The Economics of Reciprocity, Giving and Altruism

Edited by

L.-A. Gérard-Varet
Professor
Institute for Advanced Studies in the Social Sciences
Marseilles

S.-C. Kolm
Director
Institute for Advanced Studies in the Social Sciences
Paris

and

J. Mercier Ythier
Maître de Conférences
University of Paris La Sorbonne

in association with
INTERNATIONAL ECONOMIC ASSOCIATION

First published in Great Britain 2000 by
MACMILLAN PRESS LTD
Houndmills, Basingstoke, Hampshire RG21 6XS and London
Companies and representatives throughout the world

A catalogue record for this book is available from the British Library.

ISBN 0–333–74769–0

This book is published in the *International Economic Association* series
General Editor: Michael Kaser
Series Standing Order ISBN 0–333–71242–0 (*outside North America only*)

First published in the United States of America 2000 by
ST. MARTIN'S PRESS, LLC,
Scholarly and Reference Division,
175 Fifth Avenue, New York, N.Y. 10010

ISBN 0–312–22956–9

Library of Congress Cataloging-in-Publication Data
The economics of reciprocity, giving, and altruism / edited by L.A. Gérard-Varet, S.C. Kolm, and J. Mercier Ythier.
p. cm.
Includes bibliographical references and index.
ISBN 0–312–22956–9 (cloth)
1. Reciprocity. 2. Charity. 3. Altruism. I. Gérard-Varet, L.-A. (Louis-André) II. Kolm, Serge-Christophe. III. Mercier Ythier, J. (Jean)
HF1721 .E33 2000
330.1—dc21
99–059246

10 9 8 7 6 5 4 3 2 1
09 08 07 06 05 04 03 02 01 00

Printed and bound in Great Britain by
Antony Rowe Ltd, Chippenham, Wiltshire

Contents

The International Economic Association vii

Acknowledgements ix

List of Contributors x

1 Introduction: The Economics of Reciprocity, Giving and Altruism
Serge-Christophe Kolm 1

Part I Giving

2 The Common Property Nature of Market-inalienability
Emanuel D. Thorne 47

3 Preference Variation and Private Donations
Erik Schokkaert and Luc Van Ootegem 78

4 Gift Equilibrium and the Liberal Distributive Social Contract: A Tentative Synthesis
Jean Mercier Ythier 96

Part II Reciprocity

5 The Theory of Reciprocity
Serge-Christophe Kolm 115

6 Equity, Fairness Equilibria and Coordination in the Ultimatum Game
Claude Meidinger 142

7 Fairness and Retaliation
Ernst Fehr and Simon Gächter 153

8 Transfers, Empathy Formation, and Reverse Transfers
Oded Stark and Ita Falk 174

9 Things You Don't Give or Sell but Which You Keep: Valuable and Social Objects
Maurice Godelier 182

10 Altruism and Poverty in an African Context
François-Régis Mahieu 196

Part III Family

11 Intergenerational Transmission Models: A Survey
Anne Laferrère 207

12 Mutual Interest, Self-enforcing Constitutions and Apparent Generosity
Alessandro Cigno and Furio C. Rosati 226

13 Intergenerational Equity in a Model of Endogenous Growth
Claude d'Aspremont, Louis-André Gérard-Varet and Philippe Michel 248

14 Conflicts within Economic Dynasties: Selfishness versus Descending Altruism
Alain de Crombrugghe and Louis Gevers 260

15 Tax-transfer Policy with Altruists and Non-altruists
Philippe Michel and Pierre Pestieau 275

16 Strategic and Altruistic Remittances
Frederic Docquier and Hillel Rapoport 285

17 Reciprocity with Two-sided Altruism in Intergenerational Transfers: Evidence from Indonesian Family Life Survey Data
Lakshmi K. Raut and Lien H. Tran 298

18 The Nature of Two-directional Intergenerational Transfers of Money and Time: An Empirical Analysis
Yannis M. Ioannides and Kamhon Kan 314

Part IV Evolution

19 The Ecology of Altruistic Motivations in Triadic Social Environments
Angelo Antoci, Pier Luigi Sacco and Stefano Zamagni 335

20 On the Evolution of Altruism
Oded Stark 352

21 Efficiency and Stability of Relationships with Local Altruistic Commitment
Ottorino Chillemi and Benedetto Gui 359

Index of Names 375

Subject Index 380

The International Economic Association

A non-profit organization with purely scientific aims, the International Economic Association (IEA) was founded in 1950. It is a federation of some sixty national economic associations in all parts of the world. Its basic purpose is the development of economics as an intellectual discipline, recognizing the diversity of problems, systems and values in the world and taking note of methodological diversities.

The IEA has, since its creation, sought to fulfil that purpose by promoting mutual understanding among economists through the organization of scientific meetings and common research programmes, and by means of publications on problems of fundamental as well as current importance. Deriving from its long concern to assure professional contacts between East and West and North and South, the IEA pays special attention to issues of economies in systemic transition and in the course of development. During its nearly fifty years of existence, it has organized over one hundred round-table conferences for specialists on topics ranging from fundamental theories to methods and tools of analysis and major problems of the present-day world. Participation in round tables is at the invitation of a specialist programme committee, but eleven triennial World Congress have regularly attracted the participation of individual economists from all over the world.

The Association is governed by a Council, comprising representatives of all member associations, and by a fifteen-member Executive Committee which is elected by the Council. The Executive Committee (1995–98) at the time of the Tunis Congress was:

President:	Professor Jacques Drèze, Belgium
Vice-President:	Professor Anne Krueger, USA
Treasurer:	Professor Erich Streissler, Austria
Past President:	Professor Michael Bruno, Israel (deceased 26 December 1996)
Other members:	Professor Anthony B. Atkinson, UK
	Professor Vittorio Corbo, Chile
	Professor Karel Dyba, Czech Republic
	Professor Jean-Michael Grandmont, France
	Professor Yujiro Hayami, Japan
	Professor Seppo Honkapohja, Finland
	Professor Valery Makarov, Russia
	Professor Luigi Pasinetti, Italy
	Professor Hans Werner Sinn, Germany
	Professor Rehman Sobhan, Bangladesh

18

The Nature of Two-directional Intergenerational Transfers of Money and Time: An Empirical Analysis[1]

Yannis M. Ioannides
Tufts University, Medford, Mass., USA
and
Kamhon Kan
Institute of Economics, Academia Sinica, Taipei, Taiwan

1 Introduction

Since the 1970s, resource transfers among family members and across generations have been paid particular attention by economists. This has, in part, been motivated by the difficulty the life-cycle permanent income theory has faced in explaining the saving behaviour of households (Menchik and David, 1983; King, 1985; Kotlikoff, 1987; Hayashi, Ando and Ferris, 1988; and Hurd, 1987, 1989, 1990). Intergenerational transfers of resources have been found to play an important role in capital accumulation and distribution of income (Kotlikoff and Summers, 1981, 1988; and Gale and Scholz, 1994), and in consumption smoothing (Kan, 1996).

Intergenerational transfers may occur in a variety of ways. Transfers can take place while donors are alive (that is, *inter vivos* transfers), or they occur after the death of donors, as planned or unplanned bequests. Transfers may take place in either direction: that is, parents may transfer to children, and children may transfer to parents. Transfers can be non-monetary or in-kind: for example, in terms of time help to parents or in the form of payment for the costs of education. *Inter vivos* transfers are an important mechanism of intergenerational transfer (see Kotlikoff and Summers, 1981, 1988; Kotlikoff, 1987), but have received much less attention, perhaps because of the unavailability of suitable data. Cox and Raines (1985), Kurz (1984), Cox (1987), Cox (1990), Cox and Rank (1992) and Kan (1996) are notable exceptions.

While the magnitude and importance of intergenerational transfers have largely been confirmed, the underlying motives are less well understood. Empirical work has aimed at determining the dominant motive of intergenerational transfers. The two major competing hypotheses are (i) the

altruism hypothesis – where transfers are made out of a donor's concern for the well-being of the recipient; and (ii) the *exchange hypothesis* – where monetary transfers are made in lieu of payments for services received. Early studies of transfer motives mainly pertain to bequest behaviour. The altruism hypothesis has been controversial. Some findings are supportive (Tomes, 1981, 1988), while others are not (Menchik, 1980; Menchik, 1988; and Wilhelm, 1990). The exchange motive of bequest was proposed first by Bernheim, Schleifer and Summers (1985).

Findings supporting both the altruism hypothesis and the exchange hypothesis of *inter vivos* intergenerational transfers have also been reported in the literature. Cox (1987) and Cox and Rank (1992) develop cooperative game-theoretic models and test empirically whether intergenerational transfers are made by parents out of altruism or in exchange for children's services. Their test rests on the implications of their behavioural model that, if altruism is the dominant motive, a negative relationship between income and monetary transfers will *not* be observed. However, both positive and negative, such relationships are consistent with the exchange hypothesis. They obtain a positive relationship between earnings and money transfers received, which leads them to reject the altruism hypothesis.

Cox (1987) is the first to examine the motives of *inter vivos* transfers. More recently, Altonji *et al.* (1992) and Pollack (1993), were motivated by issues similar to those taken up in the present study, used the same data as in the present study, but employed theoretical and empirical approaches which were different from ours. While Altonji *et al.* (1992) conducted their empirical work based on Cox's (1987) behavioural model, Pollack (1993) explored a cooperative bargaining model to obtain empirical implications of an altruism versus an exchange motive for transfer behaviour of parents and children. It appears, however, that the behavioural implications are invariant to the game-theoretic solution concept being adopted. In their empirical work, both Altonji *et al.* (1992) and Pollack (1993) matched households with their parents in the sample, and studied the interaction between a household and *each* of the living parents (including in-laws). In the present study we treat parents (including in-laws) as a *group*, to simplify econometric modelling. Differences in data setups lead to different empirical methods employed in the three pieces of research.

The two papers and this chapter complement each other in providing a comprehensive study of the motives for transfers, using different data setups and econometric specifications, and the conclusions drawn by the three pieces of research are quite similar in that they all accept the altruism motive for intergenerational transfers. Furthermore, these findings are in agreement with those obtained by McGarry and Schoeni (1994), which are based on data from the Health and Retirement Survey (and to some extent from the 1988 Panel Study of Income Dynamics (PSID) as well), who find a negative relationship between a respondent's earnings and the amount of monetary transfers they receive.

While altruism is identified by Altonji, Hayashi and Kotlikoff (1992), Pollack (1993), and McGarry and Schoeni (1994), as well as the present study, as the major motivation underlying *inter vivos* intergenerational transfers, based on panel data from the 1976–87 PSID, Altonji, Hayashi and Kotlikoff (1995) reject the existence of perfect altruism in extended families. Taken together, these findings imply that *inter vivos* intergenerational transfers are likely to be altruistically motivated with the degree of altruism being less than perfect.

With few exceptions,[2] little emphasis has been given to in-kind (for example, education and time) *inter vivos* intergenerational transfers. On the other hand, most previous works have studied only transfers by parents to children. Notable exceptions are Grossman (1982) and Kimball (1987).[3] The empirical evidence, discussed extensively in Section 2 below, indicates that transfers in both directions – that is, by parents to children, and by children to parents, do occur and are substantial.

We examine empirically *inter vivos* intergenerational transfers in a more general manner than earlier works by incorporating both transfers of money and time, and by taking into consideration transfers in both directions. We use econometric methods involving limited dependent variables to study the nature and pattern of *inter vivos* intergenerational transfers, and to test the existence of altruism and exchange in the context of intergenerational transfers of money and time. Our empirical analysis suggests that parents and their adult children are altruistic toward each other in making transfers, and that exchange is not an important component of the parent–child relationship. The empirical findings also point to an asymmetric pattern in intergenerational transfer behaviour. A high degree of heterogeneity is found among parents in our sample. Parents' 'altruism' is not of uniform intensity and plays an important role in the parents' decisions to give transfers to their children. In contrast, we do not find the same degree of heterogeneity among adult children as among parents. We interpret this as implying that adult children's transfers to parents are based mainly on their parents' needs. While parents' time transfers to their children do not have a significant effect on their children's money transfers, time transfers given by adult children to their parents are found to cause an increase in the likelihood of transfers (both of time and money), and in the amounts, should transfer occur, transferred by parents to their children.

The organization of the chapter is as follows. Section 2 describes details of the data. We discuss our econometric methods and empirical results in Section 3. Section 4 concludes.

2 Data

Our empirical work is based on cross-sectional data from the 1988 wave of the PSID. The 1988 PSID cross-section contains a sample of 7114 households. The

data include detailed information about households' socioeconomic characteristics – for example, income, labour supply, family composition, education, health, and so on. Some information pertaining to parents of household heads and spouses is also available, and includes net wealth, total income, education level, age, house value, and whether parents are still married to each other.

Specifically, the 1988 questionnaire of the PSID places special emphasis on *inter vivos* transfers between the respondents and their parents by including a major supplement asking households about dollar amounts and time help received from, and given to, other family members. Respondents were asked whether the head of the household or the spouse had received any money or help from any people outside the family unit, and if they had, what the amounts were in 1987. About 21.1 per cent of the households reported receiving money, averaging $2326.4, and about 29.6 per cent of them reported receiving help in terms of time, averaging 337.3 hours in 1987. Households were also asked if they had given any money or help to other family members, relatives and friends (that is, parents, siblings, children, ex-spouses, relatives, friends and so on), and if they had, what the amounts were. About 16.1 per cent of the households transferred money, averaging $3310.0, to such people, whereas, 33.8 per cent of them transferred time, with an average of 383.4 hours.

We use 'offspring' households as the units of observation. In our econometric work, we model parents (including in-laws) of a household as a group that makes collective decisions about transfers of money and time to an offspring household.[4] By aggregating in this fashion, we substantially reduce the dimensions of the analytical model. Transfers by parents and in-laws as a group to a child are defined as functions of the group's average characteristics. That is, we add up the incomes of all parents of a household and divide the total by the number of parents who were alive during the survey period to derive the average income level of parents (*AVEPTINC*). There are three more variables that are constructed for the same reason and in a similar manner: average net wealth of parents (*AVEPNET*); average education level of parents (*AVEPEDUC*); and average distance between the household and parents (*AVEPMILE*). A *caveat* is that the behaviour of the parents and in-laws may not be symmetrical such that certain aspects of their transfer behaviour may be obscured by modelling them as a group.

The full 1988 wave of the PSID data contains 7114 households. We exclude households who have no parents alive. This reduces the sample size by 20.1 per cent. Moreover, because of missing values in the data, especially the household net worth data, we have a further reduction of about 15.3 per cent. Parents' data (for example, income and education level) have 29.0 per cent missing values. As a result, our final basic sample contained 3418 households. The PSID data contain a non-random subsample of poor households. In order to make our data more representative of the US population, we use in our

Table 18.1 Means of the full sample

Variable	Descriptive statistics: All observations (3418) Mean	Std. Dev.	Minimum	Maximum
GMP	0.41252E-01	0.19890	0.	1.000
GTP	0.36103	0.48037	0.	1.000
RMP	0.22411	0.41705	0.	1.000
RTP	0.30661	0.46115	0.	1.000
GIVEMP	61.487	720.40	0.	0.2500E + 05
GIVETP	126.48	446.78	0.	8760
RECMP	428.71	2628.9	0.	0.6200E + 05
RECTP	115.47	416.11	0.	8760
HAGE	36.280	10.838	17.00	89.00
HAGESQ	1433.7	924.65	289.0	7921
MS	0.60328	0.48929	0.	1.000
HBLACK	0.33616	0.47246	0.	1.000
SIBLING	5.2902	4.3993	0.	31.00
HHREARN	10.124	8.9634	0.	99.99
WHREARN	4.1337	6.2669	0.	99.99
NETWORTH	65.897	298.35	0.	10000.
KIDS	0.95260	1.1369	0.	8.000
HEDUC	4.9506	1.6606	1.000	8.000
HHEALTH	0.24868E-01	0.15575	0.	1.000
PHEALTH	0.19514	0.44703	0.	3.000
PPOOR	0.33996	0.47377	0.	1.000
AVEPNET	29.670	131.80	0.	5000.
AVEPTINC	5.6360	17.077	0.	400.0
AVEPMILE	2.6198	1.0667	0.	4.000
AVEPEDUC	3.6069	1.4332	0.	8.000

estimations the weights provided by the PSID. The descriptive statistics of our sample are displayed in Table 18.1.

3 Econometric models and empirical results

Our empirical investigation seeks answers to several questions concerning the nature of *inter vivos* intergenerational transfers, such as what is the predominant motive for transfers; whether parents and adult children behave symmetrically in giving transfers; and what the relationship is between money transfers and time transfers. We try to answer these questions using econometric methods which recognize the mixed discrete–continuous nature of the data.

3.1 Tobit estimation and results

We first use a tobit model to estimate the decisions of the amounts of transfers given and received by an agent: *GIVEMP*, which denotes the amount of *money* transfers a household gives to its parents; *GIVETP*, which denotes the amount of *time* transfers a household gives to its parents; *RECMP*, which denotes the amount of *money* transfers a household receives from its parents; and *RECTP*, which denotes the amount of *time* transfers a household receives from its parents. Details on the construction of all the variables used in our empirical work is given in the Appendix on pages 327–8. Denoting the *latent* amounts of the various transfers for the ith observation of household-parents by Y^*_{ji}, where $j \in \{GIVEMP, GIVETP, RECMP, RECTP\}$, we assume that this amount is a linear function of both the parents' and the children's characteristics, X_{pi} and X_{ki}:

$$Y^*_{ji} = \gamma_{pj} X_{pi} + \gamma_{kj} X_{ki} + \epsilon_{ji}, \tag{18.1}$$

where ϵ_{ji} is a normally distributed[5] unobservable variable known only to the ith pair of parent and child. We could observe Y^*_{ji} only if it is greater than zero:

$$Y_{ji} = \begin{cases} Y^*_{ji}, & \text{if } Y^*_{ji} > 0, \\ 0, & \text{otherwise}, \end{cases} \tag{18.2}$$

where Y_{ji} is the observed amount of transfers. In other words, the transfer amounts are censored if the desirable amounts are below zero. Therefore, if $Y_{GIVEMPi} = 0$, instead of making money transfers to their parent, the child may desire a transfer from that parent. The results of the tobit estimations are presented in Table 18.2.

3.1.1 *Existence of altruism and exchange*

In the following we examine which specification is more consistent with the pattern of interaction revealed by the PSID data. The tobit results show that, as indicated by the negative coefficients of the variable *PHEALTH* for the amount of money transfers from parents (*RECMP*) and amount of time from parents (*RECTP*) (see columns *RECMP* and *RECTP*, Table 18.2), parents with poor health are likely to make smaller transfers (especially time transfers) to children. Yet, a household (that is, adult child) is more likely to give *both* time and money transfers to parents if parents have poor health. This is demonstrated by the positive coefficients of *PHEALTH* for the amount of money transfers given to parents (*GIVEMP*) and the amount of time transfers given to parents (*GIVETP*) (see columns *GIVEMP* and *GIVETP*, Table 18.2). However, from the result, it seems that parents are not as altruistic as their adult children. The negative coefficient of *HHEALTH* for the amount of money transfers received from parents (*RECMP*) (in Table 18.2) reveals that parents tend to make smaller money transfers to a household if its head has poor health. These findings suggest that parents and their children exhibit different degrees of altruism towards each other, with children being more altruistic to parents than the reverse.

A household is likely to transfer more money to parents who live further away, as indicated by the positive coefficient of the variable *AVEPMILE* for

Table 18.2 Tobit models

Variable	Univariate Tobit GIVEMP	GIVETP	RECMP	RECTP
Constant	−12937.	987.83	−4962.3	891.08
	(−4.938	(5.346)	(−2.649)	(4.168)
HAGE	44.437	−39.548	−94.962	−25.841
	(0.419)	(−4.571)	(−0.991)	(−2.332)
HAGESQ	0.34077	0.50521	−0.70212E-01	0.64603E-01
	(0.294)	(5.109)	(−0.060)	(0.468)
MS	−514.93	25.452	−525.52	−94.604
	(−0.937)	(0.550)	(−1.208)	(−1.965)
HBLACK	−5250.1	−522.04	−5524.3	−586.42
	(−4.417)	(−8.503)	(−8.026)	(−8.945)
SIBLING	−109.76	−13.778	−249.02	−22.945
	(−1.667)	(−2.744)	(−4.746)	(−4.193)
HHREARN	49.019	−6.8031	−20.599	−7.3039
	(2.617)	(−3.229)	(−1.066)	(−2.909)
WHREARN	62.601	−5.4692	−10.050	3.7837
	(2.428)	(−1.703)	(−0.353)	(1.208)
NETWORTH	0.72777	0.11125	−1.4556	−0.19004
	(2.365)	(2.595)	(−1.558)	(−1.454)
KIDS	−543.40	−13.304	−213.94	139.53
	(−2.035)	(−0.728)	(−1.206)	(7.559)
HEDUC	336.12	38.840	615.97	38.031
	(2.360)	(3.093)	(5.065)	(2.776)
HHEALTH	−17516.	−336.77	−1977.60	−104.10
	(−0.171)	(−2.707)	(−1.237)	(−0.694)
PHEALTH	530.59	218.37	76.655	−122.93
	(1.218)	(5.831)	(0.191)	(−2.741)
PPOOR	1928.1	14.253	−562.34	−62.458
	(3.943)	(0.344)	(−1.322)	(−1.366)
AVEPNET	0.32483	−0.95057E-01	2.4339	0.33380
	(0.268)	(−0.760)	(2.510)	(2.885)
AVEPTINC	18.012	3.0108	6.5708	−0.16700
	(1.991)	(3.427)	(0.799)	(−0.195)
AVEPMILE	471.87	−229.87	−335.46	−201.14
	(2.252)	(−13.810)	(−2.207)	(−11.534)
AVEPEDUC	−447.94	−32.049	820.37	−2.8467
	(−2.492)	(−2.241)	(6.402)	(−0.194)
σ	5150.9	786.90	6697.8	776.83
	(14.494)	(46.861)	(36.868)	(42.685)
LLF	−1791.5	−10377.4	−9596.1	−9022.1
Observations	3418	3418	3418	3418

Note: *t*-statistics are in parentheses.

GIVEMP. The significant positive coefficient suggests that money and time transfers from children to parents are substitutes for each other. Consequently, if it is more difficult to transfer time to parents because of physical distance, then money transfers are more likely to be made. In contrast, the coefficient of *AVEPMILE* for *RECMP* presents us with a different picture of the (money) transfer behaviour of parents. If parents and their children live far apart, parents make smaller money transfers to their children. It is likely that contact between parents and their children enhances the degree of parents' altruism towards their children. However, children's altruism toward their parents is not affected by their contact. This argument is in fact consistent with the results for the variables *PHEALTH* and *HHEALTH* discussed earlier. If the head is in poor health, the amount of time transfer (and contact) is low. Even though a household under such circumstances is likely to need more time transfer from parents, it in fact receives far fewer time transfers from them.

From the coefficient of *PPOOR* in the *GIVEMP* equation we may infer whether or not the observed transfer behaviour is part of 'intertemporal trade' (of money transfers) between parents and children. If the household head's parents were poor when he grew up, it would have been difficult for his parents to transfer much money or pay for children's education costs. If, in making money transfers to parents, intertemporal trade of transfers is involved so that a household would give money transfers to parents only if the head has earlier received money transfers from parents, then we would expect the coefficient of *PPOOR* not to be significant for *GIVEMP*. This is not the case, however, with the tobit results, which we interpret as rejection of the intertemporal trade hypothesis concerning children. In fact, money transfers are made by offspring households to parents altruistically rather than as an obligation under an intertemporal trade agreement between them and their parents.

One may contest the hypothesis of altruistic transfers from children to parents with the conjecture that households may give transfers to parents not expecting any immediate return, but instead expecting to get a larger share of their parents' bequests. We can examine this hypothesis by looking at the effects of the number of siblings (of the head and spouse of a household).

If children were to give transfers to parents in order to maximize their share of parents' bequests, they would be more likely to give transfers to their parents the more siblings the head and spouse have. The rationale is that siblings could be potential contestants for bequests from parents. However, according to the tobit results, contrary to the bequests conjecture, as indicated by the negative (but insignificant) coefficients of *SIBLING* for the amount of money transfers given to parents (*GIVEMP*) and amount of time transfers given to parents (*GIVETP*), the more siblings there are, the less of both money and time transfers a household would give to parents.

In addition, if children gave time transfers to parents as a *quid pro quo* for a larger share of parents' bequests, we would expect children to make more time

transfers to richer parents. On the contrary, such a bequests motive hypothesis is not supported by the evidence. The coefficient of *AVEPNET* (parent's average net wealth) is negative (but statistically insignificant) for the amount of time transfer given to parents (*GIVETP*). This result contradicts the claim that children tend to give time transfers to richer parents.

3.2 Bivariate probit

We explore the potential mutual dependence in the structure of intergenerational transfers of money and time (that is, the four discrete events, *GMP, GTP, RMP* and *RTP*) by estimating a set of bivariate probit models. The estimation of a bivariate probit model is accomplished by estimating a pair of probit equations allowing for correlation between the error terms of the two equations. The results of the six bivariate probit models (that is, all possible pairwise combinations of the four discrete events) are presented in Table 18.3. In those tables, the estimated correlation coefficient of the error terms in each of the bivariate probit models is denoted by p. The discrete decisions of agent i are denoted by:

$$I_{ji} = \begin{cases} 1 & \text{if } \bar{\gamma}_{pj} X_{pi} + \bar{\gamma}_{kj} X_{ki} + u_{ji} > 0, \\ 0 & \text{otherwise,} \end{cases} \tag{18.3}$$

where $j \in \{GMP, GTP, RMP, RTP\}$, and u_{ji} is normally distributed with zero means and $CORR(u_{ji}, u_{j'i}) = \sigma_{j,j'}$, $j \neq j'$ and $j,j' \in \{GMP, GTP, RMP, RTP\}$.[6]

It is particularly interesting to look at the bivariate probit results on the two pairs of discrete events: {*GMP, GTP*} and {*RMP, RTP*}. The correlation coefficients could be interpreted as estimates of the dispersion of the unobserved heterogeneity in the transfers decisions. The estimated correlation coefficient for {*GMP, GTP*} is positive with small numerical value (0.082007) and it is not very significant statistically. This might imply that, in general, offspring households as a group are not very diverse in terms of the degree of filial piety toward their parents (after their observed socioeconomic characteristics are controlled for). Another interpretation is that the degree of affection adult children have towards their parents does not play a decisive role in adult children's transfer decisions. In fact, it is consistent with the tobit results discussed earlier. According to the tobit results, offspring households make time and/or money transfers to parents who are in need of help. It is demonstrated by the strong statistical significance of such variables as *PHEALTH* and PPOOR, which reflect parents' neediness of help. These two pieces of empirical evidence together imply that offspring households' transfers are mainly determined by parents' needs.

The bivariate results on {*RMP, RTP*} depict a different pattern of *inter vivos* transfers given by parents to their adult children. The correlation coefficient estimated in the bivariate probit model is numerically small but statistically

Table 18.3 Bivariate probit

Variable	(a) *GMP* and *GTP*		(b) *RMP* and *RTP*		(c) *GMP* and *RTP*		(d) *GMP* and *RMP*		(e) *RMP* and *GTP*		(f) *RTP* and *GTP*	
	GMP	*GTP*	*RMP*	*RTP*	*GMP*	*RTP*	*GMP*	*RMP*	*GTP*	*RMP*	*GTP*	*RTP*
Constant	−2.3812	1.8351	−0.49556E-01	1.4408	−2.3812	1.4408	−2.3812	−0.49556E-01	1.8351	−0.49556E-01	1.8204	1.4406
	(−4.381)	(7.080)	(−0.150)	(4.344)	(−4.392)	(4.369)	(−4.382)	(−0.151)	(7.044)	(−0.150)	(6.990)	(4.542)
HAGE	0.1347E-02	−0.7649E-01	−0.4302E-01	−0.4818E-01	0.1347E-02	−0.4818E-01	0.1347E-02	−0.4302E-01	−0.7649E-01	−0.4302E-01	−0.7559E-01	−0.4975E-01
	(0.056)	(−6.365)	(−2.404)	(−2.744)	(0.056)	(−2.771)	(0.056)	(−2.424)	(−6.346)	(−2.414)	(−6.267)	(−3.044)
HAGESQ	0.5014E-04	0.8082E-03	0.2207E-03	0.1022E-03	0.5143E-04	0.1033E-03	0.5135E-04	0.2214E-03	0.8081E-03	0.2207E-03	0.7974E-03	0.1354E-03
	(0.182)	(5.898)	(0.967)	(0.453)	(0.188)	(0.462)	(0.187)	(0.978)	(5.892)	(0.971)	(5.803)	(0.653)
MS	0.8960E-01	0.3657	−0.1200E-01	0.1541	0.8960E-01	0.1541	0.8960E-01	−0.1200E-01	0.3657	−0.1200E-01	0.3598	0.1480
	(0.720)	(5.591)	(−0.171)	(2.218)	(0.720)	(2.209)	(0.719)	(−0.172)	(5.577)	(−0.172)	(5.507)	(2.160)
HBLACK	−0.2252E-01	−0.5005E-01	−0.1561	−0.6565E-01	−0.2252E-01	−0.6565E-01	−0.2252E-01	−0.1561	−0.5005E-01	−0.1561	−0.5414E-01	−0.6042E-01
	(−0.144)	(−0.635)	(−1.632)	(−0.806)	(−0.144)	(−0.813)	(−0.145)	(−1.664)	(−0.633)	(−1.654)	(−0.683)	(−0.758)
SIBLING	−0.1045E-01	−0.6831E-02	−0.3610E-01	−0.3135E-01	−0.1045E-01	−0.3135E-01	−0.1045E-01	−0.3610E-01	−0.6831E-02	−0.3610E-01	−0.6591E-02	−0.3086E-01
	(−0.717)	(−0.986)	(−4.564)	(−4.132)	(−0.724)	(−4.202)	(−0.713)	(−4.677)	(−0.982)	(−4.658)	(−0.956)	(−4.199)
HHREARN	0.9270E-02	−0.1008E-01	−0.6167E-02	−0.1264E-01	0.9270E-02	−0.1264E-01	0.9270E-02	−0.6167E-02	−0.1008E-01	−0.6167E-02	−0.9791E-02	−0.1021E-01
	(1.869)	(−3.706)	(−2.207)	(−3.445)	(1.882)	(−3.551)	(1.857)	(−2.201)	(−3.656)	(−2.223)	(−3.595)	(−2.764)
WHREARN	0.1798E-01	−0.1682E-02	−0.7826E-03	0.6423E-02	0.1798E-01	0.6423E-02	0.1798E-01	−0.7826E-03	−0.1682E-02	−0.7826E-03	−0.1311E-02	0.6157E-02
	(3.749)	(−0.366)	(−0.165)	(1.295)	(3.740)	(1.281)	(3.742)	(−0.165)	(−0.364)	(−0.164)	(−0.285)	(1.248)
NETWORTH	−0.1157E-04	0.8531E-09	−0.2937E-03	−0.1401E-03	−0.1153E-04	−0.1395E-03	−0.1166E-04	−0.2940E-03	0.2742E-06	−0.2937E-03	−0.2575E-06	−0.1889E-03
	(−0.127)	(0.000)	(−1.402)	(−0.661)	(−0.130)	(−0.666)	(−0.132)	(−1.453)	(0.003)	(−1.456)	(−0.003)	(−1.018)
KIDS	−0.11384	0.3457E-01	0.1057E-01	0.2744	−0.1138	0.2744	−0.1138	0.1057E-01	0.3457E-01	0.1057E-01	0.3691E-01	0.2732
	(−2.029)	(1.401)	(0.375)	(11.001)	(−2.030)	(11.087)	(−2.046)	(0.380)	(1.401)	(0.380)	(1.499)	(11.075)
HEDUC	0.3902E-01	0.3694E-01	0.8033E-01	0.6892E-01	0.3902E-01	0.6892E-01	0.3902E-01	0.8033E-01	0.3694E-01	0.8033E-01	0.3599E-01	0.7408E-01
	(1.304)(2.089)	(4.197)	(3.528)	(1.330)	(3.618)	(1.339)	(4.287)	(2.087)	(4.280)	(2.043)	(3.951)	
HHEALTH	−3.5160	−0.3760	−0.5714	−0.1336	−3.5160	−0.1336	−3.5160	−0.5714	−0.3757	−0.5714	−0.3713	−0.8042E-01
	(0.000)	(−2.127)	(−2.302)	(−0.587)	(0.000)	(−0.590)	(0.000)	(−2.315)	(−2.280)	(−2.212)	(−2.285)	(−0.377)
PHEALTH	0.1855	0.3250	−0.2326e-01	−0.1288	0.1855	−0.1288	0.1855	−0.2326e-01	0.3250	−0.2326e-01	0.3220	−0.1292
	(2.141)	(6.064)	(−0.358)	(−2.075)	(2.140)	(−2.091)	(2.147)	(−0.361)	(6.020)	(−0.358)	(6.022)	(−2.133)
PPOOR	0.4533	0.5496E-02	−0.1181	−0.8526E-01	0.4533	−0.8526E-01	0.4533	−0.1181	0.5497E-02	−0.1181	0.3340E-02	−0.7955E-01
	(4.537)	(0.096)	(−1.727)	(−1.310)	(4.581)	(−1.328)	(4.571)	(−1.761)	(0.096)	(−1.762)	(0.059)	(−1.260)
AVEPNET	0.3295E-04	0.7170E-04	0.4227E-03	0.8264E-04	0.3306E-04	0.8246E-04	0.3292E-04	0.4226E-03	0.7175E-04	0.4227E-03	0.7255E-04	0.1259E-03
	(0.064)	(0.490)	(2.639)	(0.296)	(0.065)	(0.467)	(0.062)	(3.628)	(0.348)	(2.970)	(0.470)	(0.729)
AVEPTINC	0.3406E-02	0.3692E-02	0.1492E-02	0.1725E-02	0.3406E-02	0.1725E-02	0.3406E-02	0.1492E-02	0.3692E-02	0.1492E-02	0.3527E-02	0.1793E-02
	(1.140)	(3.261)	(1.137)	(1.145)	(1.131)	(1.225)	(1.074)	(1.145)	(3.206)	(1.205)	(3.132)	(1.286)
AVEPMILE	0.1085	−0.3204	−0.3850E-01	−0.2993	0.1085	−0.2988	0.1085	−0.3850E-01	−0.3204	−0.3850E-01	−0.3199	−0.3115
	(2.187)	(−13.618)	(−1.599)	(−12.042)	(2.200)	(−12.246)	(2.251)	(−1.616)	(−13.563)	(−1.611)	(−13.625)	(−12.979)

Table 18.3 (Continued)

AVEPEDUC	−0.1009 (−2.612)	−0.4217E-01 (−2.085)	0.1325 (6.348)	−0.2903E-02 (−0.135)	−0.1009 (−2.617)	−0.2903E-02 (−0.136)	−0.1009 (−2.525)	0.1325 (6.362)	−0.4217E-01 (−2.085)	0.1325 (6.402)	−0.4279E-01 (−2.124)	−0.2947E-02 (−0.139)
ρ	0.82007E-01 (1.348)		0.68747E-01 (2.030)		−0.42267E-01 (−0.698)		0.36094E-01 (0.420)		0.71423E-01 (2.154)		0.58373 (24.053)	
LLF	−2520.2		−3397.5		−2250.8		−2220.8		−3681.5		−3.520.7	
Observations							3418					

Note: *t*-statistics are in parentheses.

significant. This indicates presence of heterogeneity in parents' degree of benevolence towards their adult children. The transfer decisions, according to this result, depend pretty much on the unobserved element of altruism in the intergenerational relationship. We concluded from the discussion of the tobit results that parents are basically altruistic towards their adult offspring. However, parents' transfers do not increase with the children's needs – for example, when $HHEALTH = 1$. Combining the tobit results and the bivariate probit results, we could see that idiosyncrasies in the parent–child interaction, rather than the offspring households' needs, play an important role in parents' transfer decisions.

The bivariate probit results for {*GMP, GTP*} and {*RMP, RTP*} (together with the tobit results) reveal an asymmetric pattern of *inter vivos* intergenerational transfers between parents and their adult offspring. Offspring households are objective in their transfer-making behaviour in the sense that parents' needs are important determinants of the likelihood and of the amount of transfers given to parents. Conversely, parents' transfer behaviour is, to some extent, influenced by their affection toward their adult offspring.

We now turn to the bivariate probit results for {*RMP, GTP*} and {*GMP, RTP*}. Again consistent with previous results, we find an asymmetric pattern of transfers. The correlation coefficient from the {*GMP, RTP*} model is negative but statistically insignificant, whereas the correlation coefficient from the {*RMP, GTP*} model is positive and significant. From these results (and the previous bivariate probit results) it seems that time transfers given by children could enhance the parents' degree of altruism, while children's money transfers do not have that effect. *A priori*, one could also interpret these results in another way: the children's degree of altruism could be raised by the parents' money transfers, but not by time transfers. However, we adopt the former view because it is more consistent with previous findings and the findings from the {*GTP,RTP*} model discussed below. As discussed earlier in the tobit results analysis, parents' transfers (especially time transfers) depend on their children's ability to give time transfers (or *contact*). This is also present in the biviariate probit results. The effects of adult children's time transfers given to their parents could be found also in the bivariate probit results for {*GTP, RTP*}, where the estimated correlation coefficient is strongly positive in terms of its numerical value and statistical significance. If a child transfers time to his parents, it is more likely that parents would make *both* money and time transfers.

However, regarding the strong positive correlation coefficient in the {*GTP, RTP*} model, it is possible that parents' and children's *reciprocity* in giving time transfers and their *comparative advantage* in home production play an important role in the pattern of *inter vivos* intergenerational transfers.[7]

Here, as based on our empirical findings discussed above, we interpret *reciprocity* as a voluntary return of favours rather than an obligation of repayment. Our empirical findings suggest that the reciprocity effect of

children's time transfers on parents' transfers (both time and money) is particularly strong. This implies that contacts between children and parents enhance parents' altruism toward them, but not the other way round.

4 Conclusions

We studied in this chapter the nature and pattern of *inter vivos* intergenerational transfers. Unlike previous studies, which concentrate mainly on transfers of money by parents to children, we studied two-directional *inter vivos* intergenerational transfers (that is, from children to parents, including in-laws, and from parents to children), involving two commodities – that is, money and time.

The empirical work is based on a supplement of the 1988 cross-sectional data of the PSID, which details information on two-sided *inter vivos* transfers of time and money. Our econometric models recognize the discrete–continuous nature as well as the possible simultaneity of transfer decisions of various directions and types. Our empirical findings suggest that parents and their adult children are mutually altruistic when making transfers. The findings point to the absence of an exchange motive in intergenerational transfers. However, heterogeneity is found to be significant among parents. Heterogeneity could be interpreted as an indication of dispersion of altruism, which plays an important part in parents' transfers decisions. In contrast, we do not find the same degree of heterogeneity among adult children. This suggests that dispersion of altruism among children is not important. Children's decisions are determined mainly by their parents' needs (and their own ability to make transfers). Moreover, parents' transfers (of both money and time) to adult children are positively correlated with time transfers by children. This suggests that parents' degree of altruism is a function of the extent of contact with their adult children.

The findings of this study provide answers to some issues concerning public policy. We find that parents and children are altruistic to each other in making transfers, while exchange is absent. This suggests that public transfers (in terms of money) could 'crowd-out' private transfers (of both money and time). This crowding-out effect is particularly strong on transfers that parents receive from children, whose transfer decisions are mainly based on parents' need. The effectiveness of public transfer programmes on the well-being of elderly citizens may be discounted by the contraction of private transfers from children.

Nevertheless, the benefits that a household obtains from a public transfer programme would be shared by altruistically linked (and equally poor or poorer) households. The altruistically linked households may benefit indirectly from public transfer programmes through increased transfers (of both time and money) from the household that receives public transfers. The redistribution effects of public transfers is particularly strong

if they are given to adult children's households rather than to parents' households.

As a result, for a public transfer programme to be effective, the recipient's family background should be controlled for. If an applicant has parents or children who are in a financial position to provide private transfers, public transfers are likely to crowd-out private transfers and, hence, would be ineffective. On the other hand, if a recipient of public transfers has equally poor parents or children, public transfers would be effective, because the recipient is unlikely to have any other support and public transfers would be redistributed to other needy (and altruistically linked) households.

We find that, in general, elderly parents receive transfers (in terms of time, especially) from their children if they are in need of help. However, geographical distance is shown to have strongly negative effects on the likelihood and amount of time transfers parents receive from their children. In most industrial societies, geographical mobility is usually high so that the physical distance between parents and their adult children can be large, affecting the care that children might wish to provide for their parents.

Appendix: Definitions of variables

GIVEMP	The sum of all amounts of *money* transfers *given* by a household to its parents and in-laws in the year 1987.
GIVETP	The sum of all amounts of *time* transfers *given* by a household to its parents and in-laws in the year 1987.
RECMP	The sum of all amounts of *money* transfers *received* by a household from its parents and in-laws in the year 1987.
RECTP	The sum of all amounts of *time* transfers *received* by a household from its parents and in-laws in the year 1987.
GMP	Whether the household *gave* any money transfers to parents of the head or wife; *GMP* = 1, yes; *GMP* = 0, no.
GTP	Whether a household *gave* any time transfers to its parents or in-laws; *GTP* = 1, yes; *GTP* = 0, no.
RMP	Whether a household *received* any money transfers from its parents or in-laws; *RMP* = 1, yes; *RMP* = 0, no.
RTP	Whether a household *received* any time transfers from its parents or in-laws; *RTP* = 1, yes; *RTP* 0, no.
HAGE	Age of the household head.
HAGESQ	Square of the household head age.
MS	Marital status of the household head; MS = 1, married (or has cohabitor for more than one year); *MS* = 0, single.
HBLACK	Whether the race of the household head is black; *HBLACK* = 1, yes; *HBLACK* = 0, no.
SIBLING	Total number of siblings of the head of the household and spouse.
HHREARN	Average hourly earnings of the head of the household.
NETWORTH	Net worth of the household divided by 10 000.

HEDUC Education of the head of the household:
HEDUC = 1, 0–5 grades;
HEDUC = 2, 6–8 grades;
HEDUC = 3, 9–11 grades;
HEDUC = 4, 12 grades;
HEDUC = 5, 12 grades plus non-academic training;
HEDUC = 6, some college, no degree; associate's degree;
HEDUC = 7, college BA and no advanced degree mentioned;
HEDUC = 8, college, advanced or professional degree;
HEDUC = 0, could not read or write.

KIDS Number of children younger than 13.

HHEALTH Whether the household head's health is poor:
HHEALTH = 1, yes, *HHEALTH* = 0, no.

PHEALTH Number of parents (of the head of the household and spouse) who have poor health.

AVEPNET Average net worth of the parents (of the head of the household and spouse) who are alive (in 000s).

AVEPTINC Average income (in 000s) of the parents (of the head and wife) who are alive.

WHIREARN Average hourly earnings of the wife.
If there is no wife in the household, then *WHREARN* = 0.

PPOOR Whether the head of the household's parents were poor when the head grew up.
PPOOR = 1, yes; *PPOOR* = 0.

AVEPMILE Average distance (in miles) between the household's residence and those of the parents and in-laws.

AVEPEDUC Average education level of the (living) parents and in-laws:
AVEPEDUC = 1, 0–5 grades;
AVEPEDUC = 2, 6–8 grades;
AVEPEDUC = 3, 9–11 grades;
AVEPEDUC = 4, 12 grades;
AVEPEDUC = 5, 12 grades plus non-academic training;
AVEPEDUC = 6, some college, no degree; associate's degree.
AVEPEDUC = 7, college BA and no advanced degree mentioned;
AVEPEDUC = 8, college, advanced or professional degree;
AVEPEDUC = 0, could not read or write.

Notes

1 Kan thanks CORE, especially Luc Bauwens, for hospitality and generous research support during his stay, and gratefully acknowledges financial support by the National Science Council of Taiwan. Suggestions by Terry Gorman, Heracles Polemarchakis and Jean-Pierre Vidal, by participants in the 1993 ASSET Conference (Barcelona, Spain) and the 1994 Winter Meetings of the Econometric Society (Boston, USA), and in seminars at the Institute of Economics (Academia Sinica, Taiwan), CORE and University College London have greatly improved our chapter. Thanks also go to Kristin Butcher, Don Cox and Hans H. Haller, for useful comments on earlier versions of the chapter. Comments and suggestions from Anne Laferrère, as referee, have led to further improvements. Ioannides gratefully acknowledges support from the National Science Foundation and thanks the LSE's Economics Department and the Centre for Economic Performance for their hospitality during his stay there in 1994.
The data used in the estimations of this paper have been archived with the Survey Research Center of the University of Michigan.

2 Adams (1980) and Cremer *et. al.* (1992) examine transfers in terms of education in addition to monetary transfers.

3 We believe that Grossman's (1982) paper was the first to model parents' caring for children and children's caring for parents, and to explore theoretically the efficiency role of such two-directional care in overlapping-generations models. See also Blanchard and Fischer (1989), pp. 107–10, who draw on Kimball (1987).

4 Because we do not need to use data on the exact amounts of transfers made by each of the parents, data from the main file, instead of those from the special supplement, are used.

5 We did not allow for correlation between the 'ε's. The estimated coefficients are consistent even though they are not efficient. The correlation between the unobservables is addressed by using the bivariate probit models below.

6 We have also estimated a multivariate probit model which allows for correlation among the four discrete events of transfers. Numerical integration for the maximum likelihood estimation is performed by a method of simulation (the *GHK* algorithm). The results are consistent with those obtained with the bivariate models, and are thus not reported here to avoid redundancy.

7 Terry Gorman suggests that the strong positive correlation coefficient may be a result of measurement errors in *GIVETP* and *RECTP*.

References

Adams, J. D. (1980) 'Personal Wealth Transfers', *Quarterly Journal of Economics*, vol. 95 (August), pp. 159–79.

Altonji, J. G., Hayashi F. and Kotlikoff, L. (1992) 'The Effects of Income and Wealth on Time and Money Transfers between Parents and Children', mimeo, Northwestern University, USA.

Altonji, J. G., Hayashi, F. and Kotlikoff, L. (1995) 'Parental Altruism and Intervivos Transfers: Theory and Evidence', Boston University, Institute for Economic Development, No. 65, Boston.

Becker, G. S. (1981) *A Treatise on the Family*, Cambridge, Mass: Harvard University Press.

Bernheim B. D., Shleifer, A. and Summers, L. (1985). 'The Strategic Bequest Motive', *Journal of Political Economy*, vol. 93, no. 6, pp. 1045–76.

Blanchard, O. J. and Fischer, S. (1989) *Lectures on Macroeconomics*, Cambridge, Mass: MIT Press.

Cox, D. (1987) 'The Motives for Private Income Transfers', *Journal of Political Economy*, vol. 95, no. 3, pp. 508–46.

Cox, D. (1990) 'Intergenerational Transfers and Liquidity Constraints', *Quarterly Journal of Economics* (February), pp. 187–218.

Cox, D., and Raines, F. (1985), 'Interfamily Transfers and Income Redistribution', In David Morten, and Timothy Smeeding, (eds), *Horizontal Equity, Uncertainty, and Measures of Well-Being*, Chicago: University of Chicago Press, pp. 393–421.

Cox, D. and Rank, M. R. (1992) 'Inter Vivos Transfers and Intergenerational Exchange', *Review of Economics and Statistics*, vol. 74, no. 2 (May), pp. 305–14.

Cremer, H., Kessler, D. and Pestieau, P. (1992) 'Intergenerational Transfers within the Family', *European Economic Review*, vol. 36, pp. 1–16.

Gale, W., and Scholz, J. K. (1994) 'Intergenerational Transfers and the Accumulation of Wealth,' *Journal of Economic Perspectives*, vol. 8, no. 4, pp. 145–60.
Grossman, H. I. (1982) 'Familial Love and Intertemporal Optimality', Working Paper, Brown University, Providence, Rhode Island, USA.
Hayashi, F., Altonji, J. and Kotlikoff, L. (1991) 'Risk-Sharing, Altruism, and The Factor Structure of Consumption', NBER Working Paper No. 3834 (September).
Hayashi, F., Ando, A. and Ferris, R. (1990) 'Life Cycle and Bequest Savings: A Study of Japanese and US Households Based on Data from the 1984 NSFIE and the 1983 Survey of Consumer Finances', *Journal of the Japanese and International Economy*, vol. 2, no. 4, pp. 450–91.
Hurd, M. (1987) 'The Importance of Gifts and Inheritances among the Affluent', NBER Working Paper No. 2415 (October).
Hurd, M. (1989) 'Issues and Results from Research on the Elderly', NBER Working Paper No. 3018 (June).
Hurd, M. (1990) 'Wealth Depletion and Life Cycle Consumption by the Elderly', NBER Working Paper No. 3472 (October).
Kan, K. (1996) 'Empirical Evidence on Consumption Smoothing and Intergenerational Transfers', *Southern Economic Journal*, vol. 63, no. 1, pp. 76–94.
Kimball, M. S. (1987) 'Making Sense of Two-Sided Altruism', *Journal of Monetary Economics*, vol. 20, pp. 301–26.
King, M. (1985) 'The Economics of Savings: A Survey of Recent Contributions', in K. Arrow and S. Honkapohja (eds), *Frontiers of Economics*, Oxford: Basil Blackwell, pp. 227–327.
Kotlikoff, L. J. (1987) 'Intergenerational Transfers and Savings', NBER Working Paper No. 2237 (May).
Kotlikoff, L. J. and Summers, L. (1981) 'The Role of Intergenerational Transfers in Aggregate Capital Accumulation', *Journal of Political Economy*, vol. 89, no. 4, pp. 706–32.
Kotlikoff, L. J. and Summers, L. (1988) 'The Contribution of Intergenerational Transfers to Total Wealth: Reply', in Denis Kessler and André Masson (eds), *Modelling the Accumulation and Distribution of Wealth*, Oxford: Clarendon Press, pp. 53–67.
Kurz, M. (1984) 'Capital Accumulation and the Characteristics of Private Intergenerational Transfers', *Economica*, vol. 51 (February), pp. 1–22.
McGarry, K. and Schoeni, R. F. (1994) 'Transfer Behavior: Measurement and the Redistribution of Resources Within the Family', NBER Working Paper, No. 4607.
Menchik, P. L. (1980) 'Primogeniture, Equal Sharing and the US Distribution of Wealth', *Quarterly Journal of Economics*, vol. 94, pp. 299–316.
Menchik, P. L. (1988) 'Unequal Estate Division: Is It Altruism, Reverse Bequests, or Simply Noise?', in D. Kessler and A. Masson (eds), *Modelling the Accumulation and Distribution of Wealth*, Oxford: Clarendon Press, pp. 105–16.
Menchik, P. and David, M. (1983) 'Income Distribution, Lifetime Savings, and Bequests', *American Economic Review*, vol. 73, no. 4 (September), pp. 672–90.
Pollack, H. (1993) 'Informal Economic Transfers in Families: Theory and Evidence', mimeo, Kennedy School of Government, Harvard University.
Schoeni, R. F. (1993) 'Private Interhousehold Transfers of Money and Time: New Empirical Evidence', RAND, Labor and Population Program Working Paper Series No. 93–26.
Tomes, N. (1981) 'The Family, Inheritance, and the Intergenerational Transmission of Inequality ', *Journal of Political Economy*, vol. 89, pp. 928–58.

Tomes, N. (1988) 'Inheritance and Inequality within the Family: Equal Division among Unequals, or Do the Poor Get More?', in D. Kessler and A. Masson (eds), *Modelling the Accumulation and Distribution of Wealth*, Oxford: Clarendon Press, pp. 79–104.
Wilhelm, M. O. (1990) 'Bequest Behavior and the Effect of Heirs' Earnings: Testing the Altruistic Models of Bequests', mimeo, Pennsylvania State University.