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GIFTS, LIES, AND BEQUESTS

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Abstract

Recent empirical work on intergenerational transfers has shown that: i) parents prefer to transfer resources to their children using bequests rather than inter vivos transfers (gifts), and ii) bequests tend to be divided equally, while gifts tend to be directed towards the less well-off children. In this note, we present a theoretical model of the altruistic family with heterogeneous children which does not contradict either i) or ii). In our setting, i) follows because bequests are more efficient than gifts: these are negatively related to the children's reported income (true income cannot be observed) and therefore distort the effort supply decisions as well as inducing underreporting. As for ii), we propose two arguments. First, market imperfections make bequests, which come late in life, a rather ineffective redistributive tool, so that it may be pointless to differentiate them. Second, imposing the constraint that bequest have to be equal is not necessarily costly in welfare terms and permits to avoid the the psychic costs or the loss of reputation associated with unequal giving.

Keywords: altruism, inter vivos transfers, bequests
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1 Introduction

The empirical literature on intergenerational transfers (see e.g. McGarry 1999a, 1999b and the references therein) has by now accumulated a fair amount of convincing evidence in favour of

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two stylised facts:[1]

1. parents tend to transfer income to their children preferably in the form of bequests;
2. inter vivos transfers (gifts) are inversely related to the income of the children, while bequests are divided about equally (also in the absence of explicit legal rules to that effect).

The first fact poses something of a puzzle, often studied in the literature. Why should altruistic parents wish to postpone the date in which to make transfers to their children? Surely, the period in which an average individual needs more help is not when her parents are about to die, but much earlier, for instance at the age of marriage, when liquidity constraints can easily arise. One should therefore observe relatively small bequests and a large amount of gifts, which is not what occurs in practice. The existence of the second stylised fact makes the question even more puzzling: if parents are altruistic, why do they use so little of the tool which is clearly meant to perform a redistributive action?

A possible solution is of course to argue that intergenerational transfers are not always motivated by altruism: for instance, bequests can be used strategically (Bernheim et al. 1985, Cremer et al. 1992) in order to get more attention from one's children, and therefore tend to prevail over gifts.[2] Our aim in the present paper will instead be that of exploring a possible mechanism for reconciling the altruistic model of the family with the above-mentioned facts. There are some recent contributions which have followed a similar route, most notably a paper by Lundholm and Ohlsson (2000), in which the authors are able to show that rational, altruistic parents will behave in complete accordance with the pattern suggested by the second stylised fact, provided that i) the parents care about the reputation that their bequest behaviour will give to them and, ii) gifts are private information, while bequests are public. This "reputation approach" is not in conflict with the one employed here – indeed, we shall make a connection below; our focus will be however on the first stylised fact, i.e. the prevalence of bequests over gifts. Plausibly, the reputation effect and the mechanism explored in the present paper may be seen as complementary forces, both contributing to explain why altruistic parents should

[1] Another stylised fact is that gifts tend to be used more frequently by wealthier parents (see e.g. Laitner 1997). Our model is silent on this issue, as we will not consider differences among parents.

[2] The question whether the altruistic model is an appropriate description of actual behaviour has received a great deal of attention in the literature. Empirical studies have reached mixed conclusions: for example, Cigno and Rosati (1996) and Cigno et al. (1998) find support for non-altruistic models, whereas Hochguertel and Ohlsson (2000) give evidence which is consistent with the altruistic model.

indeed rationally behave in the way they actually do according to evidence.[3]

To our ends, we employ a model with altruistic parents and, importantly, heterogeneous children, so that both equity and efficiency concerns arise. Indeed, we shall see that the equity-efficiency trade-off will play a crucial role in shaping our results. Our model incorporates at the outset the following features:

- First, we postulate that gifts are used mainly for the purpose of easing liquidity constraints, since they can be made when the problem arises (not later), whereas bequests are general means of transferring resources without any specific aim. Therefore, gifts are directly related to the children's incomes, whereas bequests are not. This suggests that gifts tend to be less efficient than bequests, as the former will distort the children's effort decisions. However, bequests came later in life then gifts; since the usual imperfections in the capital market prevent children to borrow against the bequests they will receive in the future, there is some cost associated with using bequests instead of gifts.

- Second, we posit, realistically, that parents cannot observe their children's incomes. This creates an incentive problem: if inter vivos transfers are specifically meant to ease liquidity constraints, the children may be tempted to lie with regard to the income they earn, in order to obtain more help from their parents. Hence, gifts will have to be devised on the basis of reported income, rather than actual income. This reinforces the distortionary nature of gifts, as bequests, coming in a period of life where liquidity constraints are no longer a problem, are less likely to induce opportunistic behaviour.

Hence, the strategy is to suppose from the start that, consistently with empirical evidence, gifts (but not bequests) have a compensatory nature and check whether this may be compatible with bequests being preferred for transferring resources from altruistic parents to their children[4].

The paper is structured as follows. We set up the model in Section 2, and then discuss the gift-bequest mix in Section 3. We find, either analitycally or by means of numerical simulations,

[3] Other contributions on the altruistic model of the family include Cremer and Pestieau (1996) and Jürges (2000). Their analyses have the merit of showing that the altruistic model of the family is indeed compatible with the use of a gift-bequest mix, as opposed to gifts alone (although the specific question whether gifts should be used more than bequests or *viceversa* is not addressed). However, they suggest that bequests should have a stronger redistributive content than gifts, which is in conflict with the empirical evidence cited above.

[4] A similar strategy is followed by McGarry (1999a). However, she does not model explicitly differences in children's ability, since her model is one with representative individuals; therefore efficiency and equity issues are not clearly separated in her analysis.

that our model is indeed capable of predicting a transfer pattern which is in accordance with observed behaviour, in the sense that there are plausible conditions under which i) bequests turn out to be shared equally and gifts are negatively correlated with income, and ii) bequests represent the largest proportion of all intergenerational transfers. Finally, Section 4 concludes.

2 Children's behaviour

Let us focus on a household made of a couple plus several children. To abstract from the complexities of married life, we assume that the couple acts as if it were a single entity, which we refer to as "the parents". The children may be of two types, $i = 1, 2$; there are n^i children of type i. They differ in ability, as represented by a parameter ω: type-2 children have higher ability, that is $\omega^2 > \omega^1$ (in a competitive economy, ω would be the wage rate). Their income r depends on the ability parameter and on effort e:

$$r = \omega e. \tag{1}$$

The parents can observe neither e nor r; instead, they observe ω. That is, the parents know whether their children are clerks or lawyers, but do not know how much effort they put in and how much they earn.[5] Since the children know that the level of inter vivos transfers depends negatively on income (according to a relation specified below), they have an incentive to underreport: if they exaggerate their difficulties, the parents will be more generous. However, lying to one's parent is something which cannot be made without incurring in some costs, partly psychological and partly due to the necessity to hide evidence of one's actual income level. We take it that if a child wants to hide a share α of his or her income, the cost of concealing one unit of income is some function $c(\alpha)$, so that the total cost is $c(\alpha)r$ (that is, concealment costs are proportional to income). The function $c(\alpha)$ is assumed to satisfy the following restrictions:

$$c(0) = c'(0) = 0,\ c'(\alpha) > 0,\ c''(\alpha) > 0. \tag{2}$$

Hence, reporting the truth is costless and concealing one's income becomes more costly the larger is the gap between actual and reported income. Thus, only a fraction

$$y = (1 - \alpha)r \tag{3}$$

of the actual income is revealed to the parents.

[5] By contrast, Cremer and Pestieau (1996) assume that the parents observe r, but not e or ω.

There are two types of transfer. First, we have inter vivos transfers, which are a decreasing function of reported income, $g(y)$, with $g'(y) < 0$; to simplify, we postulate a linear relation,

$$g = T\left(h - y\right), \tag{4}$$

where h is some target value of income and $1 \geq T \geq 0$ is the transfer "rate"; we shall refer to the difference $h - y$ as to the "income gap". Roughly, this corresponds to the idea that parents are willing to make transfers if they perceive that their children do not have an "adequate" income.[6] The use of a more general gift function would only complicate the analysis, without changing the general thrust of our arguments, which is essentially based on the compensatory (and hence distortionary) nature of gifts, not on the exact form taken by their relationship with income. Second, we have bequests, which differ from gifts mainly because they come rather late in life. This makes them unsuitable for easing the consequences of liquidity constraints, because the usual market imperfections prevent the children from borrowing against their future incomes (i.e. their bequests). To express this, we take it that bequests are, in general, less valuable than gifts of comparable amount; for any unit of income bequeathed to a child, only a fraction $0 < k \leq 1$ actually accrues to the child (*cf.* Cremer and Pestieau 1996). It will be useful in what follows to have an index of the extent to which markets are imperfect, so we define:

$$\varkappa(k) = \frac{1}{k} - 1 \tag{5}$$

Note that $\varkappa(1) = 0$, $\varkappa' < 0$ and $\lim\limits_{k \to 0} \varkappa = \infty$: that is, the index is zero when the whole bequest goes to the children and increases monotonically as the share lost in the passage increases.

The children's utility is given by

$$u = u\left(z, e\right), \tag{6}$$

where

$$z = r + T\left(h - y\right) + kB - c\left(\alpha\right) r \tag{7}$$

denotes consumption; (6) satisfies

$$u_z > 0,\ u_{zz} < 0,\ u_e < 0,\ u_{ee} < 0. \tag{8}$$

[6] There might be some "reputation effect" at work here as well; the implicit assumption behind (4) is that the parents would like their children to have a living standard which is comparable to that prevailing in their reference group. The target value of income would therefore be fixed according to some social norm – it must be high enough to let the children do the things the other people do. This would be consistent with the idea that a social norm requires an externality to be established (see Coleman 1990).

Define

$$\omega^* = \omega\,(1 - T\,(1-\alpha) - c) > 0 \tag{9}$$

as the net marginal reward for one unit of effort, that is the ability parameter less the costs given by the reduction of the gift and by the concealment activity. Then, maximizing (6) by choice of e and α yields the following first order conditions:

$$\begin{aligned} -\frac{u_e}{u_z} &= \omega^*, && (10)\\ T &= c', && (11) \end{aligned}$$

where we have used (1), (3), (4), (7) and (9). The interpretation is straightforward: (10) establishes the standard condition for optimal effort supply, whereas (11) says that the optimal degree of underreporting is the one at which the per-unit marginal costs equal the marginal increase in the gift. Note that $T = 0$ implies, in view of (2), that $\alpha = 0$; if there are no gifts, the child says the truth concerning his or her level of income.

Let $\widetilde{e} = \widetilde{e}\,(T, B; \omega)$, $\widetilde{\alpha} = \widetilde{\alpha}\,(T, B; \omega)$ denote the solution to the child's problem. For future reference, we note here some comparative statics results (the Appendix gives details of derivation). First, we assume that:

$$\frac{\partial \widetilde{e}}{\partial \omega} > 0, \tag{12}$$

that is, effort is increasing in type. Then, we can show that

$$\frac{\partial \widetilde{e}}{\partial T} = \frac{\partial \overline{e}}{\partial T} + \frac{\partial e}{\partial B}\frac{h-y}{k}, \tag{13}$$

where the upper bar denotes the compensated supply. (13) can be read as a decomposition of the derivative of the ordinary supply into a substitution effect ($\frac{\partial \overline{e}}{\partial T}$) and a "bequest" effect ($\frac{\partial e}{\partial B}\frac{h-y}{k}$). Moreover, we can prove that

$$\frac{\partial \overline{e}}{\partial T} < 0. \tag{14}$$

That is, a larger gift rate reduces the net reward for unit of effort -see (9)-, and thus, if the child is compensated in such a way that his or her utility level is constant, this must bring about a fall in the effort level. Also, we can show that

$$\frac{\partial \widetilde{e}}{\partial B} < 0; \ \frac{\partial \widetilde{e}}{\partial T} < 0. \tag{15}$$

Hence, a larger bequest reduces effort, for the simple reason that wealthier people work less; this, together with (14) implies, from (13), that a larger gift rate reduces also the ordinary effort supply, because a rise in T brings about both a *fall* in the net reward for unit of effort (so that $\frac{\partial \overline{e}}{\partial T} < 0$) and an *increase* in the total gift received by the child ($\frac{\partial e}{\partial B}\frac{h-y}{k} < 0$). Finally, it can be shown that

$$\frac{\partial \widetilde{\alpha}}{\partial T} > 0; \ \frac{\partial \widetilde{\alpha}}{\partial B} = 0; \ \frac{\partial \widetilde{\alpha}}{\partial \omega} = 0. \tag{16}$$

The degree of concealment only depends on the inter vivos transfer rate: the higher is T, the more lucrative is misreporting, and thus α goes up.

By plunging (**??**) back into the utility function (6), we can get the children's indirect utility, written $\psi = \psi(T, B)$. Its derivatives w.r.t. the transfer parameters are

$$\frac{\partial \psi}{\partial T} = u_z (h - y) > 0, \tag{17}$$

$$\frac{\partial \psi}{\partial B} = k u_z > 0. \tag{18}$$

3 The design of intergenerational transfers

Parental utility is taken to be

$$V = v(x) + \lambda \sum_{i=1}^{2} n^i \psi^i \left(T^i, B^i\right), \tag{19}$$

where x denotes parental consumption and $0 < \lambda \leq 1$ is a parameter capturing the degree of altruism towards the children. The parents' initial wealth w is assumed to be large enough to guarantee positive transfers to the children. Given the structure of the transfer scheme, the parents' budget constraint will therefore be

$$x = w - \sum_{i=1}^{2} n^i \left(T^i \left(h - y^i\right) + B^i\right). \tag{20}$$

Since the parents know their children's abilities, they can make the transfer rates contingent on type. Note that this implies that if bequest shares turn out to be (tendentially) equal, this will be because of some endogenous mechanism: in principle, they can be differentiated.

The parents' problem is to choose $\left\{T^i, B^i\right\}$ so as to maximise

$$V = v\left(w - \sum_{i=1}^{2} n^i T^i \left(h - y^i\right) - \sum_{i=1}^{2} n^i B^i\right) + \lambda \sum_{i=1}^{2} n^i \psi^i \left(T^i, B^i\right), \tag{21}$$

subject to nonnegativity constraints for all four variables.

Let L, τ^i and β^i denote the Lagrangian and Lagrange multipliers of the nonnegativity contraints, respectively; then, using (1), (3), (17) and (18), the first order conditions can be written in the following way:

$$\frac{\partial L}{\partial T^i} = v_x \left(-n^i \left(h - y^i\right) - T^i n^i \left(\frac{\partial \widetilde{\alpha}^i}{\partial T^i} \omega^i \widetilde{e}^i - (1 - \widetilde{\alpha}) \omega^i \frac{\partial \widetilde{e}^i}{\partial T} \right) \right) +$$
$$+\lambda n^i u_z^i \left(h - y^i\right) + \tau^i \leq 0;\ T^i \geq 0;\ \frac{\partial L}{\partial T^i} \tau^i = 0, \tag{22}$$
$$\frac{\partial L}{\partial B^i} = v_x \left(-T^i n^i \left(- (1 - \widetilde{\alpha}) \omega^i \frac{\partial \widetilde{e}^i}{\partial B} \right) - n^i \right) + \lambda k n^i u_z^i + \beta^i \leq 0;$$
$$B^i \geq 0;\ \frac{\partial L}{\partial B^i} \beta^i = 0, \tag{23}$$

3.1 General transfer schemes

Let us start by describing the transfer scheme in analytic terms. Assuming an interior solution, substituting (23) into (22), using (5) and (13), and rearranging terms, yields:

$$T^i \left(\frac{\frac{\partial \widetilde{\alpha}^i}{\partial T} \omega^i \widetilde{e}^i - \left(1 - \widetilde{\alpha}^i\right) \omega^i \frac{\partial \overline{e}^i}{\partial T^i}}{\left(h - y^i\right)} \right) = \varkappa \left(1 + T^i \left(1 - \widetilde{\alpha}^i\right) \omega^i \frac{\partial \overline{e}^i}{\partial B^i} \right). \tag{24}$$

This equation represents the fundamental trade-off faced by the altruistic parents when devising their optimal transfer mix. Gifts are the source of two forms of distortion: they induce the children to underreport their income and to alter their compensated effort supply (neither distortion would arise using bequests). The total effect is expressed on the l.h.s. of (24) as the transfer rate T times the percentage change in the income gap $h - y^i$; we can interpret this as a measure of the loss associated with the use of gifts. On the r.h.s, we have instead a measure of the cost of using bequests, defined as the index $\varkappa$ times the change in the parents' budget due to a marginal increase in bequests (the term in parenthesis, which is unity plus the change in the gift due to the increased bequest). Then, (24) says that at the optimum, transferring one unit of income *via* bequest or *via* inter vivos transfers must be indifferent.

Simple inspection of (24) reveals that the sign of T^i is in principle ambiguous, as $\frac{\partial \overline{e}}{\partial T} < 0$ by (14), $\frac{\partial \widetilde{e}}{\partial B} < 0$ by (15) and $\frac{\partial \widetilde{\alpha}}{\partial T} > 0$ by (16); however, because of the nonnegativity constraints, (24) actually holds if the optimal gift rates are strictly positive. We cannot establish analytically that T^i is less than one, but in the numerical simulations we have carried out we never found solutions in which T^i was larger than unity.

What can we say about the predictions of this model? Given the objective function of the parents (a generalised utilitarian welfare function), and the assumption that children have equal tastes, there will be a tendency to equalise utility across children. The problem is whether this redistribution is accomplished using prevalently gifts and whether bequests represent the largest share of all transfers. Only if we find circumstances under which the answer to both questions is "yes", we can say that our model does not contradict observed behaviour.

As for the first issue, we can argue the following. On the one hand, inter vivos transfers are (imperfectly) tied to the children's income, so that they could represent a valuable redistributive tool: if they really perform this role, then the gift rate for low-ability children should be much larger than that of the high-ability ones, and bequests should be approximately equal. On the other hand, it is clear that bequests are more efficient that gifts, so this would be an argument for using type-contingent bequest shares as a redistributive device: in that case, we should have large differences in bequests and small differences in gifts. So, we expect that the first pattern prevails when the greater efficiency of bequests is counterbalanced by a high incidence of market imperfections: if the index $\varkappa$ takes a large value, bequests become very costly and therefore gifts should be used more extensively.

As for the second issue, the reasoning is relatively straightforward. With $k = 1$ and thus $\varkappa = 0$, we have from (24) that $T^i = 0$: in a world without market imperfections, ability-contingent bequests serve both efficiency and equity purposes and therefore gifts are redundant. Since however market imperfections make bequests less valuable than gifts, the parents switch partially to the latter in order to redistribute in favour of the low-ability children, but still tend to use bequests as much as possible. In general, we expect that our model will be consistent with the empirical prevalence of bequests over gifts in most cases, because of the two distortions associated with the use of gifts.

Unfortunately, it is difficult to confirm the above arguments analytically; therefore, we try and gain some insights into the matter first using numerical simulations and then considering a special case.

3.2 Numerical simulations[7]

Assume that the children's utility function is log-linear,

$$u = \gamma \ln c + (1 - \gamma) \ln(1 - e), \tag{25}$$

where we have normalised to unity the maximum possible effort and $0 < \gamma < 1$. For our exercise, we choose $\gamma = 0.8$. Also, let the cost function be quadratic in α, $c = \alpha^2$. Finally, assume that the

[7] All the simulations in this paper have been carried out using Maple V.

individual	u^i	g^i	r^i	z^i	$\frac{B^i}{\Sigma_i n^i B^i}$
type-1 child	3.36	31.91	17.71	78.62	0.35
type-2 child	3.26	0	59.46	86.28	0.30
parents	V	x	$\frac{\Sigma_i n^i B^i}{\Sigma_i n^i B^i + \Sigma_i n^i g^i}$		
	13.94	142.67	0.59		

Table 1:
A numerical example with an ability-contingent transfer scheme
($T^1 = 0.48$; $B^1 = 32.56$; $T^2 = 0$; $B^2 = 28.40$)

parents' utility is also logarithmic in consumption, $v(x) = \ln(x)$. Then, setting the parameters as follows:[8]

$$n^1 = 2, \ n^2 = 1, \ w = 300, \ \omega^1 = 50,$$
$$\omega^2 = 80, \ k = 0.8, \ h = 80, \ \lambda = 0.9;$$

we find that the optimal transfer scheme is:

$$T^1 = 0.48; \ B^1 = 32.56; \ T^2 = 0; \ B^2 = 28.40.$$

In this case, gifts seems to prevail as redistributive instruments: the gift rate for high-ability children is zero, while bequests are only slightly higher for the low-ability children.

Other considerations may be made on the basis of the figures reported in Table 1. Interestingly, utility and consumption leves are almost equalised across children despite the large difference in income (type-2 children earn more than three times as much as type-1 children): indeed, the utility ranking is reversed, as low-ability children have higher welfare than high-ability ones! This happens because the two types have, as we said, similar consumption levels, but low-ability children work very little because they receive a huge gift (effort levels are reported in the tables in the Appendix). Clearly, the ability-contingent transfers constitute a very powerful redistributive scheme. It is also confirmed that bequests represent the largest proportion of total transfers.

To test the robustness of our results concerning the role of the two types of transfer and on the composition of total transfers, we have performed several comparative statics exercises

[8] A fuller range of results for this and other parameter configurations are reported in the Appendix.

Description	Change	g^1	$\frac{B^1}{\Sigma_i n^i B^i}$	$\frac{B^2}{\Sigma_i n^i B^i}$	$\frac{\Sigma_i n^i B^i}{\Sigma_i n^i B^i + \Sigma_i n^i g^i}$
benchmark case	–	31.91	0.350	0.300	0.59
increased skill dispersion	$\omega^1 = 40$	48.63	0.325	0.350	0.40
wealthier parents	$w = 400$	34.89	0.335	0.330	0.70
less altruistic parents	$\lambda = 0.8$	31.39	0.350	0.300	0.57
equal number of children	$n^2 = 1$	34.45	0.510	0.490	0.74
less market imperfections	$k = 0.9$	11.53	0.385	0.230	0.86

Table 2:

Total gifts and bequest shares for some alternative configurations

on our benchmark parameter configurations: summary results are reported in Table 2. From Table 2 one sees that bequests are divided about equally among the children in all cases but one: for the "wealthier parents" and "equal number of children" variants, the shares are almost identical. The exception is, unsurprisingly, the "less market imperfections" case. This confirms that gifts acquire a redistributive role only because market imperfections make bequests less valuable: when k is close to one and the transfer scheme is contingent on type, redistribution is accomplished mostly through bequests.[9] Another pattern which emerges from Table 2 is that bequests always account for more than half of total transfers (with a peak of 86% in the "less market imperfections" case), except for the "increased skill dispersion" case. This can be explained by noting (from the Appendix) that in this variant of the simulation model, the low-ability children are extremely poor: it is therefore perfectly rational for altruistic parents to use gifts rather than bequests.[10]

3.3 A special case

We focus now on the special case in which the parents treat their children as if they were equal, applying the same transfer rates to all of them, i.e. setting $T^i = T$ and $B^i = B$, all i.

[9] As a further check, we computed the optimal transfer scheme for the case in which $k = 1$. It turns out that, with all the other parameters as in the benchmark case, $B^1 = 66.76$, and $B^2 = 36.76$ (with $T^1 = T^2 = 0$). That is, the two low-ability children get 39% each of the total estate, and the high-ability one is left with only 22%.

[10] The "increased skill dispersion" case is interesting also because is the only one in which the largest bequest share goes to the high-ability child. This is reminiscent of a result in McGarry (1999a), which found that, in same cases, bequests could be positively correlated to the child's income. The explanation in our model would be that a higher B^2 is needed to counterbalance the enormous difference between the gifts, which is in turn motivated by the extreme poverty of the low-ability children.

This guarantees at the outset that bequests, if used, will be equal across children, as we saw is usually the case in the real world. This may be criticised as unduly restrictive (equal bequest shares should be explained, not assumed), but there are at least two reasons why we wish to investigate this case. First, it has been often argued that differentiated bequests may cause what are usually referred to as the psychic costs of unequal giving (see e.g. McGarry 1999b for a brief review of the literature), and therefore, there may be circumstances under which the welfare loss associated with the use of uniform transfers is outweighed by these costs. Second, we have already mentioned a recently advanced argument according to which the parents may wish to preserve their reputation by avoiding differentiated bequests (Lundholm and Ohlsson 2000); in this case, the practice of equal bequest share should be seen as a "social norm" that cannot be violated without costs.

The parents' optimization problem in this case is to choose T and B so as to

$$\max\ V = v\left(w - T\sum_{i=1}^{2} n^i\left(h - y^i\right) - B\sum_{i=1}^{2} n^i\right) + \lambda\sum_{i=1}^{2} n^i\psi^i\left(T, B\right), \tag{26}$$

subject to nonnegativity constraints for the two variables. In principle, this may be solved to yield the optimal values of T and B. We expect that both bequests and gifts are used at the optimum; in the various simulations that we have performed (on which more presently), we always found positive levels of both T and B. Bequests represent an efficient way of transferring resources, but, being constrained to be equal across children, are not very helpful where redistribution is concerned; gifts, on the contrary, are distortionary, but are well-suited for helping the less well-off children in a direct way.

The relevant question, of course, is whether uniform schemes are consistent with the two main facts that characterise observed behaviour, namely the negative correlation between gifts and incomes and the prevalence of bequests over gifts.

As for the first point, it is indeed immediate to establish the following result:

Claim 1 *When a uniform transfer scheme is implemented, low-ability children receive a larger total gift.*

Proof. With $T^i = T$ and $B^i = B$, all i, we get from (12), (15) and (16) $r^2 > r^1$ and $\alpha^1 = \alpha^2$. Hence, $y^2 > y^1$ and $T(h - y^1) > T(h - y^2)$. ■

This way, we have that uniform transfer schemes reproduce exactly real-world intergenerational transfer patterns, in that gifts are larger for the less well-off children, while bequests are equal (by construction).

individual	u^i	g^i	r^i	z^i
type-1 child	3.29	23.67	18.41	71.02
type-2 child	3.39	16.21	37.80	86.68
parents	V	x	$\frac{\Sigma_i n^i B^i}{\Sigma_i n^i B^i + \Sigma_i n^i g^i}$	
	13.92	141.19	0.60	

Table 3:

A numerical example with a uniform transfer scheme

($T = .38$, $B = 31.75$)

Description	T	$\frac{g^1}{r^1}$	$\frac{g^2}{r^2}$	$\frac{B\Sigma_i n^i}{B\Sigma_i n^i + \Sigma_i n^i g^i}$
benchmark case	0.38	1.04	0.35	0.60
increased skill dispersion	0.49	3.01	0.53	0.44
wealthier parents	0.39	1.54	0.45	0.69
less altruistic parents	0.38	1.36	0.33	0.57
equal number of children	0.34	1.06	0.33	0.73
less market imperfections	0.17	0.37	0.12	0.85

Table 4:

Gift rates, gift/income ratios and bequests/total transfers ratios for some alternative configurations

As for the issue of the prevalence of bequests over gifts, it is difficult to say something in general. We therefore resort to numerical simulations. For our benchmark simulation model, it turns out that the optimal uniform scheme is:

$$T = .38,\ B = 31.75.$$

Other variables are reported in Table 3, from which we see that utility and consumption levels for children are much less diverse than incomes: so, we find a confirmation of the equitative role of the inter vivos transfers, even if the gift rates are constant across children. Indeed, although the total gifts do not seem to differ very much in absolute size, the low-ability children receive a gift that is larger than their income, while this is not true for the high-ability ones. We also see that total bequests are larger than total gifts.

From Table 4 we see that the above remarks on the redistributive role of gifts apply equally

Description	V	V
	General scheme	Uniform scheme
benchmark case	13.94	13.92
increased skill dispersion	13.87	13.84
wealthier parents	14.59	14.57
less altruistic parents	12.95	12.93
equal number of children	11.34	11.33
less market imperfections	14.04	14.03

Table 5:

A comparison of parental utilities across schemes for some alternative configurations

well to all the variants which we investigated, with one important exception:[11] in the "less market imperfections" case, both child types receive a gift which is smaller than their income. This reflects the fact that, with k approaching unity, the greater efficiency of bequests makes them the most appropriate way of transferring resources through generations: actually, we see that this is the case in which bequests represent the largest share of total transfers (85%). Bequests always account for more than half of total transfers, except for the "increased skill dispersion" variant, for the same reasons as in the general case (see above).

Finally, it is instructive to compare the results reported in Table 3 with those of Table 1. Note that the redistributive power of the general scheme is superior, as we do not observe the reverse utility ranking under the uniform scheme; the bequest shares and the bequest/total transfers ratio are instead almost identical. This loss of redistributive content for the gifts is clearly due to the constraint that the gift rate is equal across children. Despite this, parental utility is only slightly inferior when a uniform scheme is used: the difference is negligible. This is a potentially relevant finding, as it suggests that the welfare loss associated with the use of uniform schemes, as opposed to fully differentiated schemes, is actually tiny. For the functional forms used in this paper (logarithmic utilities, quadratic concealment costs, utilitarian welfare function), this proved to be a robust result; some cases are reported in Table 5. A possible reason for this is that the total amount transferred to the children does not vary much across schemes: parental consumption is slightly lower in the uniform scheme case, but the difference is irrelevant. With equal tastes and equal welfare weight λ for the children, and an additive

[11] Predictably, the gift rate reaches a peak for the "increased skill dispersion" case, in which the low-ability child is extremely poor (see the Appendix); for this case, we also find the highest gift/income ratio.

welfare function, differences in consumption among children do not count much in terms of overall welfare as long as the total resources are the same.

4 Conclusions

In this note, we have tried to characterise intergenerational transfer schemes within the altruistic model of the family. Since we assumed heterogenous children, both efficiency and equity issues arise. The basic feature of our model is that bequests are taken to be the most efficient way of transferring resources through the generations, as they only have an "income" effect (make people wealthier): by contrast, inter vivos transfers (gifts), being explicitly aimed at easing liquidity constraints, distort the effort supply decisions as well as inducing underreporting of income (this latter effect follows because income is not observable, and therefore the parents design their transfers schemes on the basis of reported income). In this context, we are able to show that there are plausible circumstances in which the optimally designed transfer schemes involve i) a prevalence of bequests over gifts, and ii) higher gifts for the low-income children and approximately equal bequest shares. Both results are consistent with observations.

The driving forces behind our findings are two. First, we assumed that, due to usual market imperfections (namely, the impossibility of borrowing against future income), one unit of bequests is worth less than one unit of gift for the children (see Cremer and Pestiau 1996). This makes bequests unsuitable for equity purposes, *even when the parents are capable and willing to give different bequest shares to different children.* Second, we took gifts to be compensatory from the start; this makes them highly redistributive but also inherently *inefficient* tools. Hence, parents do use inter vivos transfers for equity purposes, which is ii) above; however, they do this only to the extent that it is necessary, and still transfer as large a proportion as possible of their money via bequests, to avoid the double cost associated with the use of gifts (distortion of effort supply and underreporting of income), which is i) above. This points out to the existence of market imperfections and the distortionary nature of gifts as two simple and straightforward explanations of the commonly observed pattern of intergenerational transfers, and is consistent with the notion that parents act in perfectly rational way when deciding how much money they should leave to their children and in what form.

Alternatively, we can explain the occurence of equal bequest shares by noting that, in some cases, the welfare loss of uniform schemes, which avoid the so-called psychic costs of unequal giving or the loss of reputation associated with differentiated bequests, is tiny. These schemes yield a pattern which in complete accordance with observed behaviour, in that gifts are always larger for the low-income children and bequests are always shared equally. Moreover, they entail almost no welfare loss, at least for the specific assumptions that we made in our simulation model: this would be a strong motivation for altruistic parents to resort to uniform schemes.

Appendix

Comparative statics. The child maximises

$$U = u\left(\omega e + T\left(h - (1-\alpha)\,\omega e\right) - c\left(\alpha\right)\omega e + kB, e\right), \tag{27}$$

by choice of e and α. Note first that our assumptions on the shape of the utility and cost-of-misreporting functions ensure that the second order conditions for the child maximisation problem are satisfied. Indeed, (2) and (8) imply that $U_{ee} < 0$, $U_{\alpha\alpha} < 0$ and $U_{e\alpha} = U_{ae} = 0$, so that $|U| = \left[U_{ee}U_{\alpha\alpha} - (U_{e\alpha})^2\right] > 0$. Assume now that

$$u_{ez} \leq 0. \tag{28}$$

Then, we can compute:

$$U_{eT} = u_{zz}\left(h - y\right)\omega^* + u_z\left(\alpha - 1\right) + u_{ez}\left(h - y\right) < 0, \tag{29}$$

$$U_{eB} = u_{zz}k\omega^* + u_{ez}k < 0, \tag{30}$$

$$U_{\alpha T} = u_z r > 0, \tag{31}$$

$$U_{\alpha B} = U_{\alpha\omega} = 0, \tag{32}$$

where the signs follow from (8) and (28). Then, using the standard procedure, it is possible to see that

$$\frac{\partial \widetilde{e}}{\partial T} = \frac{-U_{eT}U_{\alpha\alpha}}{|U|} < 0, \tag{33}$$

$$\frac{\partial \widetilde{e}}{\partial B} = \frac{-U_{eB}U_{\alpha\alpha}}{|U|} < 0, \tag{34}$$

which is (15), and that

$$\frac{\partial \widetilde{\alpha}}{\partial T} = \frac{-U_{\alpha T}U_{ee}}{|U|} > 0, \tag{35}$$

$$\frac{\partial \widetilde{\alpha}}{\partial B} = \frac{-U_{\alpha B}U_{ee}}{|U|} = 0, \tag{36}$$

$$\frac{\partial \widetilde{\alpha}}{\partial \omega} = \frac{-U_{\alpha\omega}U_{ee}}{|U|} = 0, \tag{37}$$

which is (16). Furthermore, we have that

$$U_{eT} = u_z(\alpha - 1) + U_{eB}\frac{h-y}{k}, \tag{38}$$

which, in view of (34) and (36), leads to

$$\frac{\partial \widetilde{e}}{\partial T} = -\frac{u_z(\alpha - 1)}{U_{ee}} + \frac{\partial \widetilde{e}}{\partial B}\frac{h-y}{k}. \tag{39}$$

It is immediate the identify, by standard arguments, the first term on the r.h.s. of (39) as the effect of T on the compensated supply of e: hence, (13) follows. Finally, note that:

$$\frac{\partial \overline{e}}{\partial T} \equiv -\frac{u_z(\alpha - 1)}{U_{ee}} < 0, \tag{40}$$

which verifies (14).

Simulations results. In each subsection of this part of the appendix, the first table gives more information on the benchmark model ($n^1 = 2$, $n^2 = 1$, $w = 300$, $\omega^1 = 50, \omega^2 = 80$, $k = 0.8$, $h = 80$, $\lambda = 0.9$), while the other tables report the same figures for the other variants used in the text. Notice that the qualitative remarks we made in the text for the benchmark case apply equally well to all the other cases.

General schemes

Table A1 - Benchmark case

($T^1 = 0.48$; $B^1 = 32.56$; $T^2 = 0$; $B^2 = 28.40$)

individual	u^i	α^i	e^i	g^i	r^i	y^i	z^i	$\frac{B^i}{\Sigma_i n^i B^i}$	c^i
type-1 child	3.36	0.24	0.35	31.91	17.71	13.46	78.62	0.350	0.06
type-2 child	3.26	0	0.74	0	59.46	59.46	86.28	0.300	0
	V	x	$\frac{\Sigma_i n^i B^i}{\Sigma_i n^i B^i + \Sigma_i n^i g^i}$						
parents	13.94	142.67	0.59						

Table A2 - Increased skill dispersion ($\omega^1 = 40$)

($T^1 = 0.63, B^1 = 21.28, T^2 = 0, B^2 = 23.24$)

individual	u^i	α^i	e^i	g^i	r^i	y^i	z^i	$\frac{B^i}{\Sigma_i n^i B^i}$	c^i
type-1 child	3.37	0.31	0.08	48.63	3.50	2.41	68.82	0.325	0.10
type-2 child	3.21	0	0.75	0	60.28	60.28	78.87	0.350	0
	V	x	$\frac{\Sigma_i n^i B^i}{\Sigma_i n^i B^i + \Sigma_i n^i g^i}$						
parents	13.87	136.93	.40						

Table A3 - Wealthier parents ($w = 400$)

($T^1 = 0.49, B^1 = 53.90, T^2 = 0, B^2 = 52.72$)

individual	u^i	α^i	e^i	g^i	r^i	y^i	z^i	$\frac{B^i}{\Sigma_i n^i B^i}$	c^i
type-1 child	3.53	.24	0.22	34.89	11.25	8.50	88.59	0.335	0.60
type-2 child	3.42	0	0.69	0	55.56	55.56	97.74	0.330	0
	V	x	$\frac{\Sigma_i n^i B^i}{\Sigma_i n^i B^i + \Sigma_i n^i g^i}$						
parents	14.59	169.70	0.70						

Table A4 - Less altruistic parents ($\lambda = 0.8$)

($T^1 = .48, B^1 = 28.87, T^2 = 0, B^2 = 24.21$)

individual	u^i	α^i	e^i	g^i	r^i	y^i	z^i	$\frac{B^i}{\Sigma_i n^i B^i}$	c^i
type-1 child	3.32	0.24	0.38	31.39	18.82	14.32	72.23	0.350	0.06
type-2 child	3.22	0	0.75	0	60.13	60.13	79.43	0.300	0
	V	x	$\frac{\Sigma_i n^i B^i}{\Sigma_i n^i B^i + \Sigma_i n^i g^i}$						
parents	12.95	155.26	0.57						

Table A5 - Equal number of children ($n^2 = 1$)

($T^1 = 0.49, B^1 = 50.74, T^2 = 0, B^2 = 49.12$)

individual	u^i	α^i	e^i	g^i	r^i	y^i	z^i	$\frac{B^i}{\Sigma_i n^i B^i}$	c^i
type-1 child	3.51	0.24	0.24	34.45	12.21	9.24	86.53	0.510	0.60
type-2 child	3.40	0	0.70	0	56.14	56.14	95.44	0.490	0
	V	x	$\frac{\Sigma_i n^i B^i}{\Sigma_i n^i B^i + \Sigma_i n^i g^i}$						
parents	11.34	165.69	0.74						

Table A6 - Less market imperfections ($k = 0.9$)

($T^1 = 0.20$; $B^1 = 54.42$; $T^2 = 0$; $B^2 = 32.84$)

individual	u^i	α^i	e^i	g^i	r^i	y^i	z^i	$\frac{B^i}{\Sigma_i n^i B^i}$	c^i
type-1 child	3.42	0.10	0.48	11.53	24.04	21.67	84.32	0.385	0.01
type-2 child	3.32	0	0.73	0	58.09	58.09	87.65	0.230	0
	V	x	$\frac{\Sigma_i n^i B^i}{\Sigma_i n^i B^i + \Sigma_i n^i g^i}$						
parents	14.04	135.25	0.86						

Uniform schemes

Table A7 - Benchmark case

($T = 0.38$; $B = 31.75$)

individual	u^i	α	e^i	g^i	r^i	y^i	z^i	$\frac{B}{B \Sigma_i n^i}$	c
type-1 child	3.29	0.19	0.46	23.67	22.79	17.71	71.02	0.33	0.04
type-2 child	3.39	0.19	0.58	16.21	46.79	37.80	86.69	0.33	0.04
	V	x	$\frac{B \Sigma_i n^i}{B \Sigma_i n^i + \Sigma_i n^i g^i}$						
parents	13.92	141.19	0.60						

Table A8 - Increased skill dispersion ($\omega^1 = 40$)

($T = 0.49, B = 24.36$)

individual	u^i	α	e^i	g^i	r^i	y^i	z^i	$\frac{B}{B \Sigma_i n^i}$	c
type-1 child	3.27	0.24	0.29	34.76	11.54	8.73	65.09	0.33	0.06
type-2 child	3.38	0.24	0.54	22.96	43.54	32.93	83.39	0.33	0.06
	V	x	$\frac{B \Sigma_i n^i}{B \Sigma_i n^i + \Sigma_i n^i g^i}$						
parents	13.84	134.50	0.44						

Table A9 - Wealthier parents ($w = 400$)

($T = 0.39, B = 53.67$)

individual	u^i	α	e^i	g^i	r^i	y^i	z^i	$\frac{B^i}{B\Sigma_i n^i}$	c
type-1 child	3.47	0.20	0.34	26.09	16.96	13.63	85.32	0.335	0.04
type-2 child	3.55	0.20	0.51	18.51	40.96	32.91	100.81	0.330	0.04
	V	x	$\frac{B\Sigma_i n^i}{B\Sigma_i n^i + \Sigma_i n^i g^i}$						
parents	14.57	168.34	0.69						

Table A10 - Less altruistic parents ($\lambda = 0.8$)

($T = 0.38, B = 28.00$)

individual	u^i	α	e^i	g^i	r^i	y^i	z^i	$\frac{B}{B\Sigma_i n^i}$	c^i
type-1 child	3.25	0.19	0.48	32.27	23.78	19.23	68.58	.33	0.04
type-2 child	3.37	0.19	0.60	15.84	47.78	38.63	84.27	.33	0.04
	V	x	$\frac{B\Sigma_i n^i}{B\Sigma_i n^i + \Sigma_i n^i g^i}$						
parents	12.93	153.62	0.57						

Table A11 - Equal number of children ($n^2 = 1$)

($T = 0.34, B = 49.68$)

individual	u^i	α	e^i	g^i	r^i	y^i	z^i	$\frac{B^i}{B\Sigma_i n^i}$	c
type-1 child	3.41	0.17	0.41	21.65	20.42	16.92	81.21	0.50	0.03
type-2 child	3.50	0.17	0.56	14.82	44.42	36.80	97.68	0.50	0.03
	V	x	$\frac{B\Sigma_i n^i}{B\Sigma_i n^i + \Sigma_i n^i g^i}$						
parents	11.33	164.17	0.73						

Table A12 - Less market imperfections ($k = 0.9$)

($T = 0.17$; $B = 46.81$)

individual	u^i	α	e^i	g^i	r^i	y^i	z^i	$\frac{B}{B\Sigma_i n^i}$	c
type-1 child	3.34	0.09	0.53	9.81	26.50	24.17	78.23	0.33	0.01
type-2 child	3.47	0.09	0.63	6.00	50.50	46.06	98.20	0.33	0.01
	V	x	$\frac{B\Sigma_i n^i}{B\Sigma_i n^i + \Sigma_i n^i g^i}$						
parents	14.03	134.00	0.85						

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