Lecture Notes 9: Intergenerational Transfers

(reference: Altonji, Hayashi, & Kotlikoff, 'Parental Altruism and Inter Vivos Transfers: Theory and Evidence,' JPE 1997.)

The central question: Are transfers among family members motivated by altruism or self-interest?

Why do we care?

Public economics answer Altruistic transfers among family members (a) may be crowded out by government transfers/aid & (b) may therefore mitigate the effectiveness of government transfers/aid.

Macroeconomics answer Ricardian equivalence, i.e. the neutrality of government policy, only holds where members of a dynasty are perfectly altruistic.

AHK add: We know that families share risk, redistribute income, & extend credit to their members. Their motives are very important to how successfully they are able to perform each of these functions.

Previous work

AHK92 tests the joint hypotheses that (a) "family economic links" (transfers) are motivated by altruism
& (b) all families have operative altruistic linkages (i.e. someone is giving, someone receiving transfers in all families)

Under very general conditions (a) & (b) imply income pooling in the family. AHK92 reject pooling among extended family members in PSID data.

AHK97 now looks at only families with operative intergenerational linkages—where transfers are occurring.

A Two Period Model of Altruistic Inter Vivos Transfers

This model is carefully designed to be as simple & as general as possible, while still solving the transfer timing problem.

The transfer timing problem

In a model of a parent and child interacting repeatedly with repeated transfer opportunities, suppose
I. Credit markets are complete
II. Children's future resources are known
III. Parents & children interact cooperatively

Then it doesn't matter when transfers occur. A parent with relatively high lifetime income or who is relatively altruistic and therefore wants to transfer to her child can do so when the child is a young adult or via a bequest; the two are equivalent.

This is a problem for any efforts to test implications of transfers models. It's hard to collect a lifetime profile of parent-child transfers in survey data.

AHK will relax all 3 assumptions above.

Relaxing II & timing:
Relaxing the second assumption by adding uncertainty in children's resources leads parents to want to give *later*.

[This requires the additional assumption that, while parents are altruistic toward their children, children are completely self-interested.]

If the self-interested child realizes high earnings in the second period then the parent will not want to transfer to him. In fact, the parent will wish she had not transferred in the first period and will want a return transfer in the second period contingent o nthe high income realization. The self-interested child will not make a return transfer.

However, if the child realizes low earnings then the parent will want to compensate the child with a larger second period transfer.

Thus we see that uncertain child earnings creates pressure to transfer late, after the uncertainty is resolved.

<u>Relaxing I & timing:</u>
If we relax the assumption that credit markets are complete for the child, then it is possible that the child will be unable to meet his efficient intertemporal consumption profile without a transfer from the parent.

So liquidity constraints create pressure to give early, to support the child's first period consumption.

Together, uncertainty and liquidity constraints lead the parent to balance the desire to give late after uncertainty is resolved & the desire to give early to a poor, liquidity-constrained child. This creates (the possibility of) nice, interior solutions for *both* early and late transfers.

The Model

The child's objective is

$$V_{k1} = u(c_{k1}) + E_1[u(c_{k2})]$$

The parent's objective is

$$V_{p1} = u(c_{p1}) + \eta u(c_{k1}) + E_1[u(c_{p2}) + \eta u(c_{k2})], \tag{1.1}$$

where η is the altruism parameter.

Period 2

Y is income, *A* is assets, & *R* is transfer amount.

(WLOG) Assume $Y_{p2} = 0$, so there's no relevant credit for *p*;
Return on savings = discount = 1.

Parent's period 2 problem:

$$\begin{aligned} &\max_{R_2} u(A_{p2} - R_2) + \eta u(A_{k2} + Y_{k2} + R_2) \\ &s.t.\ R_2 \geq 0,\ A_{p2} - R_2 \geq 0,\ A_{k2} + Y_{k2} + R_2 \geq 0, \end{aligned} \tag{1.2}$$

where $u'(0) > 0,\ u''(0) < 0,\ u'(0) = \infty.$

Note that the child's only choice is consumption, he takes R_2 as given, so $c_{k2} = A_{k2} + Y_{k2} + R_2$.

Define $\overline{Y}_{k2}$ such that

$$u'(A_{p2}) = \eta u'(A_{k2} + \overline{Y}_{k2}). \tag{1.3}$$

Then $R_2 > 0$ for $Y_{k2} < \overline{Y}_{k2}$, 0 otherwise.

(1.3) implicitly defines $\overline{Y}_{k2}$ in A_{p2} & A_{k2}. Denote this function

$$\overline{Y}_{k2} = z(A_{p2}, A_{k2}). \tag{1.4}$$

Then the parent's per 2 utility is

$$\begin{aligned} &M(A_{p2} + A_{k2} + Y_{k2}) \text{ for } Y_{k2} \le z(A_{p2}, A_{k2}), \\ &N(A_{p2}, A_{k2} + Y_{k2}) \text{ for } Y_{k2} > z(A_{p2}, A_{k2}). \end{aligned} \tag{1.5}$$

Note that M=N at $Y_{k2} = \overline{Y}_{k2}$.

<u>Period 1</u>

The child's credit limitations:

$$A_{k2} = \rho(A_{k1} + Y_{k1} - c_{k1} + R_1), \tag{1.6}$$

where $\rho(x) = x$ above critical x^*. Below x^*, the rate of return (or interest if the value is < 0) is st $\rho'(x) > 1,\ \rho''(x) < 0.$

[graph this function on board, discuss]

The parent's assets:

$$A_{p2} = A_{p1} + Y_{p1} - c_{p1} - R_1. \tag{1.7}$$

Parent's period 1 problem:

$$\max_{c_{p1}, R_1} u(c_{p1}) + \eta u(c_{k1}(A_{k1} + Y_{k1} + R_1, A_{p2})) + V(A_{p2}, A_{k2} \mid I_1), \tag{1.8}$$

where $R_1 \le 0$,

$$V(A_{p2}, A_{k2} \mid I_1) = \int_0^{z(A_{p2}A_{k2})} M(A_{p2} + A_{k2} + Y_{k2}) f(Y_{k2} \mid I_1) dY_{k2}$$
$$+ \int_{z(A_{p2}A_{k2})}^{\infty} N(A_{p2}, A_{k2} + Y_{k2}) f(Y_{k2} \mid I_1) dY_{k2} \quad (1.9)$$

and

$$c_{k1}(A_{k1} + Y_{k1} + R_1, A_{p2}) = \arg\max_{c_{k1}} u(c_{k1})$$
$$+ \int_0^{z(A_{p2}A_{k2})} u(A_{k2} + Y_{k2} + R_2(A_{p2}, A_{k2} + Y_{k2})) f(Y_{k2} \mid I_1) dY_{k2} \quad (1.10)$$
$$+ \int_{z(A_{p2}A_{k2})}^{\infty} u(A_{k2} + Y_{k2}) f(Y_{k2} \mid I_1) dY_{k2}$$

s.t. (1.7) & (1.6).

The Transfer Income Derivative

An elaborate proof in the paper demonstrates that, in the solution to (1.8) & (1.9),

$$\frac{\partial R_1}{\partial Y_{p1}} - \frac{\partial R_1}{\partial Y_{k1}} = 1. \quad (1.11)$$

whenever $R_1 > 0$.

We'll skip the proof (to read see appendix), but here's the intuition:

Values Y_{p1}, Y_{k1}, & R_1 always enter (1.6), (1.7), (1.8), & (1.10) in combinations $Y_{p1} - R_1$ & $Y_{k1} + R_1$.

Therefore when the parent chooses interior $R_1 > 0$, she's really choosing first period family resource allocation

$$(Y_{p1} - R_1), (Y_{k1} + R_1).$$

Given this, it becomes clear how robust the "Transfer Income Derivative" implication of altruistic models of transfers is.

It is the Transfer Income Derivative restriction that AHK test in the data.

We'll discuss when it might not hold once we've looked at the data.

Data & Estimation

AHK seek to estimate

$$\frac{\partial R(Z,\eta)}{\partial Y_{pt}} - \frac{\partial R(Z,\eta)}{\partial Y_{kt}} = 1, \qquad (1.12)$$

where $Z = \{Y_{pt}, Y_{kt}, X\}$.

There are two major estimation issues to account for:

(1) η is unobserved, so we can't evaluate (1.12) for any particular family.

(2) (1.12) only holds when $R > 0$.

Solution to (1):
Estimate in $R > 0$ sample only.

Problem: (1) implies that standard solutions to sample selection like the Tobit or Heckman 2 step cannot be applied. $R(Z,\eta)$ is not separable in Y_{pt}, Y_{kt}, & X.

Solution: The authors generalize the maximum likelihood expression for a Tobit for a model that is nonseparable in Z and η and has nonnormal errors.

This generalization is actually an application of Altonji & Ichimura (1996) [referenced as a working paper at the time & which I have never been able to find. Let me know if you see it!].

Empirical formulation

AHK need estimates of the conditional expectation of *R* given *Z* and the probability of $R > 0$ given *Z*.

Define these as

$$\overline{R}(Z) \ \ \& \ \ P_R(Z),$$

respectively.

AHK estimate

$$\overline{R}(Z;\theta_1) + u \tag{1.13}$$

by OLS.

They also estimate

$$P_R(Z) = \Phi(h(Z;\theta_2)) \tag{1.14}$$

as a probit, where $h(Z;\theta_2)$ is a flexible polynomial in *Z* and the probit parameters.

Given the above, they estimate

$$\begin{aligned} &E[\partial R(Z,\eta)/\partial Y_{pt} \mid Z, R>0; \hat{\theta}_1, \hat{\theta}_2], \\ &E[\partial R(Z,\eta)/\partial Y_{kt} \mid Z, R>0; \hat{\theta}_1, \hat{\theta}_2], \end{aligned} \tag{1.15}$$

& their difference, or, for simplicity,

$$E\partial R/\partial Y_{pt}$$
$$E\partial R/\partial Y_{kt} \;\&\qquad (1.16)$$
$$\Delta E\partial R/\partial Y_{jt}.$$

Measurement error & endogenity of income

The authors note that endogeneity of child income through prior educational investments and measurement error in income create a variety of biases. One way they attempt to deal with this is by estimating off of income changes.

Panel Study of Income Dynamics

AHK use PSID data from 1968-1989, with particular focus on a 1988 supplement in which families were asked about transfers made among their members.

These data are exceptionally good for the purpose because they contain particularly credible data on both parent & child income, which is unusual.

Details on extraction & imputation of wealth data, the background on the transfers measure, and other data questions are important in this paper. We'll run out of itme on these, however, so I refer you to the paper.

Table 1 gives sample means. Go to T1 to consider contents of Z etc.

Next consider Tables 2-3, which give descriptive details on the probability and amount of parent-child transfers by families' income levels.

Table 5 gives probit estimates of the effects of income and wealth on the probability of a transfer.

Accounting for permanent income: Because of concerns like measurement error in income and the possible endogeneity of child income, AHK estimate *R* based on parents' and children's permanent incomes. The two approaches they use to do this are time-averaged income as permanent income & an autoregressive measure of permanent income.

Table 6 gives the final estimates of the transfer derivatives based on *current* income & the estimation approach described above. Consider the estimated values in table 6 column 5 relative to 1.

Table 7 gives the final estimates of the transfer derivatives based on *permanent* income & the estimation approach described above. Consider the estimated values in table 7 column 5 relative to 1.

The rest of the paper executes careful sensitivity analysis.

As you'll see in the abstract, the take-away point the authors intend from table 6, and from the exercise as a whole, is that the estimated transfer derivative difference is not $1 but rather (based on T6) about $0.13.

Thus the interior transfers from parents to children that we observe in the PSID do not support the very robust prediction of altruistic transfer models that if you take $1 from a self-interested child and give it to an altruistic parent who is making interior transfers, the altruistic parent will give the $1 back.

When might the transfer income restriction not hold?

I. AHK themselves put much effort in this model into arguing that transfer timing is pinned down.

   This is because if it isn't (families cooperate, no liquidity constraints) then observing one parent-child transfer isn't enough. We'd need to see all of them to do this test.

II. McGarry (2000? working paper): If the child's current income is informative regarding his future income, and if we extend the model a period, then we see that a current negative income shock will increase current transfers since transfers are compensatory, but decrease them because the family's total expected lifetime resources have decreased. This moves the transfer derivative difference away from 1 and toward 0.13. But how far?

III. Villanueva (2005? working paper): Parents may recognize the incentive effects of compensatory future transfers on children's current work decisions and set up incentive schemes that encourage work instead.

IV. Others have worried about the endogeneity of η to Y_k. If more altruistic parents of adult children not only transfer more now but invested more in their children's education etc. earlier, then we might expect to see higher transfers going to higher income children in cross-sectional, cross-family data as in the PSID here, all else equal. The Wisconsin folks have been discussing the extent to which the income shocks version of the estimation in this paper solves the problem—AHK believe it does.