

Economics Department
Working Papers in Economics

Boston College

Year 1996

Motives for Private Transfers over the
Life Cycle: An Analytical Framework
and Evidence for Peru

Donald Cox
Boston College,

Zekeriya Eser
Boston College,

Emmanuel Jimenez
Boston College,

MOTIVES FOR PRIVATE TRANSFERS OVER THE LIFE CYCLE:

An Analytical Framework and Evidence for Peru

Donald Cox

Zekeriya Eser

Emmanuel Jimenez*

April 1996

JEL Classification: O15, O16, J14, I30, H55

[Keywords: intergenerational transfers, liquidity constraints, social security, developing economies]

*The authors' affiliations are as follows: Cox, Boston College; Eser, Alternatif Bank, Istanbul; Jimenez, The World Bank.

The work on this paper was supported in part by RPO 674-49 of the World Bank's Research Support Budget. We wish to thank the editor Jere Behrman and two referees for comments on a previous draft. We also would like to thank Gary Becker, Oded Stark and seminar participants at Brandeis University, Duke University, the Labor and Population Workshop at Yale University, the Canadian Economic Association meetings and the American Economic Association meetings for their comments. We wish to thank the Government of Peru and the Bank's Living Standard Measurement Study (LSMS) team for providing us with access to data. Jorge Castillo, Kalpena Mehra, and Reza Firuzabadi were invaluable in setting up workable data files, and John Jordan provided outstanding research assistance. The views expressed here are the author's own and should not be attributed to the Government of Peru or the World Bank.

MOTIVES FOR PRIVATE TRANSFERS OVER THE LIFE CYCLE:
An Analytical Framework and Evidence for Peru

Abstract

This paper tests for the motives for private income transfers. We consider two motives: altruism and exchange. The question of private-transfer motives is important because such motivation can influence the effects of public income transfers on the distribution of income. Using a household survey for Peru, we find that transfer amounts received increase with recipient pre-transfer income, which contradicts a key prediction of the strong form of the altruism hypothesis but is consistent with exchange. We also find that capital market imperfections are likely to be an important cause of private transfers, and that social security benefits "crowd out" the incidence of private transfers.

1. Introduction

Private inter-household transfers are important for reallocating resources, particularly in developing countries. A recent review indicates that in some countries over half of all households are involved in relationships involving private financial transfers (Cox and Jimenez [1990]). Further, private transfers often constitute a significant fraction of overall income for recipients and are likely to be essential for survival for extremely poor households.

The importance of private transfers has prompted economists to explore the motivation for them. Among the several possible reasons why transfers might occur, this paper singles out for analysis and discussion two competing hypotheses. One is that households give to satisfy altruistic feelings. The other is that households give because they expect something in return (exchange). These two motives imply different outcomes for public policies that redistribute income. For example, Becker (1974) and Barro (1974) show that altruistic households linked through widespread, operative private transfers could neutralize completely the effects of public income redistribution by adjusting their own transfers. Changes in private inter-household transfers could render ineffective public social security transfers, education and health subsidies and other welfare programs if households are altruistic and have interior solutions for private transfers. If households are motivated by exchange, these results do not hold (Barro [1974], Bernheim, Shleifer and Summers [1985], Cox [1987]).

While each private transfer motive is likely to be at work to some extent, there is no clear consensus as to whether one predominates. Empirical studies that are beginning to emerge have produced conflicting results. This is in part due to a relative scarcity of quality data, even in developed countries. This paper fills this gap with a case study of Peru.

One contribution is that the paper develops a rigorous test based on a model that is particularly apt for developing countries--one in which households face capital markets that do not function well. Another contribution is the use of a detailed data base, described in

Section 3, that contains information about income, transfers and access to publicly provided services. Such data are uncommon in many countries. Finally, the paper uses the data and model to conclude that, in Peru, exchange appears to be stronger motive for private transfers than altruism (Section 4). We discuss the policy implications of these results in Section 5. Before describing the data set and empirical work, we present a simple model that has testable implications concerning transfer motives.

2. Theory

The key to making inferences about private-transfer motives is the relationship between the recipient's pre-transfer income and transfer amounts received. With altruistic transfer motives of the sort posited by Becker and Barro, this relationship is always negative. But exchange admits a positive relationship between these two variables. We explore this relationship in the context of behavioral models in which the purpose of private transfers is to help overcome imperfections in credit markets.¹

Assume for simplicity that capital markets are "perfectly imperfect," so that it is impossible to transfer resources from the future to the present or vice-versa. Young people cannot borrow against their future income, and middle-aged people cannot save for

¹Most researchers agree that formal capital markets do not function well in poor countries. Instead the informal sector, in which kinship networks predominate, is a leading source of credit (World Bank [1989]). Family networks that alleviate borrowing constraints are presumed to be more pervasive in developing than in developed countries (Gersovitz [1988]):

...in the absence of the family, various market imperfections would distort decision-making...[An] example might be the family's role in alleviating borrowing constraints if family members feel that repayment of intra-family loans is incumbent upon them when they would not otherwise repay outsiders. Alternatively, family members may have better knowledge about the characteristics of relatives and what they are doing with the borrowed funds, negating problems of adverse selection and moral hazard. And, they may have more sanctions with which to enforce debt service...We need empirical information about these matters, but none exists that is based on household survey data about how individuals behave. (Gersovitz [1988], p. 402)

Further, unstable financial markets, under-developed insurance markets, thin markets for durable wealth and inflationary fears can deter private saving and make transfers from children a relatively attractive mechanism for old-age support (Nugent [1985]).

retirement. In this instance, what prevents people from starving during periods when their income is very low?

Altruism

One possibility is altruistically motivated private transfers. Modern analysis of altruism has its origins in the work of Gary Becker (1974). The first model we consider is a variant of Becker's altruism model. To distinguish it from other models that also feature utility interdependence--but may differ in other respects--we refer to the altruism model below as the "strong form" of the altruist hypothesis.²

Suppose that parents care about their children, so that when a child's income is low enough, as it would be early in the life-cycle, the parent transfers income to him. In addition children care about their parents' well-being, so that when the parents' earning power is low (retirement years) children may transfer income to parents. Formally, the utility interdependence can be modeled as follows. Suppose the parent's well-being at a moment in time is

$$(1) \quad U = U(c_p, V),$$

where U denotes parental utility, c_p parental consumption and V the well-being of the child.

Altruism is mutual, so that an equivalent expression exists for the child:

$$(2) \quad V = V(c_k, U),$$

where c_k denotes child consumption.³ The idea that capital markets are imperfect can be expressed by

$$(3) \quad c_i = I_i + T_i, \quad i = p, k,$$

where T_i denotes transfers received, net of transfers given by person i . I_i denotes pre-transfer income. There is no asset accumulation or borrowing.

²Narrow definitions are useful because the term "altruism" can encompass a wide variety of behavior. Becker (1981) points out the varied nuances associated with the term. An alternative to the Beckerian formulation, for example, is the separable-earnings-transfers model of Behrman, Pollak and Taubman (1982), in which child earnings enter the parental utility function separately from transfers.

³We assume that the properties of (1) and (2) are such that their reduced forms, expressed in terms of consumption, are well-behaved. It is necessary that one person value own consumption more than the other person's consumption (Becker [1974], pp. 1080-81, fn. 30). For an exposition of similar restrictions in a dynastic economy, see Kimball (1987).

Assume parent and child overlap for two periods. We focus our analysis on these two periods. Suppose the configuration of pre-transfer incomes is as follows:

I_{k1} : low, I_{k2} : high.

I_{p1} : high, I_{p2} : low.

A plausible outcome is that the parent makes a transfer to the child in the first period, and the child makes a transfer to the parent in the second. Altruistically motivated transfers help overcome the problem of capital market imperfections.⁴

A crucial feature of altruistically motivated transfers is that an increase in the recipient's pre-transfer income is always met with a reduction in transfers received so that $\partial T_k / \partial I_{k1} < 0$ and $\partial T_p / \partial I_{p2} < 0$. Consider the first result. The altruistic parent makes transfers to the child in the first period. Children with higher I_{k1} require smaller T_k to attain the level of consumption that is optimal from the parent's perspective. The partial derivative can be written as

$$(4) \quad \frac{\partial T_k}{\partial I_{k1}} = -1 + \frac{\partial T_k}{\partial I_{p1}} .$$

The first term on the right-hand side of (4) implies that, with first-period family income ($I_{k1} + I_{p1}$) held constant, a dollar increase in I_{k1} is met with a dollar decrease in T_k . But since an increase in I_{k1} raises total family resources the cutback in T_k will be less than dollar-for-dollar as long as the income elasticity of parental giving is positive. The magnitude of (4) can be large. For example, a model with Cobb-Douglas preferences and equal weighting of parent and child utility implies that a dollar increase in I_{k1} prompts a fifty-cent reduction in T_k . The same logic applies to second-period transfers, in which the behavior is the same but the donor-recipient roles are reversed.⁵

⁴For more detailed analysis of the connection between private transfers and liquidity constraints, see Altig and Davis (1989) and Cox (1990). The analysis below would not be affected by adopting alternative specifications for liquidity constraints, such as non-zero quantity restrictions or differential borrowing rates (Cox[1990]).

⁵The assumption of capital market imperfections is critical for these comparative statics results. If instead capital markets were perfect, the timing of altruistic inter-vivos transfers over the life-cycle would be indeterminate--only their present discounted value would be determined uniquely (Cox [1990]). Further, as a referee points out, recipient income effects can be quite small, even with altruistically motivated transfers, if households have ways other than private transfers for smoothing consumption. For example, refer again to the case of equal utility weights and Cobb-Douglas

Transfer behavior has two components--the decision and the amount. Under the altruism hypothesis, the latent variable determining whether a transfer occurs has the same qualitative comparative statics properties as those which pertain to transfer amounts (Cox [1987]). For example, the variable determining whether a transfer from parent to child occurs in the first period is the difference between the parent's marginal utility of his consumption and the child's (from the parent's point of view), where each is evaluated at the family member's pre-transfer income. A rise in the child's first-period pre-transfer income reduces this variable because it lowers the parent's marginal utility from transferring income to him. So the richer the child is in the first period, the less likely it is that he will receive a transfer at all. The same goes for the parent in the second period. If the parent receives ample social security retirement benefits, for example, the altruistic child may refrain from transferring any income to him.

Exchange

We now explore the comparative statics associated with an alternative motive for transfers: exchange. Exchange implies a more complex relationship between recipient pre-transfer income and transfers received. Suppose each person realizes he can make a mutually advantageous lending agreement. The parent lends to the child in the first period, and the child repays in the second. The lending-repayment pattern helps to overcome capital market imperfections affecting both.

We assume that the terms of the intergenerational loan are determined by Nash bargaining. The parent's and child's lifetime utilities are defined as follows:

$$(5) \quad U = U_1(I_{p1} - T) + \frac{U_2(I_{p2} + R)}{(1+\rho)} + \beta V, \text{ and}$$

$$(6) \quad V = V_1(I_{k1} + T) + \frac{V_2(I_{k2} - R)}{(1+\rho)} + \gamma U,$$

preferences, only now assume perfect capital markets. The present discounted value of transfers will serve to equate the values of parent and child lifetime wealth. A change in current income that is largely transitory would have a negligible effect on private transfers.

where ρ is the subjective rate of time preference, which for simplicity is assumed to be the same for parent and child. The parental loan is denoted by T and the repayment is denoted by R . Note that our bargaining framework does not dispense with altruism. Altruistic utility interdependence is captured by the terms β and γ in expressions (5) and (6) respectively. But this depiction of altruism differs from the strong form of the altruist hypothesis, in which one agent implicitly dominates the bargaining arrangement.⁶ The levels of utility that parent and child can obtain on their own (i.e., their "threat-point" levels of utility) are given by

$$(7) \quad U^\circ = U_1^\circ(I_{p1}) + \frac{U_2^\circ(I_{p2})}{(1+\rho)} + \beta V^\circ, \text{ and}$$

$$(8) \quad V^\circ = V_1^\circ(I_{k1}) + \frac{V_2^\circ(I_{k2})}{(1+\rho)} + \gamma U^\circ.$$

The solution to the bargaining problem is given by

$$(9) \quad \max_{TR} N = (U - U^\circ) \times (V - V^\circ),$$

which generates the first-order conditions

$$(10) \quad \frac{\partial N}{\partial T} = (V - V^\circ) \frac{\partial U}{\partial T} + (U - U^\circ) \frac{\partial V}{\partial T},$$

$$(11) \quad \frac{\partial N}{\partial R} = (V - V^\circ) \frac{\partial U}{\partial R} + (U - U^\circ) \frac{\partial V}{\partial R}.$$

The primary property of the bargaining solution that interests us is the relationship between transfer amounts and the pre-transfer income of recipients. Unlike the strong form of the altruism model, the exchange model allows a *positive* relationship between these variables: $\partial T / \partial I_{k1}$ and $\partial R / \partial I_{p2}$ can be greater than zero. The comparative-statics properties of (10) -

⁶See Manser and Brown (1980), Cox (1987) and Pollak (1985) for further discussion of this point.

(11) imply that the partials of transfer amounts with respect to pre-transfer income, $\partial T/\partial I_{k1}$ and $\partial R/\partial I_{p2}$, are ambiguous in sign, unlike the large negative ones predicted by the strong form of the altruism model. Further, the terms $\partial^2 T/\partial I_{k1}^2$ and $\partial^2 R/\partial I_{p2}^2$ are predicted to be negative with exchange, so that transfers can first rise, then fall, with recipient pre-transfer income.

The properties of the bargaining solution are easiest to see with a simulation. Consider logarithmic functional forms for equations (5) - (8) and suppose that $I_{k2} = 150$, $I_{p1} = 150$, $I_{p2} = 20$, $\rho = .25$ and $\beta = \gamma = .30$. We simulate the effects of varying I_{k1} from 1 to 30 on the value of first-period transfers, T . The results are displayed in figure 1. Transfers initially rise with I_{k1} . This result is counter to that of the altruism model, which predicts that $\partial T/\partial I_{k1}$ is negative throughout.

The intuition for the result is that an increase in first-period child earnings produces two effects. The first is that the child's liquidity constraint is eased, which reduces the first period transfer. The second effect is that the child's threat-point utility rises. This second effect causes an increase in transfers, because the terms on which the child can borrow are improved. The child's gains from bargaining increase with threat-point utility. The implicit interest rate for intergenerational loans, $(R - T)/T$, declines as I_{k1} rises. So the first effect is akin to an inward shift in the demand for loans, and the second is like a downward movement along the demand curve for loans. If the second effect dominates, $\partial T/\partial I_{k1}$ is positive. Further, the second effect is stronger at lower levels of I_{k1} , which generates a concave relationship between T and I_{k1} . If transfers both rise and fall with recipient income, they first rise then fall at higher levels of income.

The analysis for the parent is similar to that of the child. Figure 2 shows the effects on repayments of an increase in second-period parental earnings from 1 to 30. (The values of other terms for this simulation are as follows: $I_{k1} = 20$, $I_{k2} = 150$, $I_{p1} = 150$, $\rho = .25$ and $\beta = \gamma = .30$.) An increase in second-period parental earnings reduces the demand for saving in the form of intergenerational lending. But an increase in second-period earnings

also raises the parent's threat point, which improves the terms of lending for him. At low levels of parental earnings, the second effect dominates the first.

In summary, the bargaining model predicts that it is possible for a positive relationship to exist between recipient income and transfer amounts. The altruism model predicts that this relationship is always negative.

Note that we have focused attention on interior solutions for transfers. But as we note above transfer behavior contains two components: the decision and the amount. In the bargaining model, the latent variable determining the transfer decision is inversely related to first-period child earnings and second period parental earnings. The reason is that increases in these variables reduces the chances that intergenerational lending is mutually beneficial. So the probability of transfer receipt is inversely related to earnings, just as in the altruism model. It is the relationship between transfer amounts and pre-transfer income that allow us to test for transfer motives.⁷ The exchange model predicts that increases in incomes of potential recipients should reduce the probability of transfer receipt but can increase transfer amounts.

Before proceeding to the data and empirical tests, we consider a further issue related to family lending: enforcement. Enforcement is not a problem in the altruistic framework with operative bequests, since parents can effect repayment for first-period loans by reducing bequests (Becker and Murphy, 1988a), and non-bequeathing parents may be able to rely on the altruism of their children. In other cases of the altruism model, such as the no-bequest case with selfish children, enforcement of parental loans to children is not automatically effected. And if private transfers are motivated in part by self-interest, what

⁷Note that the Nash assumption is not necessary to generate a positive relationship between pre-transfer income and transfer amounts. An alternative modeling strategy is to assume that one agent (e.g., the parent) dominates the bargaining. In this framework, transfers to the child are altruistically motivated--and have the comparative-statics properties of altruism--if $V > V_0$; otherwise the motive is exchange and $V = V_0$. The exchange regime of this model can generate $\partial T_1 / \partial E_{k1} > 0$, because of child threat-point effects. And it nests the parental altruism model. But this model implies that the parent expropriates all the surplus from exchange. Further, the empirical results below indicate that threat-point effects matter for both parent and child, which is consistent with the Nash bargaining framework.

mechanisms would prevent children from violating the terms of the loan agreement and perhaps abandoning their elderly parents?

One possibility is that parents expend resources to inculcate a sense of guilt for disloyalty. Becker (1993) shows how parents who desire old-age support from their children could influence the formation of their preferences. One might argue that such moral suasion creates only weak incentives. Wouldn't a rational child disregard parental influence and renege at the first opportunity? Not necessarily. Along the lines of the "rational addiction" model of Becker and Murphy (1988b), loyalty and aversion to guilty feelings could become deeply ingrained habits. Parents hold considerable sway over implicit prices by their young children. Those involved in intertemporal exchange have an incentive to use this leverage to inculcate addictive loyalty in their children.⁸ Though enforcement via preference formation is potentially a complex issue, simple but plausible variants of Becker's (1993) framework could be grafted onto the lending model above without altering any of the conclusions outlined above.⁹

A second enforcement mechanism is sanctions against children who renege on their obligations, such as disinheritance or harm to reputation. A third is reputation effects. In some instances, news that someone has failed to honor promises might lead to ostracism by third parties who are potential sources of informal credit or help (Platteau and

⁸Becker and Murphy (1988a) point out that altruism may be addictive, so that parental inculcation might prompt altruistic old-age support from children. But an anthropological account of the Chagga of Kilimanjaro (Moore [1974]) suggests that altruism need not necessarily play a major role in loyalty training, and that other emotions, such as guilt or feelings of obligation, might be more important. Moore finds that childhood training is based on negative reinforcement and summarizes one elderly man's discussion:

"Affection was as it might be. A father might like a particular son. A son might like his father. Some did not, and that was how it went. Liking had nothing to do with respecting and obeying." (Moore [1974], p. 38).

Maher (1974, pp. 108-111) provides a similar account for Moroccan families.

⁹For example, suppose the parent incurs a first-period utility cost of C to insure that the child suffers a reduction in utility (i.e., "guilt") of $\Gamma_1 > 0$ for renegeing on the loan agreement and "gratification" of $\Gamma_2 \geq 0$ for fulfilling it. As long as C is less than the discounted parental surplus from exchange and $\Gamma_1 - \Gamma_2$ exceeds $V_2(I_{p2}) - V_2(I_{p2} - R)$, this preference-formation scheme would prevent default.

Abraham (1987)).¹⁰ A further possible mechanism is demonstration by example by honoring obligations to grandparents (Cox and Stark [1994]).

3. Data

The data set used in the empirical work is the Peruvian Living Standards Survey (PLSS), conducted by the World Bank in conjunction with the Peruvian Instituto Nacional de Estadística (INE). The PLSS gathered socioeconomic information for a sample of 5,109 households, covering about 27,000 persons. Field work for the PLSS was done between June 1985 and July 1986.

The household is the unit of observation for our analysis. We deleted households with missing data for any of the following: private transfers, age, education of household head, parental schooling, illness, household size, gender of household head, and indicator of urban/rural residence. This sample-selection rule reduced the sample to 4,184. Further, we confine our attention to urban households because labor income is likely to be measured more accurately for urban than for rural households. This reduces our sample to 2,241.

Over 25 percent of the sample received a transfer, which we measure as the positive difference between amounts received and given. The average transfer receipt for the entire sample is 78 intis--4 percent of total income. To put these figures in perspective, they are roughly two-and-a-half times the comparable figures for social security pension income. (Social security is the predominant public transfer program in Peru.) Recipients got an average of 304 intis--22 percent of their total income. So private transfers are non-trivial in terms of incidence and magnitude.¹¹

¹⁰Of course, threats of punishment, explicit or not, must be credible to be effective. Binmore (1987, pp. 10-16) provides examples of strategies that generate subgame-perfect equilibria in which the young generation provides support for the old in a non-altruistic overlapping-generations model.

¹¹See Cox and Jimenez (1990, table 1) for a summary of private transfer information for selected countries. Though inter-country comparisons are difficult because of differences in surveys, some findings suggest an inverse relationship between per-capita incomes and the magnitude of transfer activity. In relation to Peru, for example, private transfers appear less prevalent in the United States and more prevalent in the Philippines.

We will investigate transfer behavior according to direction: transfers flowing from old to young ("downward transfers") and transfers from young to old ("reverse transfers"). Survey respondents were asked to report the main sources of transfers received and destinations of transfers given. Below is a summary of the distribution of transfer sources:

<u>Source</u>	<u>Percentage of Total Intis Transferred</u>
1. Parents	25.9
2. Children	32.9
3. Other Relatives	19.7
4. Grandchildren	0.5
5. Spouse	6.8
6. Non-relatives	14.2
<u>Total</u>	<u>100.0</u>

Most of the transfers occur between parents and children. After these two categories, the most significant is that of "other relatives," who are the source of 20 percent of total intis received. Very few transfers received originated with grandchildren, in-laws or spouses, but non-relatives account for a significant minority of transfers.

4. Empirical Work

Specification of the Transfer Function

Both altruism and exchange models predict that the probability of receiving a transfer should be inversely related to current pre-private-transfer income. Two forms of current income are entered in the probit equation: total monthly income (denoted as simply "income") and Social Security receipts. To capture the effects of transitory income fluctuations on transfers, we also include dummies for whether anyone in the household has been ill in the past 4 weeks or unemployed during the past 12 months.

Previous studies of transfer behavior indicate that gender of household head is an important determinant of transfer behavior. Evidence from developing countries (e.g., Lucas

and Stark (1985; Botswana) and Kaufman and Lindauer (1986; El Salvador)) indicate a positive relationship between transfers and female status. Similar evidence has been found for the United States (Cox, 1987). Further, marital status has been found to be a powerful determinant of transfer behavior in the United States (Cox, 1987). And each of these variables has a possible interpretation as an indicator of the provision of inter-household services and attention to elderly parents by adult children.¹² For these reasons, we enter gender and marital-status dummies in the probit equation for transfer receipt. We also include household size, homeownership and education dummies as regressors.

Indexing households by h and adding a normally distributed stochastic component, we express the latent variable that determines the transfer receipt as

$$(12) \quad t_h = a_0 + a_1 I_h + \mathbf{b} \mathbf{X}_h + \varepsilon_h,$$

and

$$T_h > 0 \text{ iff } t_h > 0,$$

$$T_h = 0 \text{ otherwise.}$$

When the latent variable t_h crosses the threshold 0, transfers, T_h , become positive. Otherwise, they are zero. The variable I_h denotes household income. The sign hypothesis for the income coefficient a_1 is negative under both altruism and exchange. The education, age and demographic variables are denoted by the vector \mathbf{X}_h . The stochastic term ε_h represents unobservable determinants of the transfer decision.

The estimating equation for transfer amounts received is

$$(13) \quad T_h = b_0 + b_1 I_h^{(1)} + b_2 I_h^{(2)} + \mathbf{b} \mathbf{X}_h + E(\eta_h | T_h > 0),$$

where

$$(14) \quad \begin{aligned} I_h^{(1)} &= I_h & \text{if } & I_h < I_h^* \\ &= I_h^* & & I_h \geq I_h^* \end{aligned}$$

¹²In the terminology used by Behrman and his collaborators (e.g., Behrman, Pollak and Taubman [1995]) gender might be considered an "attention endowment," where the term endowment refers to an inherent attribute that is rewarded in markets or families. Cox (1987) contains a more extensive discussion of the relationship between demographic characteristics and the provision of services by adult children to their parents.

$$\begin{aligned}
 I_h^{(2)} &= 0 & \text{if} & & I_h \leq I_h^* \\
 &= I_h - I_h^* & & & I_h > I_h^* ,
 \end{aligned}$$

and η_h is a random error component.

Income enters the equation for transfer amounts in splined form. The bargaining model predicts a non-linear relationship between recipient income and transfer amounts received. The spline formulation is useful for testing for the presence of an inverted U-shaped relationship between recipient income and transfers. The altruism model, on the other hand, predicts negative coefficients for both b_1 and b_2 .

Main Results

A key premise of this paper is that private transfers respond to capital market imperfections. Before proceeding to the question of transfer motives, we must determine whether there is evidence for the connection between private transfers and liquidity constraints. To see how we can infer whether capital market imperfections matter for transfer behavior, consider what would happen if they did not. The timing of transfers over the life-cycle would not be very important. If all households followed the permanent-income life-cycle rule, desired consumption would depend only on lifetime wealth. The sole purpose of private transfers would be to redistribute lifetime wealth. Transfers could be given all at once early on or deferred as bequests. Timing would not matter.¹³

In contrast, if transfers respond to liquidity constraints, transfer receipts should be more frequent in phases of the life-cycle when desired consumption exceeds current earnings. If households prefer to smooth consumption over the life-cycle, and transfers help smooth consumption, we should observe more frequent transfers to both young and old than the middle-aged.

¹³Timing would matter however, even without liquidity constraints, if we consider complications due to either the "Samaritan's-Dilemma" (Bruce and Waldman [1990] or the importance of having the "last word" in making exchange-related transfers (Hirshleifer [1977]; Bernheim, Shleifer and Summers [1985]).

Our estimates below indicate that timing does indeed matter for private transfers. Transfer receipts and earnings move in opposite directions over the life-cycle. We estimate a probit equation for the incidence of private transfers (table 1, column 1). Private-transfer receipt is expressed as a function of cubics in age, income, education and demographic variables. The age pattern for private transfers indicates that they are more likely to occur during periods in which earnings are low--either when households are very young or old--and less likely to occur when they are middle-aged. Figures 3 and 4 show how private transfers are concentrated during low-earning phases of the life-cycle. Figure 3 shows how the probability of receiving a transfer varies with age. Figure 4 shows the log-earnings--age profile.¹⁴ The two age profiles are mirror images of one another. The trough in figure 3 (age 45) matches the peak in figure 4. The "U"-shaped age pattern for private transfers strongly suggests that they are affected by capital-market imperfections.

Next we look at transfers received by children from their parents. To control for donor-income effects, we include the imputed value of total donor income, based on information about education and occupation of parents and in-laws.¹⁵ We confine the sample to the 1,875 households who have at least one living parent.

Table 2 contains the estimation results for transfers from parents to children. The most important results concern those for income. The probit results indicate that the probability of transfer receipt is inversely related to income, as both the altruistic and exchange models predict (first column, table 2). But the effect of income on transfer amounts, conditional on receiving a

¹⁴Figure 4 is a plot of the following Tobit estimate of log-compensation for households (asymptotic t-values in parentheses):

$$\begin{aligned} \log \text{ of compensation} = & 1.106 + 0.203(\text{age}) - 0.0022(\text{age squared}) + 0.668(\text{primary}) \\ & (1.64) \quad (7.76) \quad (-8.40) \quad (2.52) \\ & + 0.892(\text{secondary}) + 0.596(\text{technical}) + 1.066(\text{post-secondary}) \\ & (3.23) \quad (1.63) \quad (2.73) \\ & + 1.120(\text{university}) \\ & (3.76) \end{aligned}$$

log-likelihood = -5209.34, non-limits = 1,973, observations = 2,241.

¹⁵We use separate earnings equations for married men and women from urban areas (Appendix). Earnings are a function of years of schooling, a quadratic in age, and occupational classification. We impute permanent income for parents by substituting their characteristics into the respondent earnings functions to predict parental earnings at a standardized age (age 45). We also have information on the work status of mothers and mothers-in-law. Their imputed earnings are set to zero if they are non-workers. Total parental income is the sum of imputed incomes for living parents and in-laws.

transfer, is first positive and then negative (second column, table 2). Income enters the generalized Tobit in splined form. The node of the spline is set at 2,900 intis.¹⁶ At incomes lower than 2,900 intis, increases in income are associated with higher transfer amounts. A one inti increase in income prompts a .162 inti increase in transfer amounts. This positive coefficient is estimated precisely. At incomes higher than 2,900 intis, transfer amounts decline. Though the negative coefficient on high income is not estimated precisely, the splined specification is significant at nearly the .01 level against the null hypothesis that income enters in simple linear fashion.¹⁷ These findings run counter to the strong form of the altruism hypothesis, which predicts a large inverse relationship between pre-transfer income and transfer amounts received. The patterns are more consistent with the configurations predicted by exchange.

An alternative, and to some extent complementary, explanation for the positive relationship between child income and private transfer amounts is that the pattern is an artifact of "unobserved endowments" of children, i.e., fixed characteristics that may be related to both transfer behavior and earnings capacity. For example, some children may have personalities which predispose them to being especially faithful in repaying familial loans. It would not be surprising for such proclivities to be positively correlated with labor market success, so that child earnings pick up the effects of unobserved endowments. In a related vein, parents may be willing to lend more if their children earn more, because by doing so the children signal their ability to repay. In this case parents would be engaging in the same kind of "credit scoring" that is employed in some formal loan markets. Such an argument, however, is not consistent with the negative income effects in the probit equation for private transfers, nor is it likely to be applicable to the analysis of child to parent transfers.

¹⁶We varied the node of the spline by 100 intis. A node of 2,900 maximized the log-likelihood.

¹⁷The value of the log-likelihood with income entered linearly is -28.552, compared to a value of -25.294 for the splined specification. When income is entered linearly its coefficient is -0.005 and its t-value is -0.62. A χ^2 test rejects the linear specification at almost the .01 level ($\hat{\chi}^2 = 6.51$, $\chi^2_{.01} = 6.63$).

The estimations for these child-to-parent transfer receipts are given in table 3. Like downward transfers, the probability of transfer receipt is inversely related to income (first column, table 3). But income increases at the first stage of the income spline (less than 3,700 intis) are associated with increased transfer amounts (second column, table 3).¹⁸ This finding contradicts pure altruism but is consistent with exchange.

For the reverse-transfer specification we include income from social security in addition to income from other sources. Social security qualifies individuals for health-care benefits in addition to a pension.¹⁹ To capture possible non-linear effects of social security on transfers we enter a dummy for whether the household receives benefits along with benefit amounts. Receiving social security reduces the probability of receiving a private transfer by a large amount--6 percentage points (table 3, column 1). But receiving social security income raises transfer amounts received. The point estimates in the second column of table 3 indicate that the first inti of social security raises transfer receipts by 258 intis. Each successive inti of social security reduces private transfers by 0.42 intis. The social security variables in the generalized Tobit are jointly significant at the 0.01 level.

Note that the social-security effect on private-transfer incidence, while predicted by the altruism model, also squares with exchange. Households who expect social security pensions have a weaker incentive to enter into intergenerational lending arrangements for the purpose of old-age support.

The magnitudes of the coefficients on the high-income portion of the spline in the transfer-amount equations in each of the tables are nowhere near the large negative values predicted by the pure altruism model. In addition, using the generalized Tobit for parent-to-child transfers in table 2 we tested the restriction implied by the altruism model with liquidity constraints, that the difference between child and parent income effects on transfers sums to -1

¹⁸The node of the spline that maximized the likelihood function in table 3, column 2 is 3,700 intis. The spline for child-to-parent transfers is significant at the .01 level.

¹⁹Those covered by social security have access to health benefits which are 5 times higher in terms of per-capita spending than those available from Peru's Ministry of Health.

(see equation (4)). This restriction is strongly rejected.²⁰ Further, our estimates in table 1 for the entire sample, used to generate figure 3, display the same sign pattern for recipient income. The income coefficient is *negative* in the probit equation but *positive* in the first segment of the spline.²¹

Note also that the empirical results for recipient income in the transfer amount equations do not imply the absence of altruistic feelings between donor and recipient. Recall that the parent and child utility functions (expressions (5) and (6)) each feature altruistic utility interdependence. What the results do suggest is that the bargaining-cum-altruism framework based on expressions (5-11) provides a better description of the data than the strong form of the altruist hypothesis.

Other Findings

Our test for transfer motives rests primarily on the relationship between recipient incomes and transfer amounts. Empirical findings for the other variables in the transfer equations provide less discriminating tests for transfer motives. Probit estimates for the full sample (table 1, column 1) indicate that private transfers are targeted to the unemployed and those stricken with illness. Being unemployed raises the probability of transfer receipt by over 13 percentage points; illness raises the probability over 5 percentage points. These findings are consistent with pure altruism. But they could also be evidence of informal insurance schemes, which can be motivated by a combination of altruistic and self-interested motives (Lucas and Stark [1985]).²²

²⁰The χ^2 test statistic associated with this restriction is 104.63, which is significant at any popular level. Recall from the theoretical discussion above (esp. fn. 5) that the restriction implied by equation (4) only holds in the presence of binding liquidity constraints.

²¹The spline for the entire-sample estimates is significant at the .01 level. We also investigated a quadratic specification for income in the generalized Tobits, which produced qualitatively similar results to those of the spline though goodness-of-fit measures were a bit weaker. The coefficient values for income and income squared from the quadratic specification were as follows (t-values in parentheses): table 1, 0.070 (2.56), -0.172×10^{-5} (-2.62); table 2, 0.073 (1.21), -0.195×10^{-5} (-1.30); table 3, 0.140 (2.09), -0.726×10^{-5} (-2.00). In addition, we experimented with an alternative way to identify the generalized Tobit, by entering, at the probit stage, quadratics in income and age, and interactive terms in income, age, gender and marital status. This specification produced results similar to those reported in the text.

²²Note however that being ill reduces transfer amounts received, which is difficult to reconcile with either altruistic or insurance motives.

Additional evidence consistent with pure altruism is the disproportionate share of child-to-parent transfers given to female-headed households, a potentially vulnerable group (table 3, column 1). Being headed by a female increases a household's probability of receiving a transfer by nearly 10 percentage points. But this finding may be due in part to gender differences in life expectancy, so that intergenerational loan repayments accrue to widows.

Households whose heads are university-educated receive larger transfers than their less-educated counterparts (table 2, second column). The finding fits the idea that transfers respond to liquidity constraints. More schooling raises permanent income and desired consumption. With current income constant, having more education increases the demand for intergenerational loans. But the pattern for education may also reflect fixed effects: households who received education-related transfers in the past may be more likely to receive transfers later on. Education also tends to boost reverse-transfer receipts, though having a degree beyond secondary education does not increase the probability of receiving a reverse transfer (table 3).

Though education effects do not enter significantly in the probit equation in table 2, note that educational attainment is on average higher for the group of adult children receiving transfers. This pattern may be interpreted in light of the "wealth model," originally formulated by Becker and Tomes (1976) and developed further by Behrman, Pollak and Taubman (1995). Parents who have sufficiently high resources and altruism invest in their children's human capital (H) to the point where the rate of return equals the market interest rate ($H = H^*$). After providing H^* , they may make financial transfers. Behrman, Pollak and Taubman show that, regardless of the configuration of parental resource transfers to children, $H < H^*$ implies $T = 0$, and $T > 0$ implies $H = H^*$. If some of those with $T = 0$ have $H < H^*$, and if the distribution of the optimal value of H^* were not too disparate among recipients and non-recipients, lower values of H for non-recipients

would be consistent with predictions of the wealth model. (Though the empirical evidence in the previous section casts doubt on altruism-based models like the wealth model.)²³

Consistent with both exchange and altruism, parental income exerts a positive effect on both transfer incidence and amounts (table 2). But while we can proxy donor income for transfers to children, we have no proxy in the case of transfers to parents because we have no indicators of earning potential for their children.²⁴ As a result, the coefficients on recipient income in table 3 could be affected by potentially serious omitted-variable bias. Perhaps the household-income variables are picking up effects of omitted child income and the reason for the positive recipient income coefficient in the generalized Tobit is that richer parents have richer children who give bigger transfers.

We have evidence that this omitted-variable bias is likely to be small. If the bias affects child-to-parent transfers, it would likely affect parent-to-child transfers too. We assessed the bias in the equation for the latter in table 2 by dropping the parental-income variable and re-estimating the generalized Tobit. The coefficients of the recipient-income variables are only slightly higher in this regression. For example, the coefficient on "low income" rises by only three-hundredths of an inti. Our experiment suggests that the recipient-income coefficients in table 3 are little affected by omitted-variable bias.

Another issue relevant for interpreting our empirical results is that of reverse causality. For example, receipt of private transfers could influence labor supply incentives or other decisions. There is not much evidence on the connection between private transfers and labor supply incentives in developing countries, though recent evidence indicates that it is quite weak in the United States (Joulfaian and Wilhelm [1994]). Induced labor supply effects would only strengthen our conclusions, since recipient income coefficients would be influenced in the direction predicted by altruism.

²³Rigorous testing of the many implications of wealth model, however, would pose data requirements that exceed what we have available to us. Behrman, Pollak and Taubman derive and exploit the wealth model's predictions regarding inter-sibling allocation of transfers and find that the model is inconsistent with empirical patterns of transfers in the United States.

²⁴Further, households were not asked to report any information about children over age 30.

5. Conclusion

There is no denying that family members have altruistic feelings for one another. The shifting fortunes of one family member will affect the well-being of others--even aside from family-income effects--simply because of mutual interdependence of individual utilities. And there are doubtless many examples in which utility interdependence is the sole reason for transfers of money or help. At the same time, however, kinship networks and families create a setting in which repeated exchange, inculcation of family loyalty and trust, and altruism can help to enforce mutually beneficial exchanges. But exchange among small numbers of people can create bilateral-monopoly problems which must be resolved through mechanisms such as cooperative bargaining.

Once we enter the realm of bargaining, threat points become important. Indeed, these threat-point effects enable us to test between a bargaining model (in which family members are also altruistic) and the purely altruistic framework of Becker and Barro, in which one family member implicitly dominates transfer behavior. And while purely altruistic motives and exchange motives are each plausible *a priori*, finding out which predominates at the margin is an empirical problem. Our empirical results support the bargaining model and cast doubt on the strong form of the altruist hypothesis.

The main reason for testing the bargaining-cum-altruism model against the strong form of the altruist hypothesis is that the latter can produce striking neutrality results that have stimulated a lot of excitement in the public finance and macroeconomics literature in the past decade. Our findings indicate that public income redistribution might not be neutralized by private-transfer responses.²⁵ Further, exchange-motivated transfers open up the possibility that public income redistribution might in some instances actually be

²⁵We say "might not" because, as the results of Altig and Davis (1992) imply, the relationship between private transfers motives and macroeconomic neutrality can be complex. In particular, they demonstrate that the existence of even a small number of altruistic households can cause the steady-state marginal product of capital to be neutral with respect to changes in government debt and expenditures and tax rates.

reinforced by private-transfer responses, because public transfers change family members' threat points.

The primary source of support for the exchange framework comes from the finding that transfer amounts are positively related to recipient incomes. A positive relationship between transfer amounts and recipient income has been uncovered in other empirical explorations of interhousehold and intergenerational transfers (e.g., Lucas and Stark [1985], Cox [1987], Cox and Rank [1992], and Shelton and Sueyoshi [1995]).²⁶ Further modeling of private-transfer behavior might benefit from attention to this finding.

²⁶In addition, recent empirical evidence indicates that individual preferences matter for *intra*household allocation of resources, which is inconsistent with neoclassical specifications of the household objective function, which include the strong form of the altruism hypothesis. Thomas (1990) finds that an individual marital partner's control over unearned income affects child-health outcomes. Wives' unearned income boosts child health more than husbands' unearned income does. Schultz (1990) finds that individual control over unearned income matters for labor supply and fertility (though unearned income might be proxying in part the wife's unobserved productivity in child care). For additional perspective on the connection between Nash-bargained behavior and empirical work, see McElroy (1990).

REFERENCES

- Altig, David and Davis, Steve J, 1989, Government debt, redistributive fiscal policies, and the interaction between borrowing constraints and intergenerational altruism, *Journal of Monetary Economics* 24, July, 3-29.
- Altig, David and Davis, Steve J, 1992, The timing of intergenerational transfers, tax policy, and savings, *American Economic Review* 82, December, 1199-1220.
- Barro, Robert J, 1974, Are government bonds net wealth? *Journal of Political Economy* 82, November/December, 1095-1117.
- Becker, Gary S, 1974, A theory of social interactions, *Journal of Political Economy* 82, November/December, 1063-94.
- Becker, Gary S, 1981, Altruism in the family and selfishness in the marketplace, *Economica* 48, February, 1-15.
- Becker, Gary S, 1993, Nobel lecture: The economic way of looking at behavior, *Journal of Political Economy* 101, June, 385-409.
- Becker, Gary S. and Tomes, Nigel, 1976, Child endowments and the quantity and quality of children, *Journal of Political Economy* 84, August, S143-S162.
- Becker, Gary S. and Murphy, Kevin M, 1988a, The family and the state, *Journal of Law and Economics* 31, April, 1-18.
- Becker, Gary S. and Murphy, Kevin M, 1988b, A theory of rational addiction, *Journal of Political Economy* 96, August, 675-700.
- Behrman, Jere R., Pollak, Robert, and Taubman, Paul, 1982, Parental preferences and provision for progeny, *Journal of Political Economy* 90, February, 52-73.
- Behrman, Jere R., Pollak, Robert, and Taubman, Paul, 1995, *From parent to child: Intergenerational relations in the United States* (University of Chicago Press, Chicago).
- Bernheim, B. Douglas, Andrei Shleifer, and Lawrence H. Summers, 1985, The strategic bequest motive, *Journal of Political Economy* 93, December, 1045-76.
- Binmore, Ken, 1987, *Game theory and the social contract: Mark II*, mimeo. University of Michigan.
- Bruce, Neil and Waldman, Michael, 1990, The rotten-kid theorem meets the Samaritan's dilemma, *Quarterly Journal of Economics* 105, February, 155-66.
- Cox, Donald, 1987, Motives for private income transfers, *Journal of Political Economy* 95, June, 508-546.

- Cox, Donald, 1990, Intergenerational transfers and liquidity constraints, *Quarterly Journal of Economics* 105, February, 187-217.
- Cox, Donald, and Raines, Fredric, 1985, Interfamily transfers and income redistribution, In *Horizontal equity, uncertainty and measures of economic well-being*, edited by M. David and T. Smeeding (University of Chicago Press, Chicago).
- Cox, Donald, and Jimenez, Emmanuel, 1990, Social objectives through private transfers: A review, *The World Bank Research Observer* 5, July, 205-18.
- Cox, Donald and Rank, Mark, 1992, Inter-vivos transfers and intergenerational exchange, *Review of Economics and Statistics* 74, May, 305-314.
- Cox, Donald, and Stark, Oded, 1994, Intergenerational transfers and the 'demonstration effect', Mimeographed, Boston College.
- Gersovitz, Mark, 1988, Saving and development, in Hollis Chenery and T.N. Srinivasan, *Handbook of development economics*, Vol. 1 (North Holland Press, Amsterdam).
- Hirshleifer, Jack, 1977, Shakespeare versus Becker on altruism: The importance of having the last word, *Journal of Economic Literature* 15, June, 500-02.
- Joulfaian, David and Wilhelm, Mark, 1994, Inheritance and labor supply, *Journal of Human Resources* 29, Fall, 1205-1234.
- Kaufman, Daniel, and Lindauer, David, 1986, A model of income transfers for the urban poor, *Journal of Development Economics* 22, July/August, 337-350.
- Kimball, Miles S, 1987, Making sense of two-sided altruism, *Journal of Monetary Economics* 20, September, 301-26.
- Lucas, Robert. E. B. and Stark, Oded, 1985, Motivations to remit: Evidence from Botswana, *Journal of Political Economy* 93, October, 901-18.
- Maher, Vanessa, 1974, *Women and property in morocco* (Cambridge University Press, New York).
- Manser, Marilyn, and Brown, Murray, 1980, Marriage and household decision-making: A bargaining analysis, *International Economic Review* 21, February, 31-44.
- McElroy, Marjorie B, 1990, The empirical content of Nash-bargained household behavior, *Journal of Human Resources* 25, Fall, 559-83.
- Moore, Sally F, 1978, Old age in a life term social arena: Some observations from the Chagga of Kilimanjaro in 1974, In *Life's career-aging: Cultural variations on growing old*, edited by Barbara Myerhoff and Andrei Simic (Sage Publications, Beverly Hills).

- Nugent, Jeffrey, 1985, The old-age motive for fertility, *Population and Development Review* 11, March, 75-97.
- Platteau, Jean-Phillipe and Abraham, Anita, 1987, An inquiry into quasi-credit contracts: The role of reciprocal credit and interlinked deals in small-scale fishing communities, *Journal of Development Studies* 23, July, 461-90.
- Pollak, Robert A, 1985, A transaction cost approach to families and households, *Journal of Economic Literature* 23, June, 581-608.
- Schultz, T. Paul, 1990, Testing the neoclassical model of family labor supply and fertility, *Journal of Human Resources* 25, Fall, 599-634.
- Shelton, Jean and Sueyoshi, Glenn, 1995, Intra-family transfers and relative household income, Mimeographed, University of Southern California.
- Thomas, Duncan, 1990, Intra-household resource allocation: An inferential approach, *Journal of Human Resources* 25, Fall, 635-664.
- World Bank, 1988, *World development report* (Oxford University Press, New York).

Figure 1 - Simulation Results
Relationship Between Transfers to Child and Child Earnings

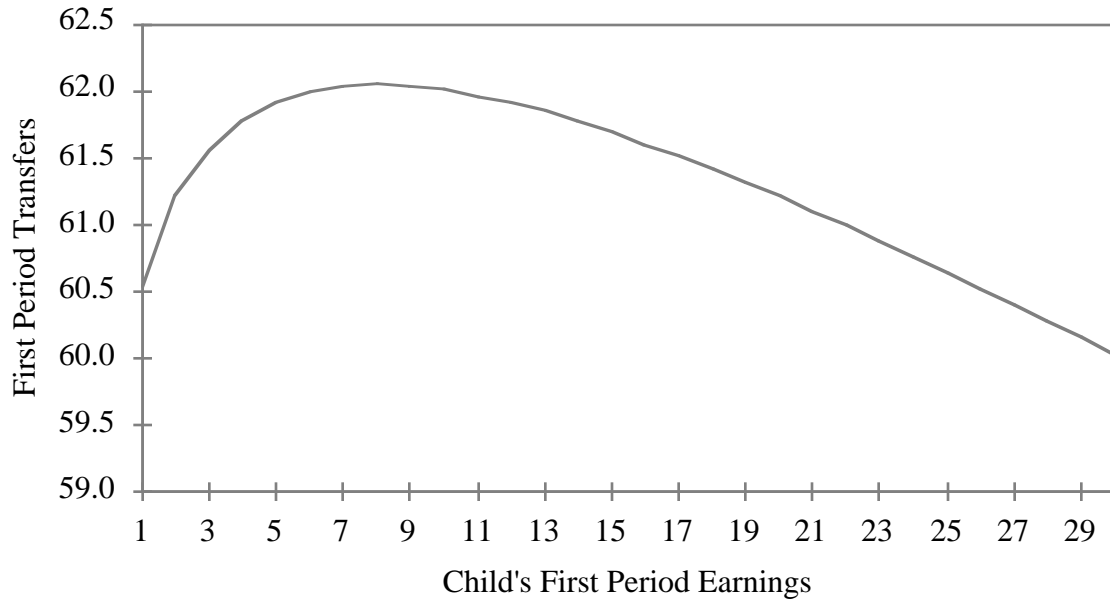


Figure 2 - Simulation Results
Relationship Between Repayments and Parental Earnings

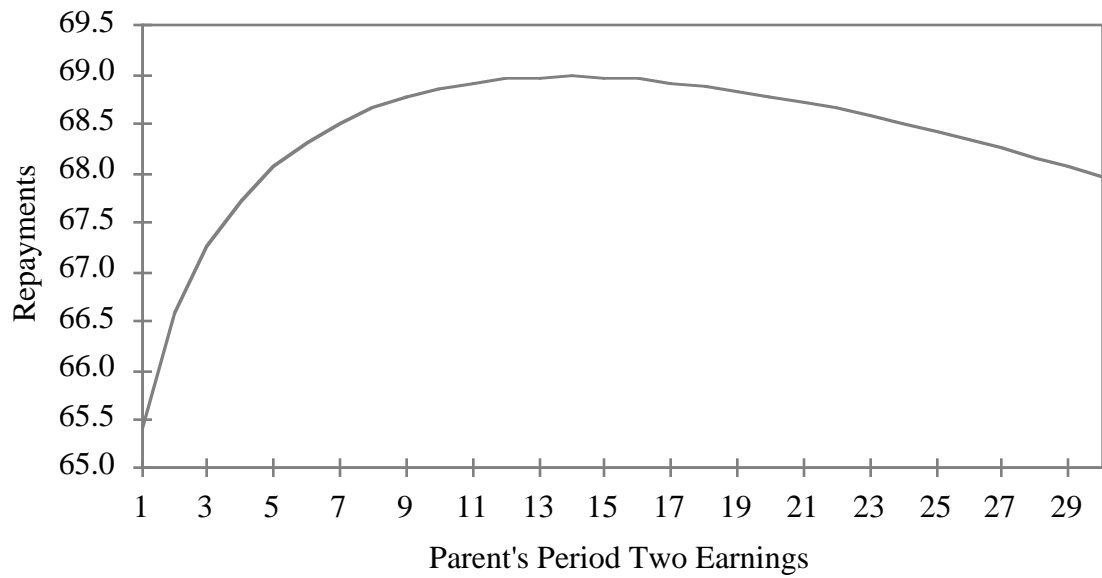


Figure 3
Probability of Transfer Receipt over the Life Cycle

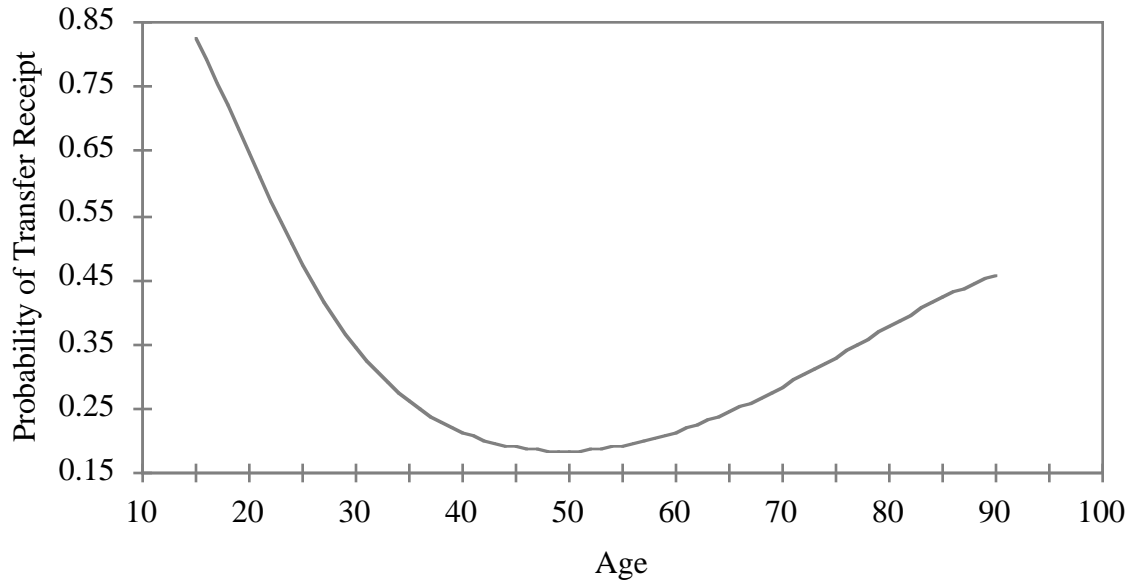


Figure 4
Log-Compensation -- Age Profile

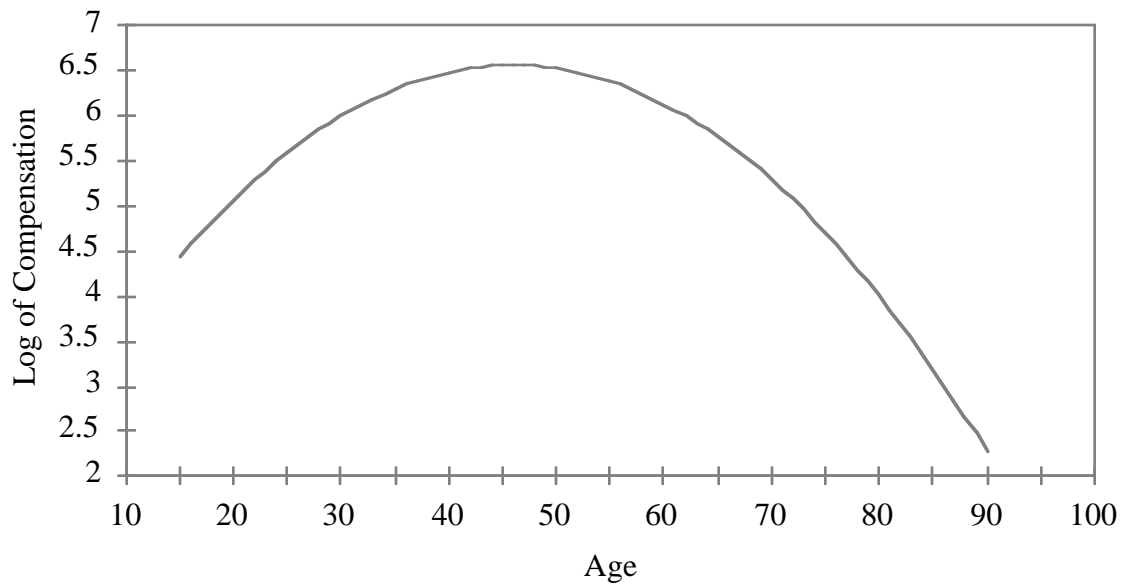


Table 1

Probit and Generalized Tobit Estimates
Transfers Received -- Entire Sample

<u>Variable</u>	<u>(1)</u> <u>Probit</u>			<u>(2)</u> <u>Generalized Tobit</u>		
	<u>Coefficient</u>	<u>Asymptotic</u> <u>t-value</u>	<u>Variable</u> <u>Mean</u>	<u>Coefficient</u>	<u>Asymptotic</u> <u>t-value</u>	<u>Variable</u> <u>Mean</u>
Income						
Income	-.379E-04	-4.09	1917.04	---	---	---
Low Income	---	---	---	0.140	2.75	1122.52
High Income	---	---	---	-0.013	-1.30	250.98
Social Security income	-.774E-03	-4.37	29.90	-0.032	-0.28	22.35
Education						
Primary	0.101	0.74	0.39	38.92	0.40	0.39
Secondary	0.126	0.83	0.31	103.46	0.66	0.33
Secondary-technical	0.026	0.14	0.05	153.68	0.98	0.05
Post-secondary	0.149	0.70	0.04	305.43	1.57	0.04
University	0.073	0.41	0.15	340.13	2.15	0.12
Household Characteristics						
Age	-0.184	-3.42	45.86	1.13	0.46	46.81
Age squared	0.003	2.75	2296.94	---	---	---
Age cubed	-.14E-04	-2.04	1.24E+05	---	---	---
Non-married	-0.146	-1.06	0.06	-36.47	-0.47	0.08
Female	0.508	5.71	0.16	127.62	1.31	0.28
Ill last 4 weeks	0.172	2.79	0.51	-113.47	-1.75	0.59
Unemployed last year	0.406	5.51	0.24	110.66	1.07	0.39
Homeowner	-0.040	-0.61	0.56	42.68	0.58	0.54
Kids out of hh	-0.185	-1.80	0.63	27.96	0.61	0.57
Kids out of hh in schl.	0.187	1.75	0.59	-0.80	-0.02	0.54
Household size	0.018	1.37	5.14	22.92	1.96	4.87
Father's education	0.017	1.50	4.55	15.30	1.26	4.76
Mother's education	0.002	0.16	3.05	4.24	0.44	3.13
Inverse Mill's Ratio	---	---	---	-335.46	-2.96	1.15
Constant	2.179	2.59	---	127.74	0.68	---
Dependent-variable mean		0.256			304	
Recipients		573		Observations	573	
Observations		2,241		R-squared	0.131	
Log-likelihood		-1172.70		Wald-test	73.330	

a. In probit analysis dependent variable is transfer receipt -- transfer receipt=1 if transfer received, 0

otherwise. In Generalized Tobit analysis dependent variable is net transfer amount received.

b. Node of spline = 3,000 intis.

c. Inverse Mill's ratio generated from probit specified in column (1) except that income and age are entered as dummies - income dummies: income < 500, income > 5000; Age dummies: 10 year intervals.

Table 2
 Probit and Generalized Tobit Estimates
 Transfers from Parents to Children -- Transfers Received

<u>Variable</u>	<u>(1)</u> <u>Probit</u>			<u>(2)</u> <u>Generalized Tobit</u>		
	<u>Coefficient</u>	<u>Asymptotic</u> <u>t-value</u>	<u>Variable</u> <u>Mean</u>	<u>Coefficient</u>	<u>Asymptotic</u> <u>t-value</u>	<u>Variable</u> <u>Mean</u>
Income						
Income	-.310E-04	-2.56	1865.04	---	---	---
Low Income	---	---	---	0.162	1.49	1112.47
High Income	---	---	---	-0.026	-1.57	299.75
Education						
Secondary	0.090	0.80	0.33	48.36	0.49	0.43
Secondary-technical	0.028	0.14	0.06	-52.85	-0.35	0.06
Post-secondary	0.113	0.56	0.05	203.83	1.69	0.06
University	0.173	1.15	0.16	304.85	2.30	0.23
Household Characteristics						
Age	-0.040	-7.21	42.93	-9.49	-1.58	33.35
Non-married	0.414	1.90	0.04	168.73	1.12	0.08
Female	-0.071	-0.48	0.17	-157.35	-1.48	0.14
Ill last 4 weeks	0.126	1.37	0.50	5.51	0.06	0.52
Unemployed last year	0.276	2.38	0.22	525.36	2.03	0.28
Homeowner	-0.071	-0.74	0.54	199.25	1.56	0.38
Kids out of hh	-0.151	-0.81	0.59	-165.20	-1.26	0.24
Kids out of hh in schl.	0.117	0.62	0.55	164.69	1.22	0.21
Household size	0.026	1.00	5.23	-26.74	-1.66	4.64
Parent's Income	.149E-03	3.37	1338.00	0.172	1.64	1949.12
Inverse Mill's Ratio	---	---	---	330.09	1.44	1.50
Constant	-0.182	-0.72	---	-624.70	-1.28	---
Dependent-variable mean		0.102			248	
Recipients		191		Observations	191	
Observations		1,875		R-squared	0.201	
Log-likelihood		-523.810		Wald-test	855.90	

- a. In probit analysis dependent variable is transfer receipt -- transfer receipt=1 if transfer received, 0 otherwise. In Generalized Tobit analysis dependent variable is net transfer amount received.
- b. Node of spline = 2,900 intis.
- c. Inverse Mill's ratio generated from probit specified in column (1) except that income and age are entered as dummies - income dummies: income < 500, income > 5000; Age dummies: 10 year intervals.

Table 3
 Probit and Generalized Tobit Estimates
 Transfers from Children to Parents -- Transfers Received

Variable	(1) <u>Probit</u>			(2) <u>Generalized Tobit</u>		
	<u>Coefficient</u>	<u>Asymptotic t-value</u>	<u>Variable Mean</u>	<u>Coefficient</u>	<u>Asymptotic t-value</u>	<u>Variable Mean</u>
Income						
Income	-.332E-04	-1.38	2179.660	---	---	---
Low Income	---	---	---	0.164	1.97	1125.61
High Income	---	---	---	-0.033	-0.98	219.98
Has Soc. Sec. income	-0.552	-3.04	0.12	258.06	1.58	0.13
Social Security income	.156E-03	0.56	45.924	-0.421	-3.18	51.99
Education						
Primary	0.306	1.90	0.48	-117.74	-1.19	0.58
Secondary	0.313	1.68	0.25	266.83	1.36	0.19
Secondary-technical	0.205	0.65	0.04	332.76	1.09	0.02
Post-secondary	-0.254	-0.49	0.03	134.67	0.58	0.01
University	0.097	0.38	0.11	369.67	1.52	0.05
Household Characteristics						
Age	0.048	8.32	53.64	-5.21	-0.78	62.54
Non-married	0.002	0.01	0.07	-108.02	-0.77	0.12
Female	0.526	4.04	0.19	157.26	0.70	0.38
Ill last 4 weeks	0.049	0.46	0.52	-211.43	-1.88	0.63
Unemployed last year	0.386	3.58	0.28	-156.77	-1.47	0.54
Homeowner	0.270	2.36	0.65	-146.04	-1.28	0.76
Kids out of hh	-0.188	-1.10	1.03	18.38	0.18	1.16
Kids out of hh in schl.	0.247	1.49	0.96	-48.56	-0.51	1.13
Have no kids under 30	-0.313	-1.95	0.48	208.78	1.51	0.44
Household size	0.000	-0.02	5.33	42.40	2.36	4.67
Inverse Mill's Ratio	---	---	---	-468.54	-2.41	1.29
Constant	-4.394	-9.71	---	1082.82	1.37	---
Dependent-variable mean		0.131			325	
Recipients		182		Observations	182	
Observations		1387		R-squared	0.257	
Log-likelihood		-429.93		Wald-test	1020.00	

a. In probit analysis dependent variable is transfer receipt -- transfer receipt=1 if transfer received, 0

otherwise. In Generalized Tobit analysis dependent variable is net transfer amount received.

b. Node of spline = 3,700 intis.

c. Inverse Mill's ratio generated from probit specified in column (1) except that income and age are entered as dummies - income dummies: income < 500, income > 5000; Age dummies: 10 year intervals.

Appendix
 Estimates Used in Imputation of Parental Income
 Dependent Variable: Log of Earnings

<u>Variable</u>	<u>(1)</u> Male			<u>(2)</u> Female		
	<u>Coefficient</u>	<u>t-value</u>	<u>Variable Mean</u>	<u>Coefficient</u>	<u>t-value</u>	<u>Variable Mean</u>
Constant	5.741	17.90	--	7.250	8.02	--
Years of schooling	0.071	9.55	8.73	0.048	4.16	7.63
Age	0.119	8.80	41.63	0.032	0.94	38.72
Age squared	-0.001	-7.93	1859.52	-.178E-03	-0.43	1589.15
Occupation						
Government	0.596	3.32	0.16	0.708	5.57	0.17
Clerical	0.550	3.19	0.11	0.972	7.44	0.08
Sales	0.515	2.95	0.17	0.496	4.65	0.36
Services	0.513	2.91	0.08	0.194	1.49	0.11
Agriculture	0.097	0.49	0.05	-0.346	-2.37	0.05
Transportation	0.430	2.58	0.39	-0.018	-0.14	0.12
Inverse Mill's Ratio	--	--	--	-0.368	-1.34	0.89
Observations		1479			680	
Dependent Variable Mean		9.46			8.63	
R-squared		0.18			0.27	

a. Earnings function estimated for sample of men earning at least 750 intis in survey year (62.5 intis monthly).

Earnings function estimated by generalized Tobit for sample of women earning at least 750 intis in survey year.

b. Reference category for occupation: occupation missing.

c. Selectivity variable constructed for probit for earnings of more than 750 intis annually.

Explanatory variables: age and schooling dummies.

