housing arrangements as a consumption good for parents and children.[3]

Second, our identification strategy, while similar to some used previously, represents an improvement. Bertrand, Miller and Mullainathan (2001) and Duflo (2000) have previously exploited a special feature of the Pension system (in South Africa) to identify the effect of grandparents' income on grandchildren's labor supply and well-being and ultimately to test for different models of household consumption. A recent paper by Edmonds, Mammen and Miller (2001) uses the same feature of the South African pension system to evaluate the effect of government transfers on household composition. The instrument in all these papers is based on the non-linearity in old-age pension eligibility that mandates that only men above 65 and women above 60 can receive pensions. Unlike this previous work which relies on cross-sectional variation in the grandparents' age for identification, we are able to exploit a change in the retirement age over the sample time period, allowing us to control for unrestricted age effects as well.

Finally, by modeling children's living arrangements as a consumption good, our research adds to the to the literature on household consumption and the debate on parents' altruism dating back to Becker's (1981) seminal analysis. The existing evidence (Deaton, Ruiz-Castillo and Thomas, 1989; Thomas 1990 and Chiappori, Bourguignon, Browning and Lechene, 1994, inter alia) suggests that Becker's unitarian model of household consumption is strongly rejected in the data. Also, direct evidence on intra-vivos transfers from parents to children (Cox, 1990; Altonji, Hayashi and Kotlikoff, 1997) lends little empirical support to the view that parents are altruistic. Our work provides further evidence to challenge Becker's view with respect to parental altruism, one of the assumptions behind his Rotten Kid theorem.

The rest of the paper is organized as follows. In Section 2 we present a stylized model of living arrangements. In Section 3 we describe the data and present our empirical results. Section 4 concludes.

[3]McElroy (1985) proposes a structural model of children's living arrangements where parental income acts as a source of insurance for children happening to be in a bad state of the world. Ruiz-Castillo and Martínez-Granado (2002) use this model to study the living arrangements decisions of Spanish youths.

2. A Simple Model of Living Arrangements

In this Section we present a simple model of children's housing arrangements and present some empirical evidence that supports the basic assumption behind the model. The basic insight of the model is that, conditional on housing costs and children's earnings, a rise in parental income tends to increase the children's propensity to live at home.

We use a bargaining model to describe household consumption decisions. We assume that parents derive some utility from cohabiting with their children while the opposite is true for children. Parents can transfer money to their children in order to provide an incentive for them to stay at home. We call this transfer the 'bribe'. Depending on their utility function and the value of their income, children might be willing to trade some of their independence for some extra consumption. We begin by ignoring any altruistic motive. Later in the section we allow for parents' altruism towards their offspring and show that the results can be reversed if parents are sufficiently altruistic.

Cohabitation in this game brings a surplus, the foregone children's housing cost. We assume that parents possess all the bargaining power so that they appropriate the whole surplus if they get their children to cooperate. We solve the problem by backward induction. We assume that children decide their living arrangements conditional on the transfers they receive from their parents. Parents then derive the optimal transfer by maximizing their own utility conditional on the children's optimal reaction.

One of the key assumptions of our model is that parents draw utility from their children's presence at home, while children would rather live on their own.[4] Evidence suggests that this assumption may be reasonable for Italy, but not necessarily for other countries, particularly the US. Table 2 shows the results of an OLS regression of a measure of parental happiness on a dummy variable indicating whether at least one child lives with the parents and a set of covariates. Parents are defined as men aged 40 to 75 and women aged 37 to 72 with children. The coefficient on the cohabitation dummy is reported for the same set of countries as in Table 1. Data are from the World Value Survey 1981-84, which includes the question: "Taking all things together, would you say you are: Not at all happy, Not very happy, Quite happy, Very happy". We classify the possible answers into equally spaced values between zero and one, with "Not at all Happy" being zero and "Very Happy" being

[4] As suggested by Cox (1990), parents might derive a utility both from services provided by children (care or housecleaning, for example) as well as "more subtle types of service that entails the behavioral constraints associated with attention to parents […], companionship and conforming to parents' regulations".

one. In the first column of the table we report the results of a regression with basic controls including family income, parents' gender, parents' age and age squared plus country-specific dummies. In the second column we have included additional controls, namely a full set of dummies for parents' marital status (married, cohabiting, single, divorced or separated and widowed), dummies for their employment status (employed, unemployed, housewife, student, pensioner and other inactive) and a health status variable. According to the estimates in column 1, parents in Italy and Spain seem to be significantly happier if their children live with them, while the opposite is true in the US. When we introduce further controls in column 2, the coefficient becomes insignificant for Spain, but remains significant and positive for Italy.

Evidence from the same survey also supports our assumption that Italian children, all things equal, are indifferent between living at home and living independently. In Table 3 we present results from a separate regression where the dependent variable is children's happiness. The sample includes males age 18 to 33, consistent with the sample that we use in the empirical part of the paper. The variable of interest here is a dummy variable for whether the child lives with his parents. In all countries, including Italy, the effect of cohabitation is negative, although it tends to become statistically insignificant when all controls are included.

Although our results are only suggestive, it appears that children are indifferent between living at home and living independently in all countries included in this analysis while parents' tastes for cohabitation with children differ between Italy and the rest of the countries in our sample.

2.1 No altruism

We assume that children's utility is a function of consumption and a term representing the disutility of living at home. Their resources are a function of their income, the compensation they receive from their parents if living at home minus any housing cost they will have to incur if living on their own. Assuming a Stone-Geary utility function, their problem can be written as:

$$\text{Max } \log(CK+k_1H) - H\log(a_1) \qquad \text{s.t. } CK+R(1-H)=YK+b_1H$$

where CK is children's consumption; H is a dummy variable equal 1 if the child is living at home; YK children's income and R their housing costs; b_1 is the compensation for being at home, which either comes in the form of a provision of goods or cash transfers from parents to children; a_1 is the children's marginal disutility of living at home ($a_1>=1$); and the term k_1H accounts for the fact that the level of consumption depends on whether children live with their parents or not. We have postulated that parents only make transfers to their children if they live at home, a hypothesis that we will remove later when we deal with the altruistic case. We assume that housing costs are borne by children if they live away from home and by parents if children cohabit. Children stay with their parents if the marginal utility of living with their parents is at least equal to the marginal disutility, a_1:

(1) $H=1$ if $(YK+b_1+k_1)/(YK-R)>=a_1$

Conditional on the bribe, b_1, the propensity of children to live with their parents depends inversely on their income, YK, and directly on housing costs, R . (See appendix for the proof.)

Parents' budget constraint requires parents' consumption not to exceed their income minus any bribe they pay to cohabiting children. We assume that parents observe their children's preferences, income and housing costs and maximize

$$\text{Max } \log(CP+k_2H)+H\log(c_1) \quad \text{s.t.} \quad CP=YP-b_1H$$
$$\text{s.t.} \quad H=1 \quad \text{if} \quad k_1>=(a_1-1)YK-a_1R-b_1$$

where CP is parents' consumption and YP is their income; k_2 denotes scale economies which accrue to parents from living with their children; and $c_1>=1$ is the parents' marginal utility of living with their children.

In equilibrium, parents set b_1 to make children indifferent between living with them and living on their own. Any surplus deriving from reaching an agreement ($R+k_1+k_2$) will then accrue to parents who have all the bargaining power. In equilibrium:

(2) $H=1$ if $k_1+k_2>=-(c_1-1)/c_1\ YP+(a_1-1)YK-a_1R$

and the optimal transfer is $b_1^*=(a_1-1)YK-a_1R-k_1$. (See appendix for the proof.) From equation 2 it is clear that in equilibrium the propensity of children to live with their parents depends inversely on their income, YK, and directly on parents' income, YP.

2.2 Altruistic parents

We have argued that as parents' income increases, they are willing to give up more of their consumption in order to compensate those children who cooperate, thereby increasing the likelihood that their children live with them. We now extend the model to allow for altruistic behavior of parents towards their children. In this case parents transfer some resources to their children irrespective of their living arrangement, although there is an additional transfer if children decide to co-reside. The children's budget constraint is now a function of both the bribe and the altruistic transfer they receive from their parents:

$$\text{Max } \log(CK+k_1H)-H\log(a_1) \qquad \text{s.t. } CK+R(1-H)=YK+b_0+b_1H$$

where b_0 is the amount of the altruistic transfer and we have assumed again Stone-Geary preferences. The compensation children want to receive for living with their parents increases as b_0 increases:

$$(3) \qquad H=1 \quad \text{if} \quad (YK+b_0+b_1+k1)/(YK+b_0-R)>=a_1$$

From the children's point of view, the altruistic transfer operates as unearned income, so that the probability of living at home depends negatively on the altruistic transfer, b_0.[5] The more generous parents are, the higher is the amount children require in order to live at home.

Parents care about their children's welfare and maximize a linear combination of their own utility and the children's utility:

$$\text{Max } \log(CP+k_2H)+H\log(c_1)+\rho[\log(CK+k_1H)-H\log(a_1)]$$
$$\text{s.t.} \quad CP=YP-b_0-b_1H$$
$$\text{s.t.} \quad H=1 \quad \text{if } b_1>=(a_1-1)(YK+b_0)-a_1R-k_1$$
$$\text{s.t.} \quad b_0>=0$$

[5] It is easy to see that (3) is the same as condition (1) where YK has been replaced by $YK+b_0$.

where ρ is the degree of parents' altruism. The condition b_0>=0 restricts altruism to be one-sided.[6]

In order to derive the equilibrium of the game, we assume that parents set b_0 so as to maximize their own utility, conditional on their children living away from home. They will then set b_1 exactly as before. In equilibrium the optimal altruistic transfer is a linear combination of the difference between parents' income and children's income net of housing costs:

(4) $b_0^*=\max[(\rho YP-YK+R)/(1+\rho), 0]$

If parents are sufficiently altruistic (b_0^*>=0), then

(5) H=1 if $k_1+k_2>=[-(c_1-1)/c_1+(a_1-1)\rho]/(1+\rho)\ (YP+YK)-(\rho\ a_1+1/c_1)/(1+\rho)R$

and the optimal bribe is $b_1^*=(a_1-1)\rho/(1+\rho)(YP+YK)-(1+\rho\ a_1)/(1+\rho)R-k_1$. (See appendix for proofs of equations 4 and 5.)

From equation 5 we conclude that if parents are sufficiently altruistic (b_0^*>=0), the main result of section 2.1 is reversed: in equilibrium a rise in parents' income reduces the children's propensity to live with them. Children of richer parents are less likely to live at home even though their parents would draw some utility from their presence. The reason for this result is that selfish children of altruistic parents only care for the differential paid to them if they live at home (equation 3). Altruistic parents, however, cannot commit to pay a high enough differential to those children who decide to live at home. Children know they will get what they need from their parents whether they are living with them or not. For ρ<=(YK-R)/YP equation 5 rewrites as 3 and we are back to the case no altruism.

[6] In principle this model could account for two-sided altruism. If b_0 were set by children in the form of a transfer to their parents, the problem would be written identically with 1/ρ being the degree of children's altruism.

3. Empirical Evidence

3.1 Data

The goal of this paper is to test the hypothesis that intra-household transfers play an important role in determining the living arrangement decisions of Italian men. We provide a test of our hypothesis by estimating the effect of parents' income on children's living arrangements. The model in the previous section suggests that if parents derive some utility from living with their adult children and are mainly driven by self-interest, increases in parental income should increase the probability of children living with their parents.

We use data from the individual records of the Bank of Italy Survey of Households' Income and Wealth (SHIW) for all the available years starting in 1989 (1989, 1991, 1993, 1995 and 1998). The survey collects detailed information on household composition, including socio-demographic characteristics of its members as well as a rich array of income and labor market information. For each household head, the data also include the year of birth of the father and mother and whether they are still alive.[7] This allows us to recover parental age for non-cohabiting children. Data on parental age for cohabiting children can be easily recovered by taking the age of the head and his spouse. We ignore living arrangement decisions of women because parental age, on which our instrument is built, is missing for individuals who are not heads of households while living on their own. In most cases household heads are men.

The top panel of Table 4 reports descriptive statistics for children. We define "children" as all men aged 18-33 whose parents are both alive, whose father is aged between 40 and 75 and whose mother is aged 37 to 72.[8] We define as cohabiting children those children who live with their parents. Overall there are 29,024 observations in the sample.[9] Roughly four out of five men aged 18 to 33 live with their parents. About half of these young adults work, suggesting that rationing in the labor market alone cannot explain living arrangements.[10] Average annual income is expressed in million lira at 1995 prices and is

[7] This information is only available starting in 1989 and this explains why we restrict our analysis to the 1989-1998 period.

[8] These correspond to the bottom and top percentiles of the distribution of parents' age for the children in the sample.

[9] Since there is no way to identify grandchildren, parents or grandparents of the head in out data, we ignore children living in three-generation households headed by one of the children's grandparents. Similarly, we treat those children living with their parents or grandparents (or both) who are classified as heads as living on their own. Finally we assume that if a child lives only with one parent, the other parent is not alive.

[10] Work is defined as at least one employment spell in the year.

defined net of taxes and social security contributions. Virtually all the children's income in our sample comes from labor earnings. Housing costs, defined as annual rental costs, increase by more than 20% over the sample period (1989-1998). The average age of the sample increases by over a year over this period, reflecting the gradual aging of the baby boom cohort of the 1960.[11] Similarly, the proportion of those living at the North decreases, reflecting the pronounced fall in fertility in the northern industrialized regions. No clear trend is detectable in the number of those enrolled in school. At the bottom of the table we report the average age of the mothers and fathers of the children in the sample.

Table 5 reports descriptive statistics for the parents. We define as "parents" all individuals in couples where the man is aged 40 to 75 and the woman is aged 37 to 72.[12] Overall we have information on 18,533 parental households. Total father's income is more than twice children's income. An increasing share of father's income comes from Social Security payments over this period, which include both contributed and non-contributed pensions. This reflects a rise in the proportion of fathers who are retired from 34% to 38% over the 10 years.

Approximately 20% of mothers receive some pensions while around 30% work. The remaining 50% is either unemployed or not participating, while receiving no pension income. Maternal earnings (calculated over the whole population of mothers) are on average a third of those of their husbands, although this in part reflects the lower labor force participation of women. Fathers are on average better educated than mothers (although one observes a fall in the proportion with at most primary education for both). Average age as self-reported by parents is approximately one year lower than parents' age as reported by children. This is attributable to the fact that fertility among new cohorts of parents has fallen so that there are more children of older parents in the sample. To account for this, we present both unweighted and weighted regressions, with the weights based on the age distribution of the parents of the children in the sample. In this way we give more weight to older parents, reflecting the fact that their children are more numerous in the sample.

[11] In Italy the baby boom took place about 20 years after the US baby boom.
[12] These couples may or may not have children. While we know whether they have cohabiting children, we have no information on whether they have non-cohabiting children.

3.2 Econometric model

To test our hypothesis that increases in parental income raise the probability that children live with their parents, we assume that $k \equiv k_1 + k_2$ in equation 2 is uniformly distributed and estimate the following linear probability model:

$$(6) \qquad H_{it} = \beta_0 + \beta_1 YP_{it} + X_{it}'\beta_2 + u_{it}$$

where i denotes a generic child and t is time; H is a dummy equal one if child i lives with his parents at time t; YP is parental income; X is a set of controls; u is a random term that reflects measurement and labor market errors, as well as any systematic factor affecting children's living arrangements on top of parental income. As discussed below, we cannot rule out that the error term is correlated with the regressors in the model. Notice that based on the theoretical model in section 2, the model also includes children's income YK and housing costs R on the right hand side of the regression model.

The coefficient of interest is β_1. As argued in the theoretical section, an increase in parents' income should increase the probability that children live at home if the parents are not altruistic: $\beta_1 > 0$. If parents are altruistic this coefficient is negative: $\beta_1 < 0$.

In estimating equation 6 we face two problems. First, data on both parental income and children's living arrangements (as well as their income and housing costs) are needed. Typically, however, household data do not contain information on parental income for those children who live on their own and our data are no exception. While parental income for cohabiting children is observed in the SHIW, parental income of non-cohabiting children is not available.

But even if parental income for non-cohabiting children was available, parental income would arguably be endogenous to housing arrangements, and OLS estimates of β_1 would be inconsistent. One reason why parents' income may be endogenous to children's living arrangements is that parents may adjust their labor supply depending on their children's living arrangements. Given the high youth unemployment rate in Italy, it is not uncommon for parents to work more in order to support their unemployed children.

Another reason for parents' income may be endogenous is that some children may decide to live with their parents if their parents suffer negative income shocks. In general, any omitted factor affecting the probability that children live with their parents that is

correlated with parental income is likely to lead to biased estimates of the effect of parental income on children's living arrangements.

We use a Two-Sample instrumental variable strategy to address both the problem of missing parental income for non-cohabiting children and the problem of endogeneity of parental income. The ideal instrument is correlated with parental income but uncorrelated with all other factors that determine living arrangements (including children's income, housing costs and children's age). Moreover, to address the fact that parental income is unobserved for non-cohabiting children, the instrument must be available for both cohabiting and non-cohabiting children. With such an instrument, one can estimate β_1 in two steps. First, estimate the first stage regression on the sample of parents:

$$(7) \qquad YP_{it} = \gamma_0 + \gamma_1 Z_{it} + X_{it}' \gamma_2 + e_{it}$$

where Z denotes the instrument. Then, estimate the reduced form equation on the sample of children:

$$(8) \qquad H_{it} = \theta_0 + \theta_? Z_{it} + X_{it}'\theta_2 + v_{it}$$

A consistent estimate of β_1 is given by the two-sample IV estimator (Angrist and Krueger, 1992):

$$(9) \qquad est(\beta_1^{IV}) = est(\theta_?^{OLS}) / est(\gamma_1^{OLS})$$

One limitation of our data is that the children's variables (such as children's income YK, housing costs R, and children's age) are available in the children sample, but not in the parents sample, and therefore we cannot include them in our empirical analysis. Similarly, parental variables are available in the parents sample, but not in the children sample (with the exception of parents' age), and therefore cannot be included in our models either. This is a concern because children's income, housing costs, children's age and parental characteristics are likely to be important determinants of living arrangement decisions. However, *if the instrument is orthogonal to children's income, housing costs, children's age and parental characteristics other than age*, our estimator in (9) is still consistent. The assumption that the instrument is orthogonal to children's income, housing costs, children's age and parental

characteristics can be tested, since we observe children characteristics in the children sample, parental characteristics in the parental sample, and the instrument in both samples. Below we show that such assumption holds true in the data. This suggests that the instrumental variable estimates are not affected by the failure to control for child and parental characteristics.

3.3 Using changes in social security eligibility to instrument for parental income

We propose to use changes in social security eligibility and retirement age introduced in Italy in 1992 as an instrument for parental income. Retirement typically reduces disposable income, since replacement ratios are generally below one. We show that changes in the normal retirement age introduced by a 1992 reform of Social security had a significant effect on the disposable income of the fathers, and we use these changes as an instrument for parental income. We argue that conditional on parental age, the reform is uncorrelated with other determinants of living arrangements. An advantage of this instrument is that it is based on parental age, which is available for both cohabiting and non-cohabiting children.

Italian workers can retire if they have accumulated enough years of social security contributions or when they reach a certain age, called "normal retirement age". Normal retirement age and the minimum number of years of social security contributions are set by law. Before 1992, normal retirement age was 60 for most men.[13] In 1992 a major reform of the Social Security system gradually increased the normal retirement age from 60 in 1992 to 65 in 2000.[14]

The rise in normal retirement age effectively forced some individuals in the affected cohorts to remain in the labor force longer than they would have otherwise. We use the change in retirement eligibility mandated by the reform as a source of variation in fathers' income that is arguably exogenous to children's living arrangements. Specifically, the instrument is a dummy equal to one if the father is older than normal retirement age for each year. In particular, the instrument equals 1 for fathers older than 60 in 1989 and 1991, 62 in 1993, 63 in 1995 and 64 in 1998. (Data for 2000 are not available.) Because replacement

[13] Normal retirement age and the minimum number of years of social security contributions are different for private and public workers. Here we only consider the rules for private sector workers despite the fact that the 1992 reform also affected normal retirement age of workers in the public sector. The reason for this choice is that private sector workers are by far the largest group and we have no information on the sector of activity of the fathers for non-cohabiting children or retired fathers. For a detailed account of the changes introduced by the 1992 social security reform see Brugiavini (1999); and Attanasio and Brugiavini, (2001). We are grateful to Agar Brugiavini for having clarified some details of the Social security system in Italy.

[14] The reform also reduced the generosity of the pension system by changing the base for benefit calculations and increased the number of years of compulsory contributions.

ratios are less than one and retirement is associated with income loss, we expect the first-stage coefficient on the instrument to be negative.[15] For example, the effect of the reform can be estimated by comparing the average income of fathers who are older than 61 in 1993 (all of whom can retire) with the average income of fathers who are older than 61 in 1993 (some of whom cannot retire). Consistent with our expectations, we find the average income of the former group to be lower than the average income of the latter group, suggesting that changes in retirement age mandated by the reform have a significant impact on parental income.

Since our source of identification depends on changes in social security eligibility, not actual retirement decisions, this is arguably exogenous to children's living arrangement decisions and it should be robust to the sources of potential endogeneity outlined in Section 3.2 above.

The fact that the new law mandated increases in the retirement age over time allows us to control for father's age. Since the age of the father is potentially an important determinant of children's living arrangements, our model includes an unrestricted set of dummies for father's age in the vector X, together with year dummies. Identification of the instrumental variable estimates comes then from the interaction of father's age and time, i.e. the changes over time in the retirement age mandated by the law. Below, we show that the instrument is orthogonal to observed children and parents' characteristics, lending credibility to our identification assumption.

In a series of papers that use an identification strategy that is similar to ours Bertrand, Miller and Mullainathan (2001), Duflo (2000) and Edmonds, Mammen and Miller (2001) exploit a special feature of the South African Pension system as a source of exogenous variation in household income. Their instrument is based on differences is pension entitlement across age (and gender) groups. Since their data consist of a single cross section, their identification comes from a comparison of individuals of different ages. In contrast, our approach, which depends on changes over time in the age for pension eligibility, allows us to control for age differences.[16]

[15] To the extent that working lowers utility, and that without the reform some individuals in the effect cohorts would have retired earlier, the reform presumably reduced the utility of the cohorts affected.

[16] A second difference with these papers is that while in the South Africa case old-age pension recipients experienced large income *increases*, in Italy retirees experience income *losses*.

3.4 Empirical results

We first examine whether observable characteristics of parents and children are correlated with the instrument as an informal test of instrument exogeneity. We then show how parental income changes as a result of changes in retirement age mandated by the 1992 reform (equation 7) and how living arrangements change as a result of changes in retirement age (equation 8). We conclude by using the first stage and reduced form coefficients to obtain estimates of β_1 (equation 9).

In Table 6 we report coefficients from bivariate regressions of different children's characteristics on the instrument. Recall that the instrument is a dummy equal to one if the father is older than normal retirement age mandated by law for each year. The estimates in Table 6 are based on the child sample. Estimates presented in the first column come from a regression that controls for unrestricted additive year effects and father age effects (the vector X) only, while in column 2 we also include unrestricted mother age effects.

The first row of Table 6 indicates that the instrument is negatively correlated with co-residence. This is a first indication that parental income may be a determinant of living arrangements, since the children of those who retire (and therefore experience an income loss) display a higher probability of leaving the parental home. There is no statistically significant effect of the instrument on children's school enrolment while there is a clear effect on employment, earnings and housing costs. This should not come as a surprise since all these variables are likely to be endogenous to living arrangements. For example, housing arrangements are likely to affect employment via their effect on the set of available job opportunities.

To account for this potential endogeneity, we also report the correlation between the instrument and the average employment, earnings, school enrolment and housing costs calculated for each age and area. These averages are calculated excluding the individual under analysis and therefore should be uncorrelated with the instrument for the instrument to be valid.[17] The estimates in the last four columns confirm that the instrument is orthogonal to the area average of employment, earnings and housing costs. The instrument is correlated with children's age, but the coefficient becomes insignificant once we also control for mother's age in column 2. All other coefficients remain essentially unchanged when we

[17] Separate regressions of individual outcome variables on area averages (excluding the individual under analysis) lead to the following estimates (s.e. errors in brackets): .955 (.009), .938 (.009), .906 (.012), .710

condition on mother's age. In Table 7 we report the correlation between the instrument and parents' characteristics. As in Table 6, the first column allows for unrestricted father age and year effects while the second column also controls for mother's age. The regressions are based on the parent sample. Estimates in rows 1 to 3 indicate that the reform affects the proportion of fathers retiring as well as their pensions. In particular, the reform forces about 7% of the fathers in the sample continue to work (row 1 and 2). The average increase in pension income associated with the reform is more than 2 million lira per year (row 3). Since earnings decline on average by almost 4 million lira (row 4), the effect of the instrument on total income is a loss of about 2 million lira per year (row 5).

The next set of results suggests that the reform had no effect on maternal labor supply decisions (rows 6 and 7). When looking at the effect of the instrument on household income (calculated excluding children), we find a negative coefficient (rows 13). The last set of results (rows 14-16) tests whether the instrument is correlated with observable parental characteristics. We find that the instrument is orthogonal to father's education and mother's education, while geographic location is marginally significant. When we include mother age effects in column 2, the estimates do not change.

Table 8 reports estimates of models similar to those in Table 7, only weighted according to the age distribution of the parents of the children in the sample. Weighting has very little impact on the results, only the coefficients on household income become marginally more precisely estimated with the weights.

From Tables 6, 7 and 8 we draw three main conclusions. First, the instrument is not correlated with exogenous children's and parent's characteristics, lending some credibility to our exclusion restriction. This allows us to use the reform to estimate consistently the effect of parental income on co-residence. Second, the coefficient on the pension reform variable is negative and significant in the first stage regression of father and household income. Retirement is associated with 2.1-2.3 million liras income loss (row 5 and 13 in Tables 7 and 8). Third, the reduced form coefficient is significant, as the instrument has a significant negative effect on the probability of cohabitation. Retirement of fathers induced by the reform is associated with a 7% decline in the propensity to cohabit (row 1 in Table 6). Taken together, the last two conclusions suggest that parental income has a positive effect on the propensity of children to cohabit. But before we turn to the 2-samples IV estimates of the

(.014) respectively for employment, earnings, school enrolment and housing costs. All regressions control for unrestricted father age and year dummies.

coefficient of interest, we further explore the robustness of our first stage and reduced form coefficients.

Table 9 reports estimates from regressions of parental income on the instrument (equation 7) including different sets of controls in order to assess the strength of the instrument. These regressions are based on the parent sample. In columns 1 and 2 the dependent variable is father's income, while in column 3 and 4 the dependent variable is household income. We report both unweighted and weighted regression results. The coefficients in the first two rows are from regressions in which we control only for father's age, year dummies and mother age, and are the same as those found in Tables 7 and 8 (rows 5 and 13). Rows 3-7 present estimates of the coefficient on the instrument in regressions that include additional controls. As we add more controls, the results are remarkably robust and show that retirement is associated to a fall in income of between approximately 2 to 3 million lira. The introduction of additional controls does not significantly affect the point estimates, which is consistent with the results in Table 7 indicating that the instrument is uncorrelated with parental characteristics. The addition of extra controls improves the precision of our estimates.

In Table 10 we report additional estimates of a regression of a dummy for cohabitation on the instrumental variable (equation 8). Estimates are based on the children sample as in Table 6. The coefficient in the first row is taken from Table 6, row 1. It suggests that the households affected by the reform experience a decline in the probability that children live with their parents of about 7 percentage points. As before, the remaining models are intended to probe the robustness of the base case estimates to the inclusion of different controls. The inclusion of different controls does not appreciably affect the point estimates, though it makes them slightly more precise.

From Tables 9 and 10 we confirm that retirement, as induced by the reform, tends to lower parents' income and reduces the propensity of children to live at home, and that this effect is fairly stable across specifications. We now combine the estimates in rows 1 and 2 of Table 9 and 10 to obtain instrumental variable estimates of the effect of father's income on the children's propensity to cohabit.

Table 11 reports the results of the Two-Sample IV regressions.[18] All specifications control for additive year and father age effects. Recall that because the controls in Table 9 and 10 are available only in one of the two samples (children or parents), we cannot estimate

[18] For details on how to compute the standard errors, see Angrist and Kruger (1995).

models with additional controls. However, since the instrument is uncorrelated with observable characteristics of parents and children (as evident in Tables 7 and 8), the TSIV estimates should still be consistent.

We report results with and without controls for mother age, for the two definitions of parental income used in Table 10 and using weighted and unweighted data. The IV estimates in Table 11 are obtained by dividing the reduced forms coefficients in Table 9 (rows 1 and 2) by the first stage coefficients in Table 10 (row 1). For example, the coefficient in row 1 column 1 of Table 11 (.033) is the ratio of the coefficient in the first row and first column of Table 9 (-.072) and the coefficient in the first row of Table 10 (-2.169). The other coefficients are calculated similarly. The point estimates of β_1 are stable across models and generally significant. A rise of one million lira in parents' income is associated with a 3-3.5 percentage point rise in the probability that children live at home. The results are marginally more significant when data are weighted and when parents' income is defined as father's income.[19]

This evidence suggests that a rise in parents' income tends to raise the probability that children live at home. We cannot reject the hypothesis that Italian parents "bribe" their children to induce them to live with them longer.

4. Conclusions

Among industrialized countries, Italy is an outlier in terms of the living arrangements of its young men. Although labor and housing market conditions are clearly part of the explanation for the high rates of cohabitation, in this paper we argue that intra-household transfers play an important role in determining living arrangements.

We hypothesize that parents and children bargain over the latter's living arrangements. Children are willing to give up some of their independence (a good for children) in exchange for financial transfers on the part of their parents while their parents are willing to give up some consumption in exchange for their children's presence at home (a good for parents). The implications of this model contrast starkly with that of an altruistic model, where parents care about child well-being. While in the 'exchange' model children of

[19] An OLS regression of children's living arrangements H on children's income delivers a coefficient of -.010 (s.e. .0001). If children's income is instrumented by the area average (excluding the individual under analysis)

richer parents are more likely to live with their parents, the opposite occurs when parents are altruistic.

To obtain consistent estimates, we exploit a major reform of the social security that took place in Italy during the 1990s. This reform raised normal retirement age for men, forcing some cohort of fathers to stay in work longer than the cohorts just preceding them. We use this discontinuous change in retirement rules to show that retirement is associated to a significant fall in father's income, while children tend to move out as their fathers retire. In order to carry our exercise, we use a Two-Sample IV estimator. We show that a one million lira rise in parents' annual income (approximately 500 US$) increases the probability that children live with their parents by between 3 and 3.5 percentage points. This lends strong support to the exchange model as opposed to the altruistic model.

this delivers an IV coefficient of -.019 (s.e. .0003). Both regressions control for unrestricted father age and year dummies.

Table 1
Percentage of Children Living With Parents. Males Aged 18-33.

Country	%
France	43
United-Kingdom	45
Germany	43
Italy	85
Spain	62
USA	35
Portugal	71

Notes. For Italy, the source is SHIW 1998. For other European countries is the European Panel, 1996; for the US is CPS monthly files 1996.

Table 2
Parents' Happiness When Living With Their Children

	Basic controls		Additional controls	
France	-1.089	(1.301)	-2.075	(1.286)
Great Britain	-1.490	(1.281)	-1.935	(1.257)
West Germany	-0.345	(1.222)	-1.754	(1.203)
Italy	5.420	(1.590)	4.084	(1.566)
Spain	3.123	(1.549)	1.892	(1.520)
US	-3.167	(1.527)	-2.706	(1.498)
Portugal	1.805	(3.106)	1.287	(3.044)

Notes. Standard errors in parentheses. The dependent variable is parents' happiness. Happiness is a categorical variable which takes 4 values between 0 (not at all happy) and 1 (very happy). The coefficients reported are the estimated coefficients (*100) on a dummy variable equal to one if at least one child lives with the parents. Basic controls include family income, parents' gender, parents' age and age squared plus country-specific dummies. Additional controls include a full set of dummies for parents' marital status (married, cohabiting, single, divorced or separated and widowed), dummies for their employment status (employed, unemployed, housewife, student, pensioner and other inactive) and health status. The coefficients on these controls are constrained to be equal across countries. Regressions are weighted by sampling weights. Sample includes men aged 40-75 and women aged 37-72 with children. Number of observations: 6021. Data: World Values Survey, 1981-84.

Table 3
Children Happiness When Living With Their Parents

	Basic controls		Additional controls	
France	1.454	(2.195)	2.635	(2.319)
Great Britain	-5.031	(2.053)	-1.851	(2.188)
West Germany	-4.557	(2.086)	-2.953	(2.178)
Italy	-6.312	(2.139)	-3.278	(2.262)
Spain	-3.886	(2.322)	-0.688	(2.433)
US	-1.181	(2.616)	1.800	(2.699)
Portugal	-6.116	(4.348)	-2.830	(4.407)

Notes. See notes to Table 2. Number of observations: 2247.

Table 4
Descriptive Statistics: Children

	1989	1991	1993	1995	1998
Living with parents	0.83	0.84	0.84	0.87	0.85
Student	0.22	0.27	0.28	0.29	0.25
Working	0.56	0.53	0.51	0.48	0.51
Income	12.810	11.631	9.949	9.307	11.203
Rent	6.669	6.690	7.219	8.088	8.489
Age	23.88	24.32	24.40	24.54	25.14
Age father	55.19	56.07	55.90	55.96	56.29
Age mother	51.33	52.16	51.92	52.10	52.39
North	44.70	43.80	44.43	43.53	42.75
Sample size	6,145	6,036	5,728	5,868	5,247

Notes. Sample: males 18-33. All money variables in 1995 million lira. Source: SHIW individual records.

Table 5
Descriptive Statistics: Parents

	1989	1991	1993	1995	1998
Father retired	0.34	0.36	0.38	0.40	0.38
Father working	0.65	0.63	0.61	0.56	0.57
Father pensions	6.306	6.750	7.339	8.082	8.167
Father earnings	20.867	18.986	18.394	16.368	18.195
Father total income	27.173	25.736	25.733	24.450	26.362
Mother retired	0.20	0.22	0.22	0.23	0.17
Mother working	0.27	0.28	0.31	0.30	0.31
Mother pensions	2.099	2.246	2.414	2.561	2.473
Mother earnings	6.073	5.874	6.181	5.744	6.668
Mother total income	8.172	8.121	8.595	8.305	9.142
Household pensions	8.405	8.996	9.753	10.644	10.641
Household earnings	26.940	24.861	24.575	22.112	24.863
Household total income	35.345	33.856	34.328	32.756	35.504
Father education					
No education	0.06	0.06	0.07	0.06	0.05
Primary	0.40	0.43	0.38	0.38	0.31
Lower secondary	0.26	0.24	0.29	0.30	0.34
Upper secondary	0.21	0.20	0.19	0.19	0.23
College	0.07	0.07	0.07	0.07	0.07
Mother education					
No education	0.08	0.07	0.10	0.09	0.06
Primary	0.46	0.49	0.44	0.43	0.37
Lower secondary	0.25	0.22	0.25	0.27	0.31
Upper secondary	0.17	0.16	0.15	0.15	0.20
College	0.05	0.05	0.06	0.05	0.06
Father age	54.70	55.22	55.02	55.67	55.26
Mother age	51.06	51.60	51.36	51.97	51.53
North	0.51	0.46	0.46	0.48	0.48
Sample size	3,983	4,031	3,561	3,650	3,308

Notes. Sample: men aged 40-75 and women 37-72 in couples. Source: SHIW individual records. Total income: sum of pension and labor earnings. Household income excludes children income. See also notes to Table 4.

Table 6
Correlation Between Instrument and Children Variables

	Coeff.	p. value	coeff.	p. value
1) Living with parents	-0.072	0.00	-0.080	0.00
2) Student	-0.022	0.13	-0.022	0.12
3) Working	0.056	0.00	0.054	0.00
4) Earnings	1.720	0.03	1.818	0.02
5) Rent	0.087	0.00	0.081	0.00
6) Age	-0.257	0.03	-0.129	0.25
7) North	-0.014	0.40	-0.014	0.42
8) Mother age	-0.627	0.00	-	-
9) Area employment	-0.001	0.91	0.004	0.65
10) Area earnings	0.122	0.62	0.248	0.30
11) Area students	-0.001	0.91	0.004	0.65
12) Area rent	0.007	0.29	0.005	0.45
Father age dummies	yes		yes	
Mother age dummies	no		yes	

Notes. The table reports the estimated coefficient of a regression of each variable on the instrument and the associated p-value. All regressions control for year dummies. Area variables are calculated as regional means excluding the individual under observation. Number of observations 29,024.

Table 7
Correlation Between Instrument and Parents Variables

	coeff.	p. value	coeff.	p. value
1) Father retired	0.066	0.00	0.070	0.00
2) Father working	-0.068	0.00	-0.072	0.00
3) Father pensions	2.241	0.01	2.262	0.00
4) Father earnings	-3.894	0.01	-4.422	0.00
5) Father total income	-2.169	0.02	-2.310	0.01
6) Mother retired	0.005	0.77	0.021	0.19
7) Mother working	0.005	0.81	-0.003	0.90
8) Mother pensions	-0.311	0.72	0.499	0.56
9) Mother earnings	1.215	0.52	0.288	0.88
10) Mother total income	0.464	0.65	0.621	0.55
11) Household pensions	1.299	0.14	1.605	0.06
12) Household earnings	-3.576	0.03	-4.404	0.01
13) Household total income	-2.218	0.05	-2.301	0.04
14) Father education > compulsory	0.087	0.07	0.079	0.10
15) Mother education > compulsory	0.023	0.24	0.020	0.30
16) North	0.043	0.08	.047	0.05
Father age dummies	yes		yes	
Mother age dummies	no		yes	

Notes. See notes to Table 6. Household income is defined excludes any income of cohabiting children. Number of observation 18,533.

Table 8
Correlation Between Instrument and Parents Variables
Reweighted Data

	coeff.	p. value	coeff.	p. value
1) Father retired	0.080	0.00	0.085	0.00
2) Father working	-0.089	0.00	-0.094	0.00
3) Father pensions	2.594	0.00	2.637	0.00
4) Father earnings	-4.340	0.00	-4.915	0.00
5) Father total income	-2.336	0.01	-2.473	0.00
6) Mother retired	0.005	0.72	0.026	0.07
7) Mother working	0.008	0.68	-0.002	0.94
8) Mother pensions	-0.250	0.76	0.745	0.34
9) Mother earnings	1.282	0.46	0.277	0.87
10) Mother total income	0.456	0.63	0.658	0.49
11) Household pensions	1.657	0.05	1.657	0.05
12) Household earnings	-3.943	0.01	-3.943	0.01
13) Household total income	-2.390	0.02	-2.448	0.02
14) Father education	0.094	0.03	0.086	0.05
15) Mother education	0.024	0.18	0.022	0.22
16) North	0.034	0.13	0.036	0.10
Father age dummies	yes		yes	
Mother age dummies	no		yes	

Notes. See notes to Table 7. Observations are reweighted by the age distribution of the children's parents.

Table 9
The Effect of Pension Eligibility on Income
Dependent Variable: Father or Household Income
Independent Variable: IV

	Controls	Dependent variable			
		Father income		Household income	
1.	Base case	-2.169	-2.336	-2.218	-2.390
		(.909)	(.863)	(1.114)	(1.057)
2.	Mother age	-2.310	-2.473	-2.301	-2.448
		(.908)	(.863)	(1.113)	(1.056)
3.	Parents' education	-3.033	-3.304	-3.874	-4.203
		(.827)	(.785)	(.961)	(.912)
4.	Area	-2.123	-2.258	-2.160	-2.273
		(.901)	(.857)	(1.098)	(1.044)
5.	Mother income	-2.168	-2.339	-2.212	-2.407
		(.901)	(.855)	(.904)	(.857)
7.	All controls	-3.086	-3.343	-3.140	-3.417
		(.827)	(.785)	(.831)	(.787)
Reweighted		no	yes	no	yes

Notes. All specifications control for year dummies and unrestricted father age dummies.

Table 10
The Effect of Pension Eligibility on Living Arrangements
Dependent Variable: Living with Parents
Independent Variable: IV

	Controls	
1.	Base Case	-.072
		(.012)
2.	Mother age	-.080
		(.012)
3.	Age	-.092
		(.010)
4.	Area Employment	-.073
		(.011)
5.	Area earnings	-.064
		(.011)
6.	Area rent	-.071
		(.012)
7.	Area students	-.083
		(.011)
8.	Area dummies	-.072
		(.012)
9.	All controls	-.093
		(.010)

Notes. All specifications control for year dummies and unrestricted father age dummies.

Table 11
Two-Sample IV Estimates
Dependent Variable: Living with Parents
Independent Variable: Parents Income

	Controls	Definition of income			
		Father income		Household income	
1.	Father age	.033	.031	.033	.030
		(.014)	(.012)	(.017)	(.014)
2.	Father age and Mother age	.035	.032	.035	.033
		(.013)	(.012)	(.017)	(.015)
Reweighted		no	yes	no	yes

Notes. All specifications control for year dummies.

Appendix

Proof of (1):

H=1 if

$\log(YK+b_0+b_1+k_1)-\log(a_1) >= \log(YK+b_0-R)$

$YK+b_0+b_1+k_1>=a_1(YK+b_0-R)$

Proof of (2):

Parents will chose H=1 if:

$\log(YP-b_1+k_2)+\log(c_1)>=\log(YP)$

$c_1YP-c_1b_1+c_1k_2 >=YP$

Suppose:

$b_1=(a_1-1)YK-a_1R-k_1$

so that children are indifferent between living at home and not living at home. Then:

$c_1YP- c_1 (a_1-1)YK+ c_1a_1R+ c_1k_1+ c_1k_2 >=YP$

$c_1k_1+ c_1k_2 >=-(c_1-1)YP+ c_1 (a_1-1)YK- c_1a_1R$

$k_1+k_2 >=-(c_1-1)/ c_1 YP+(a_1-1)YK-a_1R$

Proof of (3):

Same as (1) where YK replaced by $YK+b_0$.

Proof of (4):

In order to derive b_0, observe that parents will set it so to maximize their own utility when H=0, so, from the f.o.c.:

$1/(YP-b_0)-\rho/(YK+b_0-R)=0$

$(YK+b_0-R)-\rho (YP-b_0)=0$

$b_0=(\rho YP+R-YK)/(1+\rho)$

Proof of (5):

Parents will choose H=1 if:

$$\log(YP-b_0-b_1+k_2)+\log(c_1)+\rho[\log(YK+b_0+b_1+k_1)-\log(a_1)]>=\log(YP-b_0)+\rho\log(YK+b_0-R)$$

and in equilibrium:

$$b_1=(a_1-1)(YK+b_0)-a_1R-k_1=(a_1-1)\,\rho/(1+\rho)(YP+YK)+\,(a_1-1)/(1+\rho)R\,-a_1R-k_1$$

$$=(a_1-1)\rho/(1+\rho)(YP+YK)-(1+\rho\,a_1)/(1+\rho)R\,-k_1$$

so that children are indifferent between living at home and not living at home. So, the parents' problem can be rewritten as:

$$\log(YP-b_1-b_0+k_2)+\log(c_1)>=\log(YP-b_0)$$

$$c_1(YP-b_0-b_1+k_2)>=(YP-b_0)$$

$$c_1k_2>=-(c_1-1)(YP-b_0)+c_1b_1$$

$$c_1k_2>=-(c_1-1)(YP+YK-R)/(1+\rho)+c_1(a_1-1)\rho/(1+\rho)(YP+YK)-\,c_1(1+\rho\,a_1)/(1+\rho)R\,-c_1k_1$$

$$c_1(k_1+k_2)>=[-(c_1-1)+c_1(a_1-1)\rho]/(1+\rho)\,(YP+YK)-(c_1\rho\,a_1+1)/(1+\rho)R$$

$$k_1+k_2>=[-(c_1-1)/c_1+(a_1-1)\rho]/(1+\rho)\,(YP+YK)-(\rho\,a_1+1/c_1)/(1+\rho)R$$

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