

Halvorsen, Elin; Thoresen, Thor O.

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**Discussion Papers No. 439, November 2005
Statistics Norway, Research Department**

Elin Halvorsen and Thor O. Thoresen

**The relationship between altruism
and equal sharing**
Evidence from inter vivos transfer
behavior

Abstract:

Several studies reject the implications of the altruism model. In this study it is argued that parents who transfer resources to their children both are altruistic and influenced by an equal division fairness norm. Under such motives, the degree of income compensation should be stronger in one-child families and we expect the altruism motive to dominate the fairness norm when income differences between siblings are large. The results suggest that equal divisions are intentional and weighted against altruistic motives.

Keywords: inter vivos gifts, altruism, equal sharing, compensatory transfers

JEL classification: D19, D64, H21

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Address: Elin Halvorsen, Statistics Norway, Research Department. E-mail: vor@ssb.no

Thor O. Thoresen, Statistics Norway, Research Department. E-mail: tot@ssb.no

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Telephone: +47 62 88 55 00

Telefax: +47 62 88 55 95

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1 Introduction

The motivation behind transfers from parents to grown children has important implications for public policy. Central to the discussion is the question of whether parents behave according to the altruism model. Do they act compensatory towards their children and divide transfers unequally between children with different needs? Empirical analyses find weak support for the predictions of the altruism model and that parents often transfer equal amounts to their children. How should one interpret this finding? One would reasonably assume that most parents are essentially altruistic towards their children in the sense that they care about their children's welfare and consumption possibilities. However, it is also reasonable to assume that they would like to treat their children fair. If equal sharing is a fairness norm in the society, parents will have to weigh their "pure altruism" against the equal division norm. In this case findings of equal division should not necessarily be interpreted as evidence of absent altruism.

Here we explore the hypothesis that parents are faced with a trade-off between compensating the less well-off children and the desire to treat their children fair. A modified version of the "pure altruism" model (Barro 1974; Becker 1974; Becker and Tomes 1979) is used as a theoretical underpinning for the empirical analysis. Parents are assumed to also act in response to an equal division fairness norm, where unequal division affects parents' utility directly. The trade-off will then be determined by the relative strength of the altruism motive and a fairness norm. Such reasoning leads to at least two testable hypotheses. First, the degree of income compensation should be stronger in one-child families since the fairness norm would not apply in these families. Second, we expect the altruism motive to dominate the fairness norm when income differences between siblings are large.

To test these hypotheses we employ a rather rich dataset on inter vivos transfers between generations in Norway. The strength of our data is that the respondents are asked about characteristics regarding both their children and parents. This enables us to both study the relationship between the respondent and his parents (if they are still alive) and the respondent and all his (grown) children. Furthermore, the characteristics of children can be used for sibling comparisons. Both data sets are employed in testing the above conjectures, employing a Tobit model approach. The respondents are also asked directly about their transfer motives, and these responses are also reported.

When we employ standard analysis of inter vivos transfer behavior we find estimates of the transfer-income derivatives not far from the results

reported in Altonji, Hayashi and Kotlikoff (1997) with respect to the U.S. However, we also find that the recipient income derivative is significantly higher in one-child families than in multiple child families. Furthermore, the income derivative in multiple child families is non-linear, with a larger degree of parental compensation of income when the child's income is lower than mean or median income. Finally, in a comparison of sibling characteristics, it is economic situation that seems to be the main determinant of unequal division of inter vivos gifts. We take this evidence as supportive of the hypothesis that parents are faced with a trade-off between compensating income and being fair.

Formally our model shares similarities with a number of studies, Menchik (1988), Wilhelm (1996), Stark (1998), Lundholm and Ohlsson (2000), and Bernheim and Severinov (2003), in that the models will basically lead to the same predictions as the model employed here. Wilhelm (1996) is the only other empirical study, but on bequests instead of inter vivos transfers. He includes a vector of observable parental characteristics to represent the psychic cost of unequal division. Stark (1998) introduces negative utility of unequal division (called relative deprivation) in the child's utility function, and the cost is, thus, indirectly included in an altruistic parent's utility function. He argues that equal division is consistent with a model where the cost of unequal division emanates from altruism, rather than competes with altruism.

A number of recent papers discuss intergenerational linkages through inter vivos giving behavior instead of addressing information on bequests (see Altonji, Hayashi and Kotlikoff, 1997; Poterba, 2001). The growing awareness of parents' transfer behavior before death appears to have emerged because recent findings, for instance from the U.S., suggest that a majority of parents divide their estates equally between children at death, while inter vivos gift behavior to a larger extent result from parents' consciousness of characteristics of children (Dunn and Phillips, 1997; McGarry, 1999). These findings have also prompted explanations in terms of costs of unequal divisions. Lundholm and Ohlsson (2000) assume that the cost of unequal division is only associated with bequests since these are public information, and parents who are worried about their post mortem reputation will use gifts to treat children unequally, as gifts to a larger extent are private information. Bernheim and Severinov (2003) develop equal division norm equilibriums for bequests from altruism, when an element of parental affection is added, affecting well being of children and observed through parental transfer behavior.

One reason for using data of inter vivos transfer behavior in the present

study is that the equal division rule is, in fact, part of public policies in Norway. The Norwegian law of transmission limits parents' possibilities to differentiate between the descendants through bequests, as only one third of the estate can be transferred according to bequeathers' preferences. Two thirds of the estate is reserved for equal sharing between children. This means that the possibility to discriminate between children through transfers at death is restricted to only one third of the estate. The same regulations apply to gifts that are advancements of inheritance, and correspondingly they are an integrated part of inheritance tax bases. However, the transmission regulations do not apply for other inter vivos gifts. Thus, we expect that parents who face these restrictive transmission rules and want to transfer resources to their children in accordance with their preferences, transfer resources to children inter vivos. Such regulations are part of public policies in other European countries as well, and hence, will impact on how suitable data are for testing the altruism motive and other transfer motives.

The plan of the paper is as follows: In Section 2 we provide a more detailed outline of the Norwegian inheritance regulations, while the altruism model with fairness considerations are discussed in Section 3. Section 4 describes the data and provides some information with respect to self-reported motives for transfers to children. The econometric specification and results are presented in Section 5, while Section 6 concludes the paper.

2 Norwegian gift and bequest laws

There are at least two sets of laws that impact on transfer behavior of Norwegian parents; the transmission law and the inheritance tax law. As emphasized above, the law of transmission between generations regulates how much scope there is for compensatory activities. It states that children (or other close relatives) are guaranteed two-thirds of the estate, when the estate does not exceed 1 million Norwegian kroner (approx. \$155,000, Oct. 2005) in value. This appears to be similar to what Arrondel and Laferrière (2001) report to be the case in France, and which they characterize as "directive altruism", i.e. a law system that encourages transfers to close relatives. We are aware that transmission laws that are directive with respect to transfer to children exist in a number of other European countries, among them Sweden, Denmark and Finland.

More important with respect to empirical analyses of altruism, each child is guaranteed an equal share of this mandatory transfer to children. If a parent leaves 750,000 kroner, his two children will receive a mandatory share of

250,000 each, while the bequeather can freely target the remaining 250,000 according to his objectives; to one of them, to charity, etc. Bernheim and Severinov (2003) argue that the equal division norm follows from an equilibrium where bequests signalling parental affection affects the subjective well-being of children. In Norway, the law of transmission regulates the scope for unequal divisions. This makes Norwegian bequest data less useful in order to analyze transfer motives, for instance the conjectures of the altruism model, as parents may be constrained from carrying out their true objectives. Parents might also adhere to the equal division rule with respect to the non-mandatory share as well; the equal sharing rule constituting a transfer norm. The fact that only approximately 25 percent of the deceased transfer their assets through a will (The Ministry of Finance 2000) suggest that a minority of parents act intentionally when leaving bequests.¹

We suggest that parents, under such circumstances, will carry out their intentional transfer arrangements through inter vivos gifts. The law confirms explicitly that an equal sharing principle does not exist with respect to inter vivos transfers that are not advanced bequests. Such inter vivos gifts are also tax exempt. From a practical and administrative point of view, parents can transfer about 40,000 Norwegian kroner (approx. \$6,200) per year without creating any suspicion from the tax authorities, according to tax-law experts. Inter vivos gifts that are considered advancement of inheritance are both part of the tax base and restricted by transmission laws. However, the real distinction between taxable inter vivos gifts and non-taxable inter vivos gifts is defined by the intention of the donor.

The inheritance tax is progressive and based on aggregated values of taxable gifts and bequests, see Appendix A for a more detailed outline of the tax scheme. There are reasons to assume that the progressive inheritance tax also strengthen incentives to divide bequests equally. Therefore, in light of these regulations, both the law of transmission and the tax law, we believe that is advantageous to exploit information from inter vivos transfers instead of utilizing information from bequests and taxable inter vivos transfers, when discussing to what extent altruism act as a guideline for intergenerational transfers in Norway. These transfers hold the promise of being unpolluted both by the regulations of the law of transmission and tax law concerns.

¹This is about the same magnitude as reported from the U.S., see e.g., Menchik (1988); Wilhelm (1996).

3 The model

The altruism model (Barro, 1974; Becker, 1974; Becker and Tomes, 1979) has been at the heart of recent empirical investigations of transfer motives, see Altonji, Hayashi and Kotlikoff (1997) and Laitner and Ohlsson (2001). Here we present a modified version of the model which incorporates a fairness norm of equal sharing, see Lundholm and Ohlsson (2000) for a related setup. Altruistic parents derive positive utility from own consumption, c^p , and their children's consumption, where c_i is the consumption of child i and n is the number of children, but they dislike unequal sharing of gifts, $(b_i - \bar{b})$, where b_i is the gift to child i and \bar{b} is the sibling average. Consumption of parents and children, respectively, can be seen as

$$c^p = e^p - \sum_{i=1}^n b_i \quad (1)$$

and

$$c_i = e_i + b_i, \quad i = 1, \dots, n, \quad (2)$$

where e^p is parental earnings, and e_i is earnings of child i . Assuming log linear parental utility and introducing a parameter measuring an equal division attitude we get

$$U = \ln c_p + \alpha \sum_i \ln c_i - \sum_i \frac{\gamma}{2} (b_i - \bar{b})^2. \quad (3)$$

The optimization problem can then be formalized as

$$\begin{aligned} \max_{b_i} U &= \ln \left(e_p - \sum_i b_i \right) \\ &+ \alpha \sum_i \ln (e_i + b_i) - \sum_i \frac{\gamma}{2} (b_i - \bar{b})^2, \end{aligned} \quad (4)$$

subject to $b_i \geq 0$. To illustrate the implications of this model, consider the first order conditions in the case of two children:

$$(b_2 - b_1) \left[1 + \frac{2\gamma}{\alpha} (e_1 + b_1) (e_2 + b_2) \right] = e_1 - e_2 \quad (5)$$

If there is no fairness attitudes ($\gamma = 0$) then

$$b_2 - b_1 = e_1 - e_2 \quad (6)$$

This is the standard result of the altruism model. Parents treat their children symmetrically, and taking the e_i 's as given they balance their gifts in order to equalize children's consumption, net of transfers². However, if $\gamma > 0$ then

$$\left[1 + \frac{2\gamma}{\alpha} (e_1 + b_1) (e_2 + b_2) \right] > 1$$

and

$$b_2 - b_1 < e_1 - e_2 \quad (7)$$

i.e. parents will compensate less than in the case where they did not have a negative utility of dividing unequally. The larger the "fairness" parameter γ is, compared to the "altruism" parameter α , the less they compensate income gaps between children. These results are easily generalized to the case with more than two children. It follows from the model that transfers increase in parents' income

$$\frac{\partial b_i}{\partial e^p} > 0. \quad (8)$$

When it comes to the prediction that transfers are decreasing in the child's income

$$\frac{\partial b_i}{\partial e_i} < 0, \quad (9)$$

we assume that this depends on the relative strength of γ and α . Generally, (9) would hold in cases where there is no fairness considerations, for example when there is an only child.

Moreover, most empirical analyses of the standard model of altruism focus on the transfer-income derivative restriction,

$$\frac{\partial b_i}{\partial e^p} - \frac{\partial b_i}{\partial e_i} = 1 \quad (10)$$

It states that if transfers are positive, a small change in the income distribution, such that parents income increase by one unit and the child's income is reduced by one unit, will be cancelled by the altruistic parents through a transfer of one unit. However, as it has been a focal point of many previous analyses, see e.g., Altonji, Hayashi and Kotlikoff (1997) and Laitner and Ohlsson (2001), we also address this derivative restriction and its components in the empirical analysis in the following.

However, the main focus will be on the following two predictions of this modified altruism approach: Firstly, the degree of income compensation

²It is important to recognise that parents may well end up at a corner solution, where $b_i = 0$.

should be stronger in families with an only child, and secondly, the "pure altruism" motive will dominate the fairness norm when income differences between siblings are large.

4 Data and descriptive statistics

This paper uses very rich data from a survey conducted by Norwegian Social Research (NOVA) in the winter of 2001. The survey is intended to be nationally representative and the sample selection uses two-stage stratified random sampling. The number of households interviewed is 2025, but in this study we only use households where one of the household heads were interviewed. This leaves us with a sample of 1877 households.

The survey collected information on household and individual characteristics, wealth, income, employment status, and a number of questions regarding attitudes to intergenerational relations. Both transfers given and transfers received were collected with a recall period covering the previous 12 months. All financial figures can therefore be taken to be in 2000-prices. The survey also has information about educational attainment, economic situation and other characteristics of the interviewed member's parents, in-laws, and grown children.

For the purpose of the analysis in this paper, we use two sub-samples of the basic sample. One sample is confined to all respondents with grown children. Here the dependent variable is transfers given in the last 12 months by the respondent household to their children. Each child-parent pair represents one observation, which implies that the number of observations in this sub-sample is greater than the number of respondents. We will have detailed information about the donor, and indicator information about each recipient. The second sample consists of all respondents with at least one live parent. The dependent variable is transfers received in the last 12 months, and we have detailed information about the recipient, but only indicative information about the donor. Of course, some of the interviewed households may be in both sub-samples. Descriptive statistics for the two sub-samples are reported in table 1 and table 2.

A gift is defined as any money transfer, payment of regular or extraordinary expenses, payment of travels/holidays, interest on loans or down payments on loans, and financial support through transferring cars/housing or in other ways allowing the children to make free use of cars/housing. According to table 1, a fraction of 23 percent of households with grown children have given gifts to their grown children in the last 12 months. The condi-

Table 1: Descriptive statistics for respondents with grown children

	Mean	Std. dev.	Min	Max
Parent characteristics				
Age of respondent	61	12	22	97
Married/cohabitant	.68	.46	0	1
Female respondent	.56	.49	0	1
High education*, father	.47	.50	0	1
High education*, mother	.43	.49	0	1
No of children	3.0	1.4	0	9
Household income**	347	198	0	1200
Respondent's income**	205	131	0	1150
Household net worth**	1729	1537	-245	11400
Yes, given gift last 12m	.23	.42	0	1
Gift given last 12 m**	12	153	0	5000
Gift given** > 0	67	355	1	5000
Child characteristics				
Age	43	10	18	73
Female	.49	.50	0	1
Married/cohabitant	.63	.48	0	1
High education*	.33	.47	0	1
Grandchildren	.56	.50	0	1
Unemployed	.18	.45	0	1
Student	.15	.36	0	1
Economic situation: bad	.06	.23	0	1
Economic situation: well	.43	.49	0	1

* High education is college/university degree

** In 1000 kroner

Number of observations = 2021

Table 2: Descriptive statistics for respondents with live parents

	Mean	Std. dev.	Min	Max
Parent characteristics				
Father's age	65	11	38	105
Mother's age	65	12	35	101
Married/cohabitant	.51	.50	0	1
High education*, father	.41	.49	0	1
High education*, mother	.32	.46	0	1
Number of children	3.3	1.6	0	12
Yes, received gift last 12m	.19	.36	0	1
Gift recieved last 12 m**	12	225	0	7500
Gift recieved** > 0	76	556	1	7500
Child characteristics				
Age of respondent	38	10	18	74
Married/cohabitant	.70	.45	0	1
Female respondent	.55	.50	0	1
High education*	.42	.49	0	1
Grandchildren	.56	.49	0	1
Unemployed	.16	.36	0	1
Student	.13	.34	0	1
Economic situation: bad	.10	.29	0	1
Economic situation: well	.54	.49	0	1
Household income**	421	282	0	6600
Respondent's income**	244	135	0	1200
Household net worth**	1290	1234	-740	13020

* High education is college/university degree.

** In 1000 kroner

Number of observations = 1263

Table 3: Parents' attitudes to inter vivos transfers

What kind of economic obligation do you think parents should have towards their grown children?		
	All parents	Donor parents
Only in emergencies	.68	.64
Education, house and family formation	.26	.33
Same living standard	.04	.02
When parents that have more than one child give economic support, how do you think they should divide the resources?		
	All parents	Donor parents
Equal sharing	.73	.67
According to need	.23	.29
To the most helpful child	.01	.02
To the most able child	.00	.01
No of observations	1512	348

tional average value of these transfers is 67,000 kroner, although if we exclude four high values above 1 million, this figure is reduced to 30,000 kroner. For comparison, the average value of parent household income is 347,000 kroner. Table 2 shows that 19 percent of households with live parents report that they have received gifts in the last 12 months. The conditional average value of these gifts is 63,000, and again, if we exclude three high values above 1 million the figure is 22,000 kroner. In both samples, 80-85 percent of the amounts are lower than 40,000 kroner, which we previously argued would be the unofficial lower limit of a gift that would have to be reported to the tax authorities.

4.1 Reported attitudes

Some of the questions in the survey concern attitudes towards intergenerational transfers and motives for transfers. Such evidence is also reported by Light and McGarry (2004). Since our claim is based on an assumption about the parents' attitude to fairness, it is relevant to see what they answered to such questions. The question "what kind of economic obligation do you think parents should have towards their grown children?" can be related to the degree of altruism since the possible answers ranged from "they should

be helped only in emergencies” to ”they should be helped so that they may attain the same living standard as their parents”. It is interesting to note that the creators of the survey did not even consider the answer ”they should not be helped” as an option, and the non-response to the question is low. As shown in Table 3, a majority of the parents answer that children should only be helped in emergencies. The group of parents actually transferring resources to their children is identified as donor parents and the table shows that they are somewhat more inclined to answer that children should receive help for education, house purchase and family formation, but the difference between donors and the rest is small.

In the present study we employ information on gifts given in the last 12 months. Parents are also asked qualitative questions about whether they have ever given a) support for education, b) support for housing purchase, or c) an advancement of inheritance. Questions like these open up a new set of problems since the answer will depend on the parents’ age (advancement of inheritance in particular), so the information that these questions provide will just be used incidentally. From these questions we find that 50 percent of all parents have given support for education and 26 percent have helped with a house purchase. Comparing these figures with the 26 percent who believe that children should get support for education, there seems to be a discrepancy between opinion and action.

A question that connects to the to the equal division issue is: ”When parents that have more than one child give economic support, how do you think they should divide the resources?” Table 3 shows that equal sharing between children is the view taken by the majority. Very few answer that the most helpful child or the most able/talented child should get the larger transfer. Although a sizeable fraction believes that a larger transfer should be given to the child who needs it most, we consider the responses to imply that equal sharing is the general norm of fair division. The donor parents are also asked about the actual division of the gifts. Among parents with more than one child, 45 percent believed they had shared equally between them. Calculations of actual behavior show that about 30 percent of the cases were cases of approximate equal sharing. Again there is a discrepancy between ideas and action. This brings us to the conclusion that equal sharing often is the stated norm, but might be difficult to uphold in practice, when you are faced with the needs of your children. The next sections will probe deeper into this issue.

5 Econometric specification and results

In this section we explore the determinants of the transfer amount in the form of a transfer function, using the two datasets above. Since neither of the subsamples have exact information on income and wealth in both parent and child household at the same time, we employ indicators when detailed information is missing. We estimate the function on both samples in order to compare results and assess the effects of employing proxies for income and wealth. It follows from Section 3 that a general specification of the transfer function is

$$b_{ij} = g(e_j^p, e_i, X, u_{ij}) \quad i = 1, \dots, N; \quad j = 1, \dots, P;$$

where b_i is the transfer to child i , e_i is the recipient/child income, e_j^p is the donor/parent income, X is a set of controls describing both donor and recipient household characteristics that contribute to determine transfer flows, and u_{ij} is the error term. There are N number of children and P ($< N$) number of parents in the data, which means that some children link up with the same parents. Some variables may be used to proxy permanent income, such as educational level, while proxies for transitory income may be information about the child being unemployed or a student.

As is apparent from Table 1 and Table 2, more than two thirds of the surveyed households neither gave nor received transfers during the surveyed year. It follows from the model in Section 3 that parents may very well end up in a corner solution with transfers equal to zero. A part of the zero observations may be explained by this, but another part may be due to the survey design, covering gifts made or recieved in the last 12 months, only. In other words, zero transfer observations include parents who will make or have made a transfer in other periods and families in which parents who will never make transfers or children that might never receive transfers. Regardless of the explanation, ignoring the presence of the large number of zero values will result in biased inference, similar to what occurs under censoring. Here we use a Tobit model to account for the presence of non-participant households when analyzing the transferred amount:

$$b_{ij}^* = \eta_1 e_j^p + \eta_2 e_i + X\beta + u_{ij} \tag{11}$$

where

$$b_{ij} = \begin{cases} b_{ij}^* & \text{if } b_{ij}^* > 0 \\ 0 & \text{if } b_{ij}^* \leq 0 \end{cases}$$

and b_{ij}^* is the latent transfer to child i . The corresponding Probit is reported in Appendix B.

5.1 Determinants of inter vivos gifts

Table 4 reports the Tobit estimates for inter vivos gifts in the last 12 months, measured in 1000 kroner. The first four columns show results of the estimation when exploiting parental level information in data. In the last two columns it is the grown child that is the unit of observation.

We find a significantly negative effect of recipient income on the amount of inter vivos gifts. This confirms the standard hypothesis that a child with low income will receive a larger transfer from his/her parents than a child with high income, all other things equal. We have also tried to replace the child's household income with household income per person, but this does not alter results. Furthermore, parents' income and wealth have the expected positive sign. However, the size of the coefficients are small, especially compared to the hypothesis that a units increase in parental income combined with a units decrease in child income should yield a transfer response of one unit, or

$$\eta_1 - \eta_2 = 1.$$

This is the so-called transfer-income derivative; the focal point of several empirical analyses (Altonji, Hayashi and Kotlikoff, 1997; Laitner and Ohlsson, 2001). According to the results in Table 4 the two would sum to 0.09 [0.05-(-0.04)] which is far from 1. Shortly, we will return to this estimate when we examine if the transfer derivative of recipient income in one-child families deviates from estimates of larger families, because of fairness considerations.

Let us first consider the effects from other variables. The transfer declines as the parent household ages, where age is set equal to the mother's age in a two parent households. It makes no difference for the results whether we consider the child's age or the parent's age. Descriptive statistics show that transfers are smaller and more frequent when children are younger, and conversely larger and less frequent when parents and children are older.

It seems to be of little importance for the size of a transfer whether there are one or two persons in the parent household, since the dummy for the parents being a couple has a coefficient that is both small and insignificant. However, two parents' household income is normally larger than the income of an one parent household, and this effect is apparent in column three, where the dummy for two parents is rendered positive and significant when the parents' household income is omitted from the regression. Similarly, we know that the level of parents' education correlates with household income.

Table 4: Tobit results for inter vivos gifts in 1000 kroner

	Donor households				Recipient hh.	
	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.
Parent characteristics						
Household income*	.050	.021	–	–	–	–
Household net wealth*	.011	.002	–	–	–	–
Age	-.407	.423	-.477	.351	-.715	.247
Couple	2.60	13.3	38.3	11.2	-2.56	6.07
Number of children	-14.6	2.81	-15.7	2.56	-4.43	1.71
College/university, father	11.9	7.64	21.3	7.20	22.1	5.28
College/university, mother	10.6	8.21	22.6	7.83	12.0	5.42
Child characteristics						
Household income*	–	–	–	–	-.041	.015
Female	-6.59	6.29	-4.11	5.94	-1.29	4.65
Couple	.752	13.1	-3.28	12.1	-5.41	6.07
College/university	15.8	6.88	21.1	6.57	9.40	4.90
Grandchildren	-8.13	8.14	-12.5	7.69	-4.08	5.10
Unemployed	19.1	14.1	14.5	13.1	3.71	6.44
Student	20.9	8.72	24.6	8.27	12.4	6.15
Economic situation: bad	37.9	10.9	39.1	10.4	1.89	7.16
Economic situation: well	-22.8	7.41	-17.2	6.95	-12.1	5.22
Constant	-73.2	31.3	-67.8	25.7	22.7	16.3
<i>se</i>	84.4	3.53	85.7	3.49	48.8	2.81
Log likelihood	-2333.4		-2553.2		-1254.9	
PseudoR ²	0.05		0.04		0.04	
Number of obs.	1667		2016		1105	

* in 1000 kroner

These variables also become more important when income and wealth is omitted. High education of both mother and father has a significant effect on the size of a transfer, but note that the effect of having a mother with high education is stronger than that of a father with high education in the dataset where the child is the unit of observation.

Not surprisingly, the size of the transfer declines with the number of children, or the number of potential recipients. The proxies for the child's permanent income, such as being a couple/married and having completed higher education (previous versions of the model included a dummy for homeownership, but this variable proved to be consequently insignificant), does not seem to affect the chance of getting a transfer, in particular, after controlling for household income.

5.2 The transfer derivative with fairness considerations

Let us now return to the transfer-income derivative. In section 3 we proposed an alternative model where parents with more than one child faces a trade-off between compensating one child's income and being fair by giving equally to all children. It follows that we expect the income compensation to be smaller in families with two or more adult children than in families where there is only one child. In other words, parental altruism is more purely described in one-child families, since these parents do not have to struggle with the equal division norm.

In Table 5 we present the results that follow from running regressions separately for families with an only child and for families with two or more children, using the recipient data set. We remember from Table 4 that the overall estimate was -.04. Table 5 shows a big difference in the estimated transfer derivative, dependent on number of children; -.27 for one-child families, while only -.03 for children with siblings. The difference between the two is also significant at a 5 percent significance level. This confirms that a child can expect more income compensation from his/her parents when the child has no siblings, which indicates that there is a equal division norm working, competing with "pure" altruistic motives.

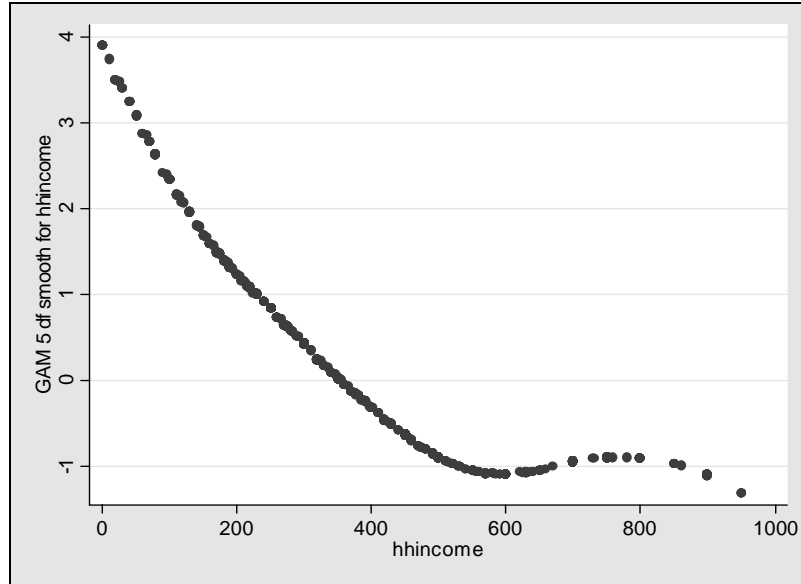
Although the estimated transfer derivatives for recipient income shows some interesting differences depending on the number of children, one should note that the number of observations is low in the sub-sample of one-child families. Note also that all other explanatory variables are insignificant in the regression reported in the first two columns, except recipient income and the dummy for high education of mothers.

Table 5: Tobit results for inter vivos gifts by number of children

	Only child		Two or more children		All.	
	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.
Parent characteristics						
Age	-.039	.616	-.880	.237	-.715	.247
Couple	22.3	16.8	1.71	4.98	-2.56	6.07
Number of children	–	–	-4.26	1.91	-4.43	1.71
High education, father	-6.42	13.5	23.9	5.67	22.1	5.28
High education, mother	44.5	16.4	9.69	5.79	12.0	5.42
Child characteristics						
Household income*	-.266	.089	-.034	.016	-.041	.015
Female	-2.61	14.1	-1.94	4.91	-1.29	4.65
Couple	19.7	22.5	-6.94	6.39	-5.41	6.07
High education	24.1	14.2	8.79	5.20	9.40	4.89
Grandchildren	11.4	16.2	-4.56	5.36	-4.08	5.10
Unemployed	12.3	24.8	4.39	6.74	3.71	6.44
Student	-1.49	18.4	13.2	6.49	12.4	6.15
Economic situation: bad	-42.1	26.8	4.59	7.51	1.89	7.16
Economic situation: well	-7.69	16.9	-10.9	5.52	-12.1	5.22
Constant	6.90	47.5	25.5	17.2	22.7	16.3
<i>se</i>	31.4	6.16	49.7	2.99	48.8	2.81
Log likelihood	-85.6		-1163.3		-1254.9	
PseudoR ²	0.11		0.04		0.04	
Number of obs.	64		1041		1105	

* in 1000 kroner

Figure 1: Fitted spline for inter vivos gifts by recipient household income



5.3 A non-linear response to child income?

As stated above, parents that weigh altruism against equal division considerations, might be involved in unequal gift behavior when differences between children exceed a certain level. In other words, parents will only compensate a child if his or her income is substantially below the sibling average. This leads us to believe that we will primarily find compensating transfers below a certain level of children income. Graphically we investigate this hypothesis by using a semi-parametric regression method, which has the advantage of not imposing any restrictions on the functional form when relating income to gift amounts. The profile in Figure 1 is a fitted spline to the variable recipient household income, while the parametric part of the equation consists of the other variables in the model. According to the figure, inter vivos gifts seems to be negatively related to household incomes lower than 500,000 kroner, and approximately flat or zero for incomes above that level. If we compare this to the average income in recipient households, which is 420,000 kroner in the sample, we see that a child's income is negatively related to transfers when the child has lower than average income.

The plot in Figure 1 indicates that the transfer derivative could be ap-

Table 6: Tobit results with non-linear transfer response to income

	Two or more children	
	Coefficient	Std. Err.
Low household income* (<250)	-.167	.056
Medium household income* (250-550)	-.083	.035
High household income* (>550)	-.009	.066
Other controls as in table 3 & 4		yes
<i>se</i>		49.88
Log likelihood		-1186.15
PseudoR ²		0.04
Number of obs.		908

* in 1000 kroners

proximated by a piecewise linear function, where the transfer derivative is allowed to change at the lower quartile (250,000 kroner) and the upper quartile (550,000 kroner) of the recipient income distribution. Table 6 shows the results of replacing recipient income with the piecewise linear function defined as

$$\begin{aligned}
 \text{low income} &= \begin{cases} e_i & \text{if } e_i \leq 250 \\ 250 & \text{if } e_i > 250 \end{cases} \\
 \text{medium income} &= \begin{cases} 250 & \text{if } e_i \leq 250 \\ e_i & \text{if } 250 < e_i \leq 550 \\ 550 & \text{if } e_i > 550 \end{cases} \\
 \text{high income} &= \begin{cases} 550 & \text{if } e_i \leq 550 \\ e_i & \text{if } e_i > 550 \end{cases}
 \end{aligned}$$

The sample used is child respondents with siblings and the other variables are the same as in Tables 3 and 4. Given the size of the standard errors, the estimated coefficients for the three income segments in Table 6 are not significantly different from each other. Yet, they strongly suggest non-linearities in the transfer derivative; -0.17 for low-income households and zero for high-income households. Alternatively, we could have chosen median household income as the knot. The estimated transfers derivatives would then have been -.10 (.02) for incomes lower than the median and -.02 (.03) for incomes above the median (with standard errors in parentheses). For incomes above the mean or median income in the sample, the relationship between gifts

and income is not significantly different from zero.

Cox, Hansen and Jimenez (2004) also find a non-linear relationship, but they present a different interpretation; they argue that exchange motives dominate altruism above a threshold level. Here, the interpretation is that parents with more than one child face a trade off between a child's need and the fairness norm of sharing equally. When the income of the child is above average, we assume that the economic situation of the child is sufficiently good, and parents may combine being altruistic and being fair at the same time.

5.4 Sibling comparisons

Furthermore, one of the advantages of the data we have at hand is that the relationship between unequal treatment and the level of income can be examined by comparing siblings directly. While we in the two previous subsections used the subset of data where the child was the unit of observation, and where we had detailed information about the child's income, here we employ data with parents as the respondents. This enables us to exploit information on transfers from parents to siblings to address the question of income differences and transfers.

In the previous subsections we were forced to evaluate the child's income in relation to the overall sample mean or median, since we had no information about the income of the child's siblings. Here, we use detailed information of transfers together with indicator information about the economic situation of children in a family. The empirical model is

$$(b_i - \bar{b}) = \gamma Z^p + \beta_k (x_{ki} - \bar{x}_k) + \varepsilon_i, \quad (12)$$

where $(b_i - \bar{b})$ is child i 's transfer measured as a deviation from the total sibling mean, Z^p is a set of controls concerning the parents' characteristics, and the x_k 's are different indicator variables describing the child's economic situation. We denote these variables with subscript k as these variables are derived from information about siblings, choosing one child as the reference. Some of these variables are dummy variables, such as the existence of grandchildren, sex (where 1 denotes female), and being a student or unemployed. Taking differences yields variables that range from 1 to -1. Education is reported at three levels, primary school, high school and college/university. Economic situation assessed by the parents also takes on three values (bad, ok, good). In order to evaluate our results in light of an alternative hypothesis about inter vivos gifts; the exchange motive (Bernheim, Shleifer and Summers, 1985; Cox, 1987), we have also included variables for the degree

Table 7: Deviation from sibling average and probability of unequal sharing

	Tobit		Tobit		Probit	
	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.
Parent characteristics						
Age	-.012	.170	–	–	-.025	.009
High education, father	4.01	3.04	4.54	4.10	.132	.159
Household income*	.022	.008	.031	.010	-.147	.046
Number of children	-3.26	2.00	-5.47	2.71	.591	.135
Sibling differences						
Age	-1.15	.510	-1.64	.636	–	–
Sex	-4.28	3.44	–	–	–	–
Educational level	6.71	3.48	7.57	4.60	–	–
Grandchildren	1.22	4.29	–	–	–	–
Economic situation	-17.8	4.01	-23.0	5.32	–	–
Student	-.047	3.79	–	–	–	–
Unemployed	6.51	3.03	8.08	3.79	–	–
Contact with parents	2.78	2.30	3.10	3.06	–	–
Service provided	-11.2	6.94	-15.7	9.31	–	–
Constant	-33.1	13.2	-42.3	9.30	.998	.691
<i>se</i>	18.2	1.93	24.7	2.56		
Log likelihood	-377.2		-403.6		-198.2	
Pseudo R2	0.10		0.09		0.08	
No of observations	853		912		355	

* in 1000 kroner (in 100,000 in the Probit equation)

of contact between parents and child and services provided. The degree of contact range from 1 to 5 and the higher the value, the more contact, while service levels can take three values where 1 is none, 2 is some and 3 is often.

Table 7 shows the result of a Tobit based on equation (12). For comparison we also include a Probit, in which the dependent variable is

$$\text{Prob} [(b_i - \bar{b}) \neq 0 | \bar{b} > 0].$$

Addressing the Tobit results first, we see that the only variable that significantly determines unequal sharing of gifts (at the 5 percent level) is the child's relative economic situation and unemployment status. Parents give

more transfers to a child that has a relatively unfavorable economic situation, or to a child that is unemployed when the other siblings are not. Thus, these results support that there are altruistic motives among parents, in accordance with results presented above. Information based on siblings holds the promise of describing such relationships very accurately.

At a lower significance level we find that older children get less than their younger siblings and that higher education seems to pull in the direction of higher than average transfers. This result remains even if all students are taken out the sample. In previous sections we found that students receive a significant amount of income compensation, but the results in Table 7 imply that being a student does not influence parents to share unequally between their children. There is a lower correlation between student status and the parents' evaluation of economic situation than one might expect. The same goes for unemployment, and it reflects that the individual situation of the child may not always be representative for the child's household situation. Finally, results reported in Table 7 suggest that a child that have frequent contact with his or her parents does not receive a larger transfer than a child that has infrequent contact. Remarkably, it seems that a child that provides more services to the parents than a brother or sister actually gets less transfers, although the effect is only significant at a 10 percent level.

The controls for parent characteristics may be difficult to interpret since one parent has given characteristics, and if he gives more than average to one child he must necessarily give less than average to another child and the total effect of parent characteristics on the deviation may be unclear. Therefore we also present Probit results in Table 7: the probability of unequal sharing conditional on a gift being given as a function of parent characteristics. We find that the probability of unequal sharing is significantly declining with age and income and increasing with the number of children.

6 Concluding remarks

Information on the transfer behavior of Norwegian parents is important from a public policy perspective, not the least since a recent tax commission (The Ministry of Finance, 2003) has suggested eliminating wealth taxation in Norway and amplifying the role of the gift- and inheritance tax. As discussed, for instance by Gale and Slemrod (2000) and Kaplow (2001), an inheritance tax is expected to distort behavior when parents are altruistic. If parents behave in accordance with the altruism model, there are reasons to assume that taxes on intergenerational transfers will reduce donors' savings

(Kotlikoff and Summers 1981; Kopczuk and Slemrod 2001) and discourage their work efforts. No such harmful tax effects on donors' behavior exist if bequests are unintended, that is, follow from death before donors have been able to consume all their wealth (Davies 1981).

In this perspective it is of key importance to have information on the degree of altruism among parents. Here we present the hypothesis that parents are faced with a trade-off between compensating income and being fair. As evidence we find that the recipient income derivative is significantly higher in one-child families than in multiple child families. Furthermore, the income derivative in multiple child families is non-linear, with a larger degree of parental compensation of income when the child's income is lower than mean or median income. Also, in a comparison of sibling characteristics, it is economic situation that seems to be the main determinant of unequal division of inter vivos gifts. This means that usual estimates of average transfer-income derivatives are in danger of concealing important indications of parental involvement. The evidence presented here indicates that Norwegian parents are more concerned about children's utility than revealed by traditional measures. This analysis therefore suggests that average measures of the transfer-income derivative might suppress important evidence of altruistic behavior.

We would also like to point out that Norwegian transmission laws have had strong effect on our choice of empirical strategy, i.e., that we employ information on non-taxable inter vivos transfers. Such considerations might be relevant for data analyses based on information from other countries as well, where data are obtained from individuals under similar type of environments. Finally, we need to emphasize that we focus on financial transfers from parents to children in this analysis. A more comprehensive approach should bring in other types of transfers and permit transfers going in both directions; also from children to parents.

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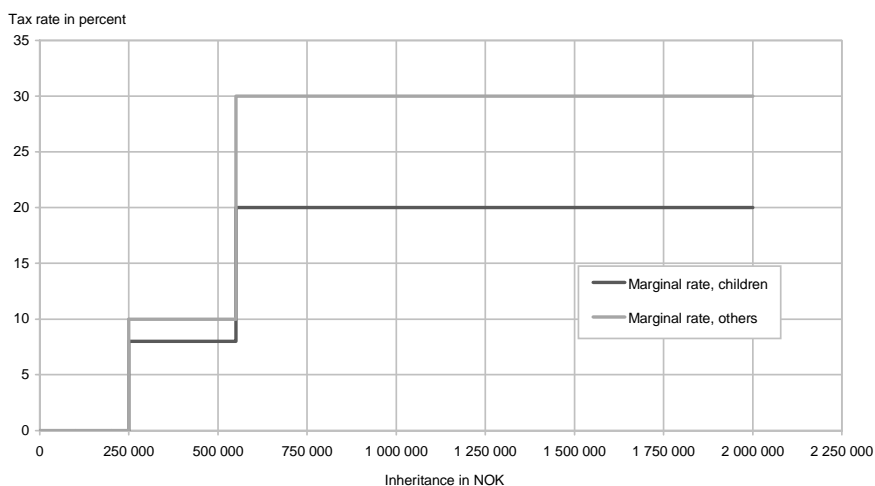
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A The Norwegian inheritance tax system

The aggregation of gifts and bequests to establish the tax base is in accordance with the taxation of bequest in a number of other countries, as Sweden, France, U.K, and the U.S. Spouses are considered as two donors, which means that the value of an asset that is owned by both parents (matrimonial asset) is divided into two parts, one for each parent, when calculating the tax base. As the statutory tax rate system is progressive this is advantageous for the tax-paying child. As shown in Figure 1 the inheritance tax rate scheme (at the time of data collection) implies that inheritances below 200,000 kroner (approx. \$23,000 in 2000) is tax exempt, while a two-tier rate system applies to inheritances above that, commencing at a rate of 8 percent, while transfers above 500,000 kroner (\$57,000) are taxed at a rate of 20 percent. This scheme also applies to parents of the deceased.



The Norwegian inheritance tax rate system, 2004

The figure also shows that the rates for other relatives and other heirs under a will are 10 percent and 30 percent in the two brackets, respectively. Inter-spousal gifts and bequests are not taxed. The general valuation rule is that assets should be valued at the market value. However, there are some important exemptions. For non-listed shares and interests in partnerships, firstly, the value of the company is calculated by excluding values of most intangible assets, as goodwill, by setting real estate values very low, and, secondly, only 30 percent of the total value is included in the tax base. The main purpose of this rule is to facilitate the transfer of family businesses. Moreover, as taxation in most cases is based on values reported by tax-payers to tax authorities, there are incentives to report low values.

B Probit results

We use a standard Probit model to account for participation

$$\Pr(b_i > 0|X) = \Phi(\eta_1 e^p + \eta_2 e_i + X\gamma) + \varepsilon_i$$

where $\varepsilon_i \sim (0, 1)$. The functional form and explanatory variables correspond to the Tobit in equation (11) and table (4).

	Donor households				Recipient hh	
	Marg. effect*	S.E.	Marg. effect*	S.E.	Marg. effect*	S.E.
Parent characteristics						
Age	-.003	.001	-.004	.001	-.004	.001
Couple	.026	.036	.105	.025	.012	.022
Number of children	-.053	.009	-.050	.007	-.019	.007
Household income**	.026	.008	–	–	–	–
Household net wealth**	.003	.000	–	–	–	–
High education, father	.048	.028	.078	.025	.044	.027
High education, mother	.126	.029	.147	.026	.047	.029
Child characteristics						
Female	-.022	.021	-.025	.018	-.009	.022
Couple	-.053	.043	-.067	.038	-.028	.029
Household income**	–	–	–	–	-.020	.007
High education	.016	.023	.154	.022	.046	.024
Grandchildren	-.012	.027	-.030	.023	-.033	.024
Unemployed	.051	.046	.043	.040	.022	.033
Student	.121	.036	.132	.032	.104	.040
Economic situation: bad	.271	.059	.245	.051	.062	.040
Economic situation: well	-.073	.022	-.047	.020	-.067	.025
$E \Pr[b_i > 0]$.200		.191		.180	
Log likelihood	-723		-879		-441	
PseudoR ²	.22		.20		.15	
Number of obs.	1671		2021		1108	

* Marginal effect for dummy variables is a discrete change from 0 to 1

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