Is the Extended Family Altruistically Linked? Direct Tests Using Micro Data

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This paper uses Panel Study of Income Dynamics data on parents and their adult children to test the standard altruism model. This model predicts that, within the extended family, the distribution of consumption is independent of the distribution of resources. Our findings strongly reject this prediction. (*JEL* E21)

What is the basic economic decision-making unit? Is it the household or the extended family? For questions of public policy, knowing the size and scope of economic decision-making units is of great importance. As Robert Barro (1974) and Gary Becker (1974, 1981) stressed, nondistortionary government redistribution among members of an altruistically linked economic unit will not alter the collective budget constraint and, therefore, will not alter any of the unit's economic choices. If large altruistically linked economic units exist, this line of argument implies that private behavior will neutralize most, if not all, of the government's intergenerational and intragenerational redistribution.

In this paper we use extended-family data from the Panel Study of Income Dynamics (PSID) to test directly the assumption of operative altruistic linkages between parents and children against the alternative of zero linkage.[1] On an ongoing basis, the PSID surveys child "split-offs." These are children of the original 1968 respondents who subsequently became heads or spouses in their own households. By combining data on food consumption, income, assets, transfers, and household characteristics for these split-off adult children with the same data for their parents (the original survey respondents who have also been continually reinterviewed), one can use the PSID to form a unique and rich data set covering at least a portion of the extended family.[2]

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[1] One might think that directly studying transfers (see Donald Cox [1987] for a survey of the literature) would be a more appropriate way to test altruism than studying consumption. However, in the absence of liquidity constraints (see Becker, 1974; Allan Drazen, 1978; David Altig and Steven Davis, 1989) or strategic considerations (see Assar Lindbeck and Jörgen Weibull, 1988; Neil Bruce and Michael Waldman, 1989, 1991), the timing of transfers is arbitrary in altruistic models. Secondly, transfers are difficult to measure since they may be in kind or in forms whose prices are not available (e.g., partnership shares). Third, transfers may arise for nonaltruistic reasons, and the mere occurrence of transfers is not, in itself, evidence of altruism.

[2] Other studies that have used the PSID child split-offs include Altonji (1988), Jere Behrman et al. (1989), Gary Solon et al. (1987), and Solon (1992). While food expenditures comprise the only consumption data in the PSID (other than expenditures on utilities and

The intuition behind our tests is quite simple. If parents and children are altruistically linked, their consumption will be based on a collective budget constraint, and the distribution of consumption between parents and children will be independent of the distribution of their incomes. In contrast to the altruism model, the nonaltruistic pure life-cycle model predicts that the distribution of incomes is a critical determinant of the distribution of consumption between parent and children.

While this simple idea underlies our tests, the actual form of our tests involves specifications of food demand functions. Under both the altruism and life-cycle models, one can express the consumption and leisure choices of parents (children) as functions of the parents' (children's) marginal utility of income and of prices.[3] An implication of the altruism model's single-collective-budget constraint is that parents and children have the same marginal utility of income. In contrast, under the life-cycle model, parents and children maximize their own preferences subject to their own budget constraints and have different marginal utilities of income.

The marginal utility of income is captured by a fixed effect in our food demand regressions. Given that we control for this fixed effect, according to the altruism model, the exogenous incomes and asset positions of parents (children) should not enter into our estimated demand functions for the parents' (children's) food consumption. Under the life-cycle hypothesis, in contrast, knowing the parent's fixed effect will not control perfectly for the child's fixed effect, and vice versa; hence, the exogenous incomes and asset positions of parents and children should enter into our estimated demand functions.

After estimating demands at a point in time, we combine the data over time and estimate the first differences of the demand functions. We find strong evidence against the altruism model both in the levels and first-differenced estimates of the food demand functions.[4] At a point in time, the distribution of consumption between parents and children is highly dependent on the distribution of their incomes; and over time, the distribution of consumption changes between parents and children is highly dependent on the distribution of their income changes. As we discuss below, the first-difference results rule out the possibility that the correlation we find in the levels reflects a correlation between parental preferences for particular children and the permanent incomes of those children.

In addition to showing that the distribution of extended-family resources matters for extended-family consumption, we test the life-cycle model by asking whether only own resources matter (i.e., whether the resources of extended-family members have no effect on a household's consumption). Our results indicate that extended-family member resources have at most a modest effect on household consumption after one has controlled for the fact that extended-family resources help predict a household's own permanent income.

The paper proceeds in Section I by developing our empirical tests of altruism. Section II describes the linked PSID data. Sections III and IV contain, respectively, our findings from static and dynamic tests of altruism. Section V presents results of tests that take the life-cycle model, rather than the altruism model, as the null hypothesis. Section VI summarizes and concludes the paper.

information on housing and automobiles, for which rental services would need to be imputed), food is a nondurable and is a major component of nondurable consumption expenditure. Food expenditures should respond to altruistic transfers unless those transfers are in kind and the amount of such in-kind transfers exceeds what the household would voluntarily purchase if the transfer had instead been made in cash.

[3]These are Frisch demand functions.

[4]Our first-difference results accord with those in the revised version of Andrew Abel and Kotlikoff (1988) and John Cochrane (1991). Other studies in this literature are Mark R. Rosenzweig (1988), Robert M. Townsend (1989), and Barbara Mace (1991).

I. Testable Implications of the Altruism Model

A. *A Static Illustration*

To see in the simplest possible terms the force of altruism, consider the case of a parent who is altruistic toward a child, but the child is not altruistic toward the parent. Suppose the parent's utility function is given by $U_p = \theta_p U(C_p) + \theta_k U(C_k)$, where C_p stands for the parent's consumption, C_k stands for the child's consumption, and θ_p and θ_k are the respective weights the parent attaches to his own utility from consumption, $U(C_p)$, and to the child's utility, $U(C_k)$. The child's consumption, C_k, will equal the child's resources, R_k, plus T, the transfer made to the child (i.e., $C_k = R_k + T$). The parent's consumption will equal the parent's resources less the transfers to the child (i.e., $C_p = R_p - T$). These two constraints imply the combined budget constraint: $C_k + C_p = R_k + R_p$.

Suppose that the child takes the parent's transfer as given. Then the parent's choice of his own consumption and transfer (assuming it is positive) leads the parent to set $\theta_p U'(C_p) = \theta_k U'(C_k) = \lambda$, where λ is the marginal utility of income. This first-order condition and the collective-budget constraint can be used to solve for C_p and C_k. Hence, as first shown by Becker (1974) and Barro (1974), the parent and child act as if they are maximizing the parent's utility function subject to the combined-budget constraint. This type of outcome is generic in one-sided, two-sided, or, indeed, many-sided altruistic models assuming that recipients of transfers take such transfers as given [i.e., the game between the donor and recipient is noncooperative Nash and there are positive (operative) transfers].[5]

Next assume that the utility function is of the isoelastic form, $U(C) = C^{1-\gamma}/(1-\gamma)$. From the first-order conditions, we have $\log C_p = -(1/\gamma)\log \lambda + (1/\gamma)\log \theta_p$ and $\log C_k = -(1/\gamma)\log \lambda + (1/\gamma)\log \theta_k$. Obviously, C_p will exceed C_k if θ_p is greater than θ_k. If the true values of C_p and C_k differ from the measured values, C_p^m and C_k^m, by multiplicative errors, whose logarithms we denote u_p and u_k, respectively, we have the following statistical representation of the demand system:

$$(1)\quad \log(C_{ip}^m) = -\left(\frac{1}{\gamma_i}\right)\log \lambda_i + \left(\frac{1}{\gamma_i}\right)\log \theta_{ip} + u_{ip}$$

$$(2)\quad \log(C_{ik}^m) = -\left(\frac{1}{\gamma_i}\right)\log \lambda_i + \left(\frac{1}{\gamma_i}\right)\log \theta_{ik} + u_{ik}.$$

In equations (1) and (2) the subscript i refers to parent-child pair i. With data on a sample of parent-child pairs one can estimate (1) and (2) jointly treating the terms $\log \lambda_i$ for each parent-child pair as a fixed effect.[6] Since controlling for the fixed effect fully controls for the combined resources of the parent and child, one can test the model by asking whether the parent's resources, R_{pi}, enter into the parent's consumption equation and whether the child's resources, R_{ki}, enter into the child's consumption equation.[7] The altruism model predicts zero coefficients on own resources, controlling for combined resources. In contrast, the life-cycle and Keynesian models predict that own resources are significant determinants

[5] See Kotlikoff et al. (1990) for a model in which transfers are not taken as given.

[6] See James Heckman and Thomas MaCurdy (1980) and MaCurdy (1981) for an early use of fixed-effects methods in estimating Frisch demand functions from panel data on individuals.

[7] The fixed-effect estimation in this case of only one child and one parent is equivalent to taking the difference between the logarithm of C_{pi} and the logarithm of C_{ki} as the dependent variable. Clearly, the fixed effect drops out of this regression, and the log difference of the parent's and child's consumption should depend only on the weights θ_p and θ_k and not on the difference between the parent's and child's incomes.

of own consumption. As we show below, this basic test procedure carries over to more realistic dynamic models with multiple consumption goods, uncertainty, and endogeneous labor supply.

B. *Two-Sided Altruism*

Before turning to those issues we need to remark on how the results of the proposed test should be interpreted if altruism is two-sided. By two-sided altruism we mean that the child cares about the parent's utility and vice versa. It is easy to show that with two-sided altruism there will be different transfer regimes (three in the case of a single parent and a single child) determined by the division of resources between the parent and child. As the share of joint resources owned by the parent increases from zero to unity, the regime shifts from one in which the child transfers to the parent to one in which there are no transfers and then to one in which the parent transfers to the child. Changes in the resource distribution between the parent and child that are large enough to shift the transfer regime will be associated with changes in the ratio of the parent's consumption to the child's consumption.

Hence, one response to a finding of a significant own-resource coefficient in the fixed-effect test discussed above is that extended families are indeed altruistic but that the test is simply capturing the fact that transfer regimes change as the distribution of resources changes between parent and child. While this may be true, its implication with respect to Barro's neutrality proposition, at least for large government redistributions between parents and children, is the same as if there is no altruism, namely, that such government redistribution is not neutral. One way to test whether the Barro proposition holds for small government redistributions—those that are not likely to alter the transfer regime—is to focus on the subset of parent-child pairs in which the parent's resource share is much larger than that of the child. For this subset of observations one would expect no correlation between consumption and resource shares. While we do not know precisely the resource shares of our parent-child pairs, we can conduct this more refined test of altruism by running our fixed-effects test for parent-child pairs in which the parent has high income and the child has low income.

C. *A Dynamic Formulation*

Given that within a transfer regime the standard altruism model can be summarized by the maximization of a single objective function subject to a single collective budget constraint, we proceed by referring to the extended family as the dynasty and by expressing the general problem of the dynasty as

$$\max E_t\left\{\sum_{s=t}^{\infty} b^s U(Z_s, \mathbf{p}_s; \mathbf{x}_s)\right\} \tag{3}$$

subject to

$$A_{t+1} = (1+r_t)A_t + Y_t - Z_t$$

where

$$Y_t = \sum_{k=1}^{m_t} Y_{kt}$$

and where

E_t = expectation operator,
m_t = number of households in the dynasty at time t,
Y_{kt} = labor earnings of the kth household of the dynasty at time t,
Z_t = total nominal consumption expenditure by the dynasty at t,
A_t = the dynasty's wealth at time t,
r_t = nominal interest rate at time t,
$\mathbf{x}_{kt}$ = vector of demographics for the kth household at time t,
$\mathbf{x}_t$ = vector consisting of $\mathbf{x}_{kt}$ $(k = 1, \ldots, m_t)$,
$\mathbf{p}_t$ = vector of commodity prices, and
b = discount factor.

In (3) we assume that labor supply is exogenous. The dynasty's indirect intertemporal utility function $U(Z_t, \mathbf{p}_t; \mathbf{x}_t)$ is defined as the

maximized value of the following static optimization problem:

$$(4) \qquad \max_{\{\mathbf{C}_{kt}\}} \sum_{k=0}^{m_t} u(\mathbf{C}_{kt};\mathbf{x}_{kt})$$

subject to

$$\mathbf{p}_t' \sum_{k=0}^{m_t} \mathbf{C}_{kt} \leq Z_t$$

where $u(\mathbf{C}_{kt};\mathbf{x}_{kt})$ is the dynasty's time-t utility from the vector of consumption of household k, $\mathbf{C}_{kt}$, with demographic characteristics $\mathbf{x}_{kt}$. The term $\mathbf{p}_t$ stands for the time-t price vector.

The key prediction of this more general model—namely, that resources are shared by altruistically linked individuals within the dynasty and, therefore, by households within the dynasty—can be formalized as follows. Let λ_t be the scalar shadow price for the budget constraint in (3). Then the first-order conditions from the maximization in (4) imply the demand functions:

$$(5) \qquad \mathbf{C}_{kt} = f(\lambda_t, \mathbf{p}_t; \mathbf{x}_{kt}) \qquad k = 0,1,\ldots,m_t.$$

As suggested above, the important point here is that the scalar shadow price λ_t, which is a "sufficient statistic" for dynasty resources at time t, is common across dynasty members, while in the life-cycle hypothesis it depends on the household identifier k. For a wide range of utility functions the shadow price λ_t can be treated as a component of a fixed effect. In the case of exogenous labor supply, since the price vector $\mathbf{p}_t$ is also common across dynasty members, the fixed effect can also depend on prices. Since the only consumption component available in our data is food consumption, we now focus on the food component of (5) and require that the demand function for food be of the form:

$$(6) \qquad f_{kt} = h(\mathbf{x}_{kt}, \mathbf{p}_t) + \alpha(\mathbf{p}_t, \lambda_t)$$

where f_{kt} is either the level or the logarithm of food consumption. Since the $\alpha(\cdot,\cdot)$ function does not depend on k, we treat it as a fixed effect. As described in Altonji et al. (1989), a large class of utility functions satisfy the demand specification given in (6). The class includes the familiar constant-elasticity-of-substitution (CES) functions and constant-absolute-risk-aversion functions.[8]

D. *Testing the Dynasty Model*

With (6) as our starting point, our statistical representation is given by

$$(7) \qquad f_{kt} = \boldsymbol{\beta}_t' \mathbf{x}_{kt} + \alpha_t + u_{kt} \qquad k = 0,1,\ldots,m_t$$

where α_t is the fixed effect. The error term u_{kt} accommodates measurement error for food consumption and unobserved household characteristics that are unrelated to $\mathbf{x}_{kt}$ and α_t.

To implement tests of the dynasty model, we have to resolve a few problems. First, we do not observe all the dynasty member households. Let $\{0,1,2,\ldots,n\}$ stand for the set of dynasty members we can observe in the PSID, with $k=0$ being the parent household and $k=1,2,\ldots,n$ representing split-offs. The second problem is that this n varies across dynasties and over time. Third, we do not have a specific model of how the marginal utility of dynasty income, λ_t, is related to observable variables.

To see how these problems can be resolved, we suppress the time subscript in (7), but add the dynasty index i to obtain

$$(7') \qquad f_{ik} = \boldsymbol{\beta}' \mathbf{x}_{ik} + \alpha_i + u_{ik} \qquad k = 0,1,\ldots,n_i \quad i = 1,2,\ldots,N$$

where N is the number of dynasties with at least one split-off in the sample and n_i is

[8]As described in note 8 of our working paper (Altonji et al., 1989) a CES function leading to (6) can be viewed as an indirect utility function that incorporates optimal within-household allocation of the total household consumption of each good.

the number of split-offs of dynasty i. This is exactly the fixed-effect model for panel data. Because the fixed effect controls for household preferences/characteristics and measurement errors that are common across all members of the dynasty, the error term u_{ik} consists of household deviations in preferences and measurement error from the dynasty mean.

We can nest this model with the life-cycle alternative by augmenting (7') to include an earnings term:

$$(8) \qquad f_{ik} = \boldsymbol{\beta}'\mathbf{x}_{ik} + \psi Y_{ik} + \alpha_i + u_{ik}$$
$$k = 0, 1, \ldots, n_i \quad i = 1, 2, \ldots, N$$

where Y_{ik} stands for earnings of member-household k of dynasty i. This additional variable Y need not be restricted to earnings. Under the life-cycle hypothesis, variables like nonlabor income, assets, and the history of earnings should matter even when the fixed effect is controlled for. As discussed below, if we allow for variable labor supply, then nonlabor income, assets, possibly current wage rates, and lagged wage rates can be used to test the altruism model.

We now make the basic identifying assumption that the error term u (which consists of consumption measurement error and unobservable household characteristics unrelated to the observable characteristics $\mathbf{x}$) is uncorrelated with earnings (or our other controls for household k's resources). According to the dynasty model the fixed effect α_i (which is time-specific) should be correlated with earnings Y_{ik} (or our other controls for household k's resources), but the earnings coefficient ψ is, nonetheless, identified to be zero under the null hypothesis of the dynasty model. This is because the fixed effect is removed in the estimation. Note that if some (or all) of the dynasties in the sample are linked, the fixed effect α_i will be numerically the same for each of these dynasties. Hence, our fixed-effect test is robust to altruistic linkages across dynasties.

In contrast to the dynasty model, which predicts a value of ψ equal to zero, under the life-cycle and Keynesian alternatives, ψ should be positive. The reason is that under these alternatives to the dynasty model consumption depends not on the collective resources of one's extended family, but rather simply on one's own resources. Hence, under the alternative models controlling for extended-family resources by controlling for the marginal utility of income of the extended family will not control for the resources used in making consumption decisions. Indeed, under the life-cycle or Keynesian alternatives the fixed effect α_i has the interpretation of common environmental and genetic components of the unobservable characteristics common to the family, rather than the interpretation of a transform of the extended family's marginal utility of income.

E. *Does Variable Labor Supply Alter the Test Procedure?*

If labor supply is variable, the price vector $\mathbf{p}_t$ in (6) includes the wage rates of different household members, which could differ across member households within the dynasty as well as across members within particular dynasty households. Thus, the $\alpha(\cdot, \cdot)$ function in (6) cannot, in general, be treated as a fixed effect, and we have to restrict preferences further to ensure that the $\alpha(\cdot, \cdot)$ function is independent of wage rates, which may differ across households. One can show (see Richard Blundell, 1986) that for the demands to take this form the utility function must be either homogeneous or additively separable as in (7').

For the case in which f_{kt} stands for the level of food expenditure, Martin Browning et al. (1985) provide a complete characterization of preferences in which demand functions can be written as the sum of an $\alpha(\cdot, \cdot)$ function that does not depend on wage rates plus an $h(\cdot, \cdot)$ function that may include wage rates. Constant absolute risk aversion, expanded to include leisure, is one example of such a preference structure. For this particular preference structure cross-price effects do not arise in the demands; hence the demand function is of the form given by (6), but $h(\cdot, \cdot)$ depends only on demographics and the price of food (and

not wage rates), and $\alpha(\cdot,\cdot)$ depends only on λ_t. For other preferences described by Browning et al. the $h(\cdot,\cdot)$ function, but not $\alpha(\cdot,\cdot)$, may depend on wage rates. For this latter set of preferences in which $h(\cdot,\cdot)$ may include wage rates, the significance of own wage rates in the food demand does not constitute evidence against altruism. However, for these preferences, one can test altruism by including own nonlabor income and own assets in addition to wage rates.

Since nonlabor income and assets may reflect idiosyncratic tastes that are not fully captured by our demographic controls and, therefore, enter the error term u_{ik} in (8), we also estimate specifications that include both current and lagged wage rates. If preferences are time-separable, past wage rates will not enter $h(\cdot,\cdot)$, and they will affect consumption only through the marginal utility of income. Consequently, we can test the altruism model by determining whether the lagged wage rate is significantly greater than zero.

F. *Dynamic Tests*

A dynamic version of the static fixed-effect equation is derived from the time-differencing of equation (8), which yields

$$(9)\qquad \Delta f_{ikt} = \boldsymbol{\beta}'\Delta \mathbf{x}_{ikt} + \theta \Delta Y_{ikt} + \Delta\alpha_{it} + \Delta u_{ikt}$$

where $\Delta f_{ikt} = f_{ikt} - f_{ikt-1}$ in the case of one-year differences and $\Delta f_{ikt} = f_{ikt} - f_{ikt-2}$ in the case of two-year differences. The term $\Delta\alpha_{it}$ equals the corresponding difference over time in dynasty i's logarithm of its marginal utility of income (i.e., it equals $\alpha_{it} - \alpha_{it-1}$ in the case of first differences and $\alpha_{it} - \alpha_{it-2}$ in the case of second differences).[9] Since $\Delta\alpha_{it}$ does not depend on the household identifier k, it is the same across all dynasty households (although its value differs in the case of one-year and two-year differences). Assuming exogenous labor supply, one can test the dynamic version of the altruism model by including the change in current earnings, ΔY_{ikt}, where $\Delta Y_{ikt} = Y_{ikt} - Y_{ik,t-1}$ in the case of one-year differences and $\Delta Y_{ikt} = Y_{ikt} - Y_{ik,t-2}$ in the case of two-year differences. If the altruism model holds, the coefficient on this variable will be zero. This is true despite the fact that the income-change term is correlated over time with changes in the marginal utility of income. The reason is that the fixed-effect technique fully controls for changes in the marginal utility of income. Thus, the proposed dynamic test of the dynasty model is simply the fixed-effect first-differenced version of the static fixed-effect test.[10]

The dynamic test, however, does have one advantage over the static test. It controls for the remote possibility that the dynasty's preferences toward its member households are correlated with their earnings capacity. Such a correlation could arise if parents invested more in the human-capital accumulation of favorite children. Such preferences could be represented by a household-specific constant in equation (8). However, these constants would drop out in the time-difference results; that is, favorite children may get to consume more and, as a result of past investments, earn more, but their change in consumption should depend on the dynasty's total change in income, not on the particular income change they experience.

The dynamic test also raises the issue of risk sharing. The dynamic test can distinguish the altruism model from the life-cycle model with no risk sharing, but it does not

[9] If the dynasty is not liquidity-constrained, this difference plus a term involving the time-t interest rate equals the logarithm of the multiplicative Euler error. Note that our dynamic tests, as well as our static tests, are valid even if the dynasty is liquidity-constrained.

[10] In contrast to the Euler-equation approach to testing intertemporal consumption choice (see Hayashi [1987] for a survey), our test of the altruism model against the life-cycle/Keynesian alternatives controls for the Euler error through the fixed-effect estimation and, as such, does not require any assumption about the correlation (or lack thereof) across households of the time-t Euler error with information available at time $t-1$.

have power against the life-cycle model with selfish risk sharing among extended-family members. To see why not, take the case of a selfish parent and selfish child who overlap for, in the simplest case, two periods, time t and $t+1$. Suppose the parent's and child's incomes at time s $(s=t,t+1)$ are Y_{ps} and Y_{ks}, respectively. The parent and child must make consumption decisions at time t knowing Y_{pt} and Y_{kt}, but not knowing Y_{pt+1} and Y_{kt+1}. Let V_p and V_k stand, respectively, for the expected utilities of the parent and child, where

$$V_p = C_{pt}^{1-\gamma}/(1-\gamma) + bE_tC_{pt+1}^{1-\gamma}/(1-\gamma)$$

$$V_k = C_{kt}^{1-\gamma}/(1-\gamma) + bE_tC_{kt+1}^{1-\gamma}/(1-\gamma)$$

and where E_t is the expectation operator at time t conditional on information at time t and C_{ps} (C_{ks}) stands for the parent's (child's) consumption at time s. Suppose the selfish parent and child choose to pool their income risk and that they reach an efficient bargain. In this case their behavior can be described as a decision to maximize $\theta_pV_p + (1-\theta_p)V_k$, where the bargaining weight θ_p agreed to by the parent and child will depend on the known values of Y_{pt} and Y_{kt} and the distributions of Y_{pt+1} and Y_{kt+1}. At time s $(s=t,t+1)$ this maximization will lead to

$$\log C_{ps} = \left(\frac{1}{\gamma}\right)\log\theta_p - \left(\frac{1}{\gamma}\right)\log\lambda_s$$

and

$$\log C_{ks} = \left(\frac{1}{\gamma}\right)\log(1-\theta_p) - \left(\frac{1}{\gamma}\right)\log\lambda_s$$

where λ_s is the Lagrangian multiplier for the time-t parent-child combined-budget constraint. From these relations we have

$$\log C_{pt+1} - \log C_{pt} = -\left(\frac{1}{\gamma}\right)(\log\lambda_{t+1} - \log\lambda_t)$$

and

$$\log C_{kt+1} - \log C_{kt} = -\left(\frac{1}{\gamma}\right)(\log\lambda_{t+1} - \log\lambda_t).$$

With the addition of measurement error and taste variations, this is the dynamic fixed-effect model specified in (11). Hence, selfish risk sharing, like altruism, can lead to identical changes in the logarithm of the marginal utility of income for extended-family members. The dynamic test must, therefore, be viewed as a test of the altruism/life-cycle models with risk sharing against the Keynesian/life-cycle models with no risk sharing.[11]

G. *Using Extended-Family Data to Test the Life-Cycle Model*

The discussion thus far has centered on tests that can lead to the rejection of the altruism model; but the altruism model is not the only interesting null hypothesis. For example, one would also like to test the pure life-cycle model against its alternatives. By pure life-cycle model we mean that households neither fully nor partially share resources with their extended-family members. This rules out selfish risk sharing as well as altruism. The new data on the extended family provide an opportunity for testing the pure life-cycle model's prediction that the household's resources and only the household's resources affect its consumption. The test is simply to determine

[11]Note that the static fixed-effects test of altruism verses the Keynesian/life-cycle models remains valid even if there is selfish life-cycle risk sharing. At a point in time s, life-cycle risk sharing leads to the fixed-effect model: $\log C_{ps} = (1/\gamma)\log\theta_p - (1/\gamma)\log\lambda_s$ and $\log C_{ks} = (1/\gamma)\log\theta_k - (1/\gamma)\log\lambda_s$. If one regresses the log of consumption against the fixed effect $-(1/\gamma)\log\lambda_s$, demographics, and household income, household income will enter significantly because the bargaining weights, θ_p and θ_k, will depend on the initial resource position of the parent and child. This is not the case in the altruism model, in which utility weights reflect preferences, not bargaining power.

whether extended-family resources affect a household's consumption after one has controlled for the fact that extended-family resources help predict the household's permanent income.

Consider again equation (7), but modified in accordance with the life-cycle model's prediction to permit the marginal utility of income to be household-specific:

$$(10)\quad f_{kt} = \boldsymbol{\beta}_t' \mathbf{x}_{kt} + \alpha_{kt} + u_{kt} \qquad k = 0,1,\ldots,m_t.$$

According to the life-cycle model α_{kt} in equation (10) will depend on household-specific resources, although in general this dependence will not be simple. We proxy this relationship by considering the projection of α_{kt} on the household's current wealth, A_{kt}, its current nonasset income, e_{kt}, and z lags of past nonasset income, $e_{kt-1},\ldots, e_{kt-z}$. Hence, we can write $\alpha_{kt} = \alpha_{kt}(A_{kt},e_{kt},\ldots,e_{kt-z})$. Assuming that the elements of the α_{kt} projection fully capture the household's marginal utility of income and assuming that the life-cycle model is true, the corresponding dynasty-average values of wealth and current and past nonasset income should not enter significantly in the regression equation given in (11):

$$(11)\quad f_{kt} = \boldsymbol{\beta}_t' \mathbf{x}_{kt} + \ell_1 A_{kt} + \ell_2 e_{kt-1} + \ldots + \ell_{z+1} e_{kt-z} + \bar{\ell}_1 \bar{A}_{kt} + \bar{\ell}_2 \bar{e}_{kt-1} + \ldots + \bar{\ell}_{z+1} \bar{e}_{kt-z} + \varepsilon_{kt}.$$

In addition to incorporating the substitution of the α_{kt} projection into equation (10), equation (11) permits household food consumption to depend on the dynasty-average values of $A_{kt}, e_{kt},\ldots,e_{kt-z}$, where the dynasty averages (denoted with overbars, "–") at time t are taken over all time-t members of the dynasty in the data including the own household. We test the life-cycle model by considering whether the ℓ_i's $(i = 1,\ldots,z+1)$ are zero.

With additional assumptions one can refine the testing strategy underlying equation (11). Assume that utility is quadratic and that households face only earnings uncertainty. Then α_{kt} can be written as the sum of the present expected value of human wealth plus nonhuman wealth, where f_{kt} now stands for the level of food consumption. Let us further assume that the household's labor earnings e_{kt} equal the sum of a permanent component, e_{kt}^P, which evolves as a random walk, and an independent and identically distributed transitory component, $\tilde{e}_{kt}$; that is,

$$(12)\qquad e_{kt} = e_{kt}^P + \tilde{e}_{kt}.$$

Assume that the present expected value of human wealth may be approximated by e_{kt}^P divided by the interest rate plus $\tilde{e}_{kt}$. Together these assumptions imply the following specification of (10):

$$(13)\quad f_{kt} = \boldsymbol{\beta}_t' \mathbf{x}_{kt} + \delta_1 A_{kt} + \delta_2 e_{kt}^P + \delta_1 \tilde{e}_{kt} + \varepsilon_{kt}.$$

The econometric problem in estimating (13) is that we do not have independent measures of the permanent and transitory components of e_{kt}. Substituting into (13) for e_{kt}^P from (12) and allowing for the possibility that the dynasty-average values of A_{kt} and e_{kt}, $\bar{A}_{kt}$ and $\bar{e}_{kt}$, enter the equation yields

$$(13')\quad f_{kt} = \boldsymbol{\beta}_t' \mathbf{x}_{kt} + \delta_1 A_{kt} + \delta_2 e_{kt} + \bar{\delta}_1 \bar{A}_{kt} + \bar{\delta}_2 \bar{e}_{kt} + \varepsilon_{kt}'$$

where, under the life-cycle hypothesis, the error term $\varepsilon_{kt}' = \varepsilon_{kt} + (\delta_1 - \delta_2)\tilde{e}_{kt}$. Since e_{kt} is correlated with ε_{kt}', we estimate (13') using instrumental variables. Our test of the life-cycle model is that $\bar{\delta}_1$ and $\bar{\delta}_2$ equal zero.

Unfortunately, the PSID has data on assets and liabilities only for 1984. Hence, we conduct the test in equation (11) and the test in equation (13') for 1984. In order to use data from the other years, we again estimate (11) but use, instead of the nonasset income and wealth variables, the following variables: current and lagged values of

own and dynasty-average total income and current values of own and dynasty-average home equity. Equation (13′) can also be estimated in the absence of wealth data by using own and dynasty-average current total income in the place of current own and dynasty-average nonasset income and current wealth and by instrumenting own and dynasty-average current total income. This formulation is simply Friedman's permanent-income hypothesis augmented to allow the average permanent income of the dynasty to affect household consumption. In conducting our tests of (11) and (13′) we measure food consumption both in the levels and in the logs.

A final test that we conduct of the life-cycle model is to regress the change in the logarithm of food consumption against changes in the log of household's total income (head's wage rate) and changes in the average value of dynasty total income (heads' wage rates). Considering whether changes in relatives' resources affect a household's consumption may more sharply test the life-cycle model than tests based on the level of relatives' resources. The reason is that even if the life-cycle model is true, dynasty resource variables, which are correlated with household resource variables, will enter into equation (11) if we have not controlled properly for the household's marginal utility of income. In contrast, while dynasty resources may help predict the level of a household's resources, changes in dynasty resources are less likely to help predict changes in a household's resource position.

II. Data and Sample Selection

A. *The PSID*

The PSID began in 1968 with a sample of over 5,000 households. The PSID has reinterviewed the heads and spouses of the initial sample each year since 1968. In the case of divorce or separation, the PSID has followed both the head and spouse into their new households. Such new households that are added to the PSID are referred to as "split-offs." In addition to split-offs from divorce or separation, there are child split-offs that arise whenever one of the children of the 1968 respondents, who was not living independently of the respondents in 1968, leaves the respondents' household to form (or become a spouse in) his or her own household.[12] The same set of information that has been collected for the parent households has also been collected for all split-offs. Hence, the PSID provides a matched data set of parents together with at least a subset of their independent children.

Our data come from the 1985 PSID, specifically the families and individuals tape that does not include households who dropped out of the PSID prior to 1985. The 1985 tape contains data collected for 1984 as well as for all previous years. We first identify all individuals in the 1985 PSID who are listed, in 1968, as children. We then identify the 1968 parents of these children. These parents are referred to as the "earliest parents," since they may or may not be the natural parents. Our second step is to follow, starting in 1968, each identified child and determine whether and when he or she formed an independent household, by which we mean became a head or spouse in a household different from that of the child's earliest parents. The third step involves collecting data on consumption, labor supply, income, and so forth for such independent children in each year that they are independent together with contemporaneous data for the households that include their earliest parents. If there is only one earliest parent or if both earliest parents are still living together, we collect data on the single households containing such earliest parents. If there are two earliest parents but they are no longer living together, we collect contemporaneous data on the two households containing each of the two earliest parents, including data on possible step-parents. Hence, in a given year there will be data for one or two earliest-parent house-

[12] We include divorced parents in the dynasty because their altruism for their children will lead to altruistic linkages between them (see Kotlikoff, 1983; B. Douglas Bernheim and Kyle Bagwell, 1988).

TABLE 1—ENUMERATION OF INDEPENDENT-CHILD AND EARLIEST-PARENT HOUSEHOLD OBSERVATIONS

	Independent children				Earliest parents			
			Two parents					
Year	Total	1 Parent	Married	Divorced/ separated	Total	One child	Two children	Three or more children
1976	713	314	386	13	544	396	121	27
1977	775	315	447	13	576	411	129	36
1978	971	387	563	21	692	462	173	57
1979	1,201	481	685	35	792	484	211	97
1980	1,384	524	816	44	883	508	258	117
1981	1,550	591	900	59	945	515	280	150
1982	1,731	635	1,017	79	1,019	522	307	190
1983	1,892	699	1,114	79	1,068	512	332	224
1984	2,043	725	1,219	99	1,129	530	341	258
1985	2,178	764	1,293	121	1,171	531	344	296
Total:	14,438	5,435	8,440	563	8,819	4,871	2,496	1,452

holds for each independent child. We are able to link the data on each of the independent-children households to the data for their independent siblings as well as to the data for their earliest parents. In order to run the fixed-effect model, we need at least two observations on extended-family members in a given year. Hence, if data are available on an independent child who has no independent siblings and who has no parents (because of death, missing data, or attrition from the sample), we exclude the observation from the analysis. We also require that each dynasty in the regression samples contain at least one parent and one child.

Since there are new split-offs every year, the number of independent-child household observations in the data increases over time. The number of earliest-parent household observations also changes through time because of divorce, remarriage, death, and sample attrition. Table 1 reports for each year the number of earliest-parent households as well as the number of independent-child households used in our analysis after we have applied the sample selection rules described below. The table also distinguishes the number of independent-children observations according to whether they are associated with one or two earliest-parent households. Finally, it distinguishes the number of earliest-parent households by the number of associated independent-child households. The table, as well as our empirical work, begins with the 1976 data; prior to 1976 there are relatively few observations on independent children, and information needed to construct our income measure is missing.

The number of independent children increases from 713 in 1976 to 2,178 in 1985. The corresponding figures for earliest parents are 544 in 1976 and 1,171 in 1985. To understand the table, take 1985 as an example. In that year 764 of the 2,178 independent children have only one earliest parent, while the rest (1,293 + 121) have two earliest parents. Of those children with two earliest parents in the 1985 PSID, 121 have two earliest parents who are living in separate households in 1985. Next consider the 1,171 earliest parents listed in the table for 1985. A total of 531 of these parents have only one independent child in the data set; 344 have two children in the data set, and the rest (296) have three or more children in the data set.

As mentioned, the PSID so far has included a complete list of assets and liabilities only for the 1984 wave. Our 1984 wealth measure uses the 1984 PSID data on holdings of stocks, bonds, real estate, vehicles, business and farm assets, checking and sav-

TABLE 2—A DESCRIPTION OF THE DATA

Variable	Child households		Parent households		Total	
	Mean	SD	Mean	SD	Mean	SD
Household income	8,608	5,599	9,297	9,740	8,869	7,452
Dynasty income	7,871	3,965	9,103	7,752	8,336	4,227
Total food	1,234	691	1,326	751	1,269	716
Food away from home	259	279	214	307	242	291
Food at home	975	610	1,112	633	1,027	622
Black	0.310	0.463	0.315	0.464	0.312	0.463
Asian	0.002	0.049	0.002	0.042	0.002	0.047
American Indian	0.002	0.053	0.003	0.057	0.003	0.054
Other nonwhite	0.005	0.070	0.004	0.065	0.005	0.068
Married	0.699	0.458	0.683	0.465	0.693	0.461
Divorced	0.074	0.262	0.106	0.307	0.086	0.280
Female	0.503	0.500	0.362	0.480	0.449	0.497
Age of head	29.1	3.96	56.7	7.71	39.5	14.5

ing accounts, house value, and the value of outstanding mortgages. For years other than 1984, when relatively complete asset data are not available, we can use information on the house value less the remaining mortgage. We also use data on nonlabor income, which includes income from assets and income from exogenous sources (e.g., social-security benefits).

B. *Additional Sample Selection Criteria*

The PSID's survey questions about income and consumption for a particular year refer to income earned in the previous year and consumption expenditures at the time of the survey (typically March or April). Since children who are first recorded as independent in year t are asked about income and consumption during year $t-1$, some or all of which time may have been spent with their earliest parent(s), we exclude from the analysis data from the year in which a child is first reported as independent. For the same reason, data are excluded on parents who split off by divorcing or separating in the first year the parents are reported as split-offs. Parents and children must also be either a head or a spouse. In addition, we exclude household observations in which either reported annual income is less than \$500 or annual consumption is less than \$250, where both numbers refer to 1967 dollars. Finally, we require that the age of parent is greater than 38 and the age of each child is greater than 24. Table 2 reports, for both child and parent households, means and standard deviations of many of the variables used in this analysis.

III. Results of Static Tests of Altruism

A. *Static Tests Based on Current Income*

The first row of Table 3 reports the income coefficients from the static fixed-effect test for both logarithm and level specifications. These are the results of fitting equation (8) to the data pooled across years. As described in Altonji et al. (1989), disaggregating by year has no material effect on the results. Income is defined here as total family income less transfers received by the household head from family members living outside the household. Hence, the income variable consists of labor income plus nonlabor income, where the latter variable includes asset income plus government transfers but excludes private transfers. The demographic controls in these and subsequent static regressions are the number of males and females in the household in 11 age brackets,[13] dummies for the household's

[13] We constructed the age–sex variables by counting the number of persons who were in a particular household and in a particular age–sex category in a given year. See Altonji et al. (1989 note 16) for a description of the construction of these variables.

TABLE 3—REGRESSION ESTIMATES OF THE EFFECT OF INCOME ON FOOD CONSUMPTION

Test	Fixed effect		No fixed effect		Sample size	
	Log	Level	Log	Level	Log	Level
Static Tests of Altruism:						
Food	0.240 (23.289)	0.021 (4.163)	0.286 (33.067)	0.028 (5.083)	23,257	23,257
Food at home	0.165 (14.940)	0.010 (3.732)	0.201 (22.868)	0.014 (4.573)	23,148	23,257
Food away from home	0.383 (17.545)	0.010 (4.085)	0.497 (24.156)	0.013 (5.268)	19,723	23,257
Food lagged one year	0.242 (22.802)	0.020 (4.016)	0.279 (31.231)	0.026 (4.954)	20,565	20,565
Rich parent, poor child	0.228 (12.567)	0.057 (10.888)	0.246 (17.457)	0.062 (14.885)	7,036	7,036
Nonlabor income	0.028 (5.144)	0.014 (1.944)	0.041 (7.865)	0.019 (2.068)	12,534	12,534
Instrumental variable for income with Education/Occupation	0.306 (9.510)	0.042 (7.972)	0.340 (13.500)	0.046 (10.016)	15,687	15,687
Dynamic Tests of Altruism:						
One-year difference in food	0.063 (5.013)	0.002 (1.518)	0.074 (7.108)	0.002 (1.295)	18,189	18,189
Two-year difference in food	0.137 (10.425)	0.003 (1.005)	0.144 (13.352)	0.005 (1.191)	15,439	15,439

Note: Numbers in parentheses are t statistics testing the null hypothesis that the coefficient is zero.

race, dummies for the household's marital status, a fourth-order polynomial in the age of the head, a dummy for the sex of the head, a dummy for whether the household is a child or parent household,[14] the square of the number of children, the number of adults squared, and the square of the household's size. The standard errors in this and subsequent regressions are White standard errors (see Halbert White, 1984). Specifically, they allow for an arbitrary covariance pattern of errors across years and households for each extended family.

[14]In terms of the simple model described in equations (1) and (2), the child dummy captures the terms involving θ_{ip} and θ_{ik}.

In contrast to the altruism model's prediction of zero income coefficients when one controls for the fixed effects, both the log and level income coefficients are positive and highly significant. From the double logarithmic specification it is immediate that the income elasticities are economically large and reasonable. These income coefficients are also quite large when compared with the income coefficients that arise if one omits the fixed effects. In the case of the log specification the fixed-effect coefficient is 84 percent as large as the non-fixed-effect coefficient; in the level specification the fixed-effect coefficient is 75 percent as large.

While the income coefficients are larger when the fixed effects are omitted, one would expect such an outcome if the life-cycle model were true and current income

were not a perfect measure of permanent income. To see this, suppose each dynasty member had an identical permanent income. In this case the fixed effects would control perfectly for the household's permanent income and, given that one has controlled for permanent income, the coefficient on current income should be zero. Now clearly, the permanent income of different dynasty members will differ; but if they are correlated, which is surely the case, the force of the argument should go through.[15]

The strong rejection of the altruism model found in the first row of Table 3 is robust to the definition of food consumption. Rows 2 and 3 of the table report the income coefficients for food at home and food away from home. All four of these coefficients are statistically significant and economically significant when compared with the size of the coefficients when fixed effects are omitted.

The rejection of altruism is also robust to the temporal pairing of the consumption and income data. In the base case we pair year t's response to the consumption question with year t's response to the income question. However, the year-t income question refers to income in the previous year, while the year-t consumption question refers to the respondent's household's usual weekly consumption expenditure (although the data are reported on an annual basis). It may be that the response to the consumption question refers to consumption in the current year. In row 4 of Table 3 we regress year $t-1$'s consumption against year t's income. The results are quite similar to those in the first row of Table 3.

One response to these findings is that, while the altruism model may not hold for all parent and child pairs, it may hold for a subset of households such as those that engage in transfers with one another. Unfortunately, there are relatively few observations across all the years in which the household head reports receiving transfers from other family members. A larger sample that might be likely to satisfy the predictions of altruism and also avoid the problem discussed in Section II of switches in transfer regimes is the sample of parents with incomes above the median for parents together with that subset of their children whose incomes are below the median for children. Row 5 of Table 3 reports the results for this sample of rich parents and poor children. The results also very strongly reject the altruism model.

B. *Static Tests Based on Nonlabor Income, Wage Rates, and Assets*

Row 6 of Table 3 repeats the fixed-effect tests but uses nonlabor income rather than total income when estimating equation (8). We restrict the sample to households with \$50 or more of nonlabor income. The results again reject the altruism model. Table 4A reports a regression that replaces income with the wages of the head and spouse plus the household's nonlabor income. For the level regression, wage rates and nonlabor income are entered in their levels, while in the logarithmic regression these variables are entered in their logs. An additional sample selection rule imposed here is that wage rates exceed \$0.50 per hour in 1967 dollars. The regression sample in this case includes wives with reported wages less than \$0.50. To control for such wives, many of whom simply do not work, we included a dummy.

The findings in Table 4A add to the case against the altruism model. In the fixed-effects regressions the coefficients on annual wage rate are significant statistically and economically, which, depending on the form of preferences, may itself constitute evidence against the altruism model. The nonlabor-income coefficient in the log regression is highly significant. In addition, the nonlabor-income coefficients are close in magnitude (the level coefficients are identical to three digits) for the fixed-effects and non-fixed-effects regressions. We also estimated the models of Table 4A but excluded nonworking wives. The regression results are quite similar.

[15]For evidence on this correlation found in the PSID data see Solon et al. (1987) and Solon (1992).

TABLE 4—REGRESSION ESTIMATES INCLUDING WAGE RATES AND DUMMY FOR NONWORKING WIFE

A. *Current Wage Rates and Nonlabor Income:*

	Fixed effect			No fixed effect			
Regression	Head's wage	Spouse's wage	Nonlabor income	Head's wage	Spouse's wage	Nonlabor income	Sample size
Levels	0.379 (5.540)	0.180 (1.871)	0.012 (1.683)	0.549 (7.491)	0.339 (3.669)	0.012 (1.419)	8,237
Logs	0.136 (10.255)	0.071 (3.838)	0.030 (5.252)	0.178 (14.183)	0.107 (6.867)	0.047 (8.967)	8,237

B. *Current and Lagged Wage Rates:*

	Fixed effect			No fixed effect			
Regression	Head's wage	Spouse's wage	Lagged wage	Head's wage	Spouse's wage	Lagged wage	Sample size
Levels	0.354 (6.469)	0.257 (3.126)	0.293 (4.653)	0.412 (7.683)	0.406 (5.070)	0.401 (6.299)	14,421
Logs	0.114 (9.588)	0.065 (4.466)	0.069 (5.752)	0.134 (13.063)	0.097 (7.705)	0.099 (9.793)	14,421

Note: Numbers in parentheses are t statistics testing the null hypothesis that the coefficient is zero.

Next we estimated pooled regressions for a sample defined like that of Table 4A (including wives with wages less than \$0.50), except that home equity rather than nonlabor income was used to test the altruism model. In these regressions (not reported), we required that households have \$1,000 or more of home equity to be included in the sample. In the fixed-effects regressions (sample size = 6,257) the levels coefficient on home equity is 0.004 ($t = 1.97$), and the log coefficient is 0.042 ($t = 3.39$). The corresponding non-fixed-effects coefficients are 0.008 ($t = 5.15$) and 0.075 ($t = 7.43$). Again, contrary to the altruism model's prediction, the fixed-effects coefficients are nontrivial compared with the non-fixed-effects coefficients.

Finally, in Table 4B we use the lagged wage of the household head to test the altruism model. The regressions also include current wages of the household head and spouse. Recall that if the dynasty's utility function is time-separable, current wages may enter the demand functions, but lagged wages will not. The advantage of testing altruism with lagged wages is that, compared with nonlabor income, they are less likely to be correlated with that component of the error term that reflects household preferences not captured by our demographic controls. The lagged wage coefficients are highly significant in both rows. While the lagged wage coefficients are larger if one excludes the fixed effects, the lagged wage coefficients in the fixed-effects regressions are, nevertheless, quite substantial.

C. *Static Tests of Altruism Under Asymmetric Information*

One response to these results is that they only reject the symmetric-information altruism model. If dynasty members are imperfectly informed about each other's income, then the component of dynasty members' income that is unobservable may affect the members' consumption. If parents are altru-

istic toward children and wealthier than them and if children are less altruistic toward parents, then the component of a child's household income that is unobservable to parents will affect the child's consumption relative to other members of the extended family. Income components that parents know about will not be related to the distribution of consumption in the dynasty. In this case, parents may act to neutralize intergenerational government transfers (which they can observe), even though our results show that they do not neutralize all within-dynasty differences in income.

We allow for this possibility in the seventh row of Table 3 by instrumenting income with education and two-digit occupation dummies of the household head under the assumption that these are observable to all dynasty members. The sample consists of 15,687 household-year observations with valid data on the occupation and education variables and excludes persons who left the survey in 1986 or 1987, but the departure from our basic sample does not affect the results. The coefficient on the instrumented log of income is 0.306 with a t statistic of 9.51 when fixed effects are included, which compares to 0.340 ($t = 13.5$) when fixed effects are excluded. In the linear case, the instrumented regression coefficient is 0.042 with a t statistic of 7.92 when fixed effects are included and 0.046 when they are excluded. Evidently, the dynasty does not neutralize income differences that are easily observable.

IV. Dynamic Tests

The results from estimating the basic model in one-year and two-year differences are given in the last two rows of Table 3. These are the results of fitting equation (9) to the pooled data. As the table indicates, the magnitudes of the income-change coefficients are very similar whether one includes or excludes the fixed effects. The effect of changes in own income on household consumption appears to be equally large whether or not one controls for changes in the resource positions of the household's relatives. For example, the coefficient on the second difference in the log of income is 0.137 ($t = 10.425$) in the fixed-effect regression and 0.144 ($t = 13.352$) in the non-fixed-effect regression. The low t statistics in the linear regressions may reflect the problem of greater noise relative to signal associated with first-differencing (see Zvi Griliches and Jerry Hausman, 1986).

These dynamic results reject the standard altruism model and a modified altruism model in which favorite children receive more human capital and, as a result, end up with higher earnings. The results also reject the hypothesis of selfish risk sharing among extended-family members.

V. Can One Reject the Life-Cycle Model?

Table 5 reports the ordinary least-squares (OLS) results of estimating equation (11). Recall that this equation relates food consumption to current and two lagged values of own and dynasty nonasset income and current own and dynasty values of wealth. The results in both the logs and the levels (columns 1 and 2) seem, on balance, to suggest a role for dynasty resources in influencing household consumption. In the case of the logs, the sum of the dynasty nonasset income coefficients is about two-fifths the corresponding sum for household nonasset income. The dynasty asset coefficient, although insignificant, is 38 percent of the household asset coefficient.

Table 5 also contains the results for 1984 from estimating equation (13′) by instrumental variables (IV). Recall that (13′) arises from assuming that utility is quadratic and that nonasset income consists of a random walk plus a transitory component. In this structural model, consumption is determined by current wealth and the instrumented value of current income. The instrumental variables we use for current (1984) nonasset incomes of the household and dynasty are the demographic controls, household and dynasty wealth, and the separate means (across years) of nonasset income for the household and for all dynasty households. In forming these means we exclude data for 1984.

The IV results suggest a smaller role of dynasty resources than the previous reduced-form results. In the log regression,

TABLE 5—THE EFFECTS OF HOUSEHOLD AND DYNASTY NONASSET INCOME AND WEALTH ON THE LOG OF FOOD CONSUMPTION, 1984

Variable	OLS		IV on current nonasset income	
	Logs	Levels	Logs	Levels
Household nonasset income in 1984	0.124 (4.08)	0.013 (1.96)	0.281 (10.63)	0.040 (5.02)
Household nonasset income in 1983	0.049 (1.46)	0.007 (0.906)		
Household nonasset income in 1982	0.041 (1.35)	0.014 (2.23)		
Household wealth in 1984[a]	0.00142 (2.96)	2.27 (2.46)	0.0011 (2.60)	1.823 (1.347)
Dynasty nonasset income in 1984	0.113 (2.44)	0.021 (2.31)	0.057 (1.71)	0.0069 (2.15)
Dynasty nonasset income in 1983	−0.058 (1.22)	−0.020 (2.01)		
Dynasty nonasset income in 1982	0.035 (0.825)	0.013 (1.61)		
Dynasty wealth in 1984[a]	0.00054 (0.671)	1.397 (2.46)	0.0007 (1.09)	1.523 (1.22)
Sum of household income coefficients	0.214 (9.43)	0.034 (7.66)		
Sum of dynasty income coefficients	0.090 (2.80)	0.015 (2.31)		
Number of households:	2,045	2,045	2,507	2,507
X^2 statistic[b] on dynasty income and wealth [P value]:	15.10 [0.005]	18.84 [0.001]	6.70 [0.035]	6.98 [0.030]

Notes: Numbers in parentheses are t statistics testing the null hypothesis that the coefficient is zero.

[a]Wealth is measured in thousands of 1967 dollars.

[b]The chi-square test statistics in columns 1 and 2 (3 and 4) have 4 (2) degrees of freedom.

the point estimate of the coefficient on dynasty current nonasset income is only one-fifth that of the household; in addition, the dynasty wealth coefficient, though numerically large, is insignificant. Even these results may overstate the true size of the dynasty coefficients since modeling income as a random walk plus a white-noise component may be inappropriate, and the dynasty variables may be correlated with the misspecification error.

The findings of Table 5 are reinforced by those in Table 6. Table 6 is another reduced-form version of (11), but one that uses data for all past years. Since data on wealth are not available, the regressions of

TABLE 6—THE EFFECTS OF CURRENT AND LAGGED HOUSEHOLD AND DYNASTY NONASSET INCOME AND HOME EQUITY ON FOOD CONSUMPTION

Variable	Pooled regression	
	Logs	Levels
Household income in year:		
t	0.151	0.013
	(10.42)	(3.39)
$t-1$	0.030	0.006
	(2.27)	(2.07)
$t-2$	0.027	0.011
	(2.34)	(3.32)
Dynasty income in year:		
t	0.061	0.016
	(3.20)	(2.14)
$t-1$	−0.0066	0.001
	(0.34)	(0.22)
$t-2$	0.008	−0.002
	(0.42)	(0.48)
Home equity:		
Household	0.0027	4.59
	(3.69)	(3.06)
Dynasty	0.0020	2.40
	(1.44)	(1.02)
Sum of income coefficients:		
Household	0.208	0.031
	(13.97)	(8.43)
Dynasty	0.062	0.015
	(3.04)	(3.68)
Number of households:	11,905	11,905
X^2 [P value]:	19.58	19.10
	[0.0006]	[0.0007]

Notes: Numbers in parentheses are t statistics testing the null hypothesis that the coefficient is zero. X^2 statistics and associated P values are for the joint test that dynasty income and wealth variables are all zero.

Table 6 include home equity as well as current and two lags of nonasset income. In the pooled log results the sum of the dynasty income coefficients are almost 30 percent of the corresponding sum of household income coefficients. The dynasty home-equity coefficient is three-quarters the size of the household's home-equity coefficient and is significant.

Table 7 returns to the structural permanent-income formulation [equation (13′)] but uses the data for all the years. Since wealth data is available only for 1984, we used total income and instrumented total income with the mean (over past and future years) of total income. The IV coefficients on dynasty income are much smaller than the IV coefficient on own income. In the case of the pooled log IV regression the coefficient on dynasty income is not statistically significant, and it is one-eighteenth of the coefficient on household total income.[16] Note that, as predicted, the difference between the own-income and dynasty coefficients is larger for the IV estimates than for the OLS estimates.

Table 8 considers how changes in household and dynasty total income and wage rates (of heads) influence changes in household consumption. The results here are slightly more supportive of the life-cycle model. Consider first one-year changes in consumption. Here, the change in dynasty income has an insignificant influence on the change in consumption, although the magnitude of the point estimate is not trivial. In the case of two-year changes, the two-year change in dynasty income has zero (to three decimal places) effect on the two-year change in household consumption. The wage-rate changes of the dynasty are uniformly insignificant, even after we instrument the wage measure with an alternative wage measure to reduce bias from measurement error.

VI. Summary and Conclusion

In recent years the infinite-horizon altruism model has played an important role in theoretical analysis and policy debate. This is surprising, given the lack of direct micro

[16]The R^2 values for the first stage of the pooled IV estimation underlying Table 7 are 0.714 for Y_{ikt} and 0.764 for Y_{it}. The R^2 of the pooled OLS consumption regression is 0.381.

TABLE 7—TESTS OF THE LIFE-CYCLE MODEL

Pooled regression	Number of households	OLS estimates: Household total income	OLS estimates: Dynasty total income	IV estimates: Household total income	IV estimates: Dynasty total income
Logs	21,711	0.261	0.048	0.337	0.023
		(25.3)	(3.29)	(21.4)	(1.12)
Levels	21,711	0.0219	0.0142	0.040	0.010
		(4.11)	(5.52)	(7.01)	(3.02)

Note: Numbers in parentheses are t statistics testing the null hypothesis that the coefficient is zero.

TABLE 8—DYNAMIC TESTS OF THE LIFE-CYCLE MODEL: THE EFFECTS OF HOUSEHOLD AND DYNASTY INCOME AND WAGE-RATE CHANGES ON CHANGES IN FOOD CONSUMPTION

Variable	One-year changes: OLS	One-year changes: OLS	One-year changes: IV	Two-year changes: OLS	Two-year changes: OLS	Two-year changes: IV
Household variables:						
Change in log of household income	0.065			0.138		
	(5.39)			(13.2)		
Change in log of wage of household head		0.035	0.455		0.061	0.280
		(2.67)	(2.86)		(5.05)	(3.77)
Dynasty variables:						
Change in log of average dynasty income	0.022			0.000		
	(1.16)			(0.013)		
Change in log of wage of average dynasty head		−0.014	−0.228		−0.026	0.086
		(0.728)	(1.31)		(1.37)	(0.80)
Number of observations:	18,200[a]	12,203	6,621	14,284	9,747	5,038

Notes: All equations include year dummies and controls for changes in demographics. The equations that include wage rates also include dummy variables for year t and $t-j$ ($j=1,2$) that equal 1 if a wife was present in the given year and worked a positive number of hours in the previous year at an hourly wage rate greater than \$0.50.

The wage rate in the consumption equation is annual labor earnings of the head divided by annual hours. It refers to the calendar year before the survey. The samples for columns 2 and 3 (columns 5 and 6) exclude households in which the household head did not work or had an average wage rate of less than \$0.50 in either year t or year $t-1$ (t and $t-2$). The principal instrument for the change in the average hourly wage in columns 3 and 6 is the change in a second wage measure that refers to the job held at the time of the survey. This second wage measure is based on a direct question about the hourly wage in the case of hourly workers and is imputed from a question about earnings per week, per month, and so forth in the case of salaried workers. The other instruments are the mean of this alternative wage-change measure taken across households in the dynasty and all the control variables that appear in the consumption-change equation. The sample in column 3 (6) is further restricted to households for which both wage measures are available in years t and $t-1$ (t and $t-2$). However, the difference in the samples has little to do with the increase in the absolute value of the coefficients that arises when instruments are used. Altonji (1986) discusses the properties of this instrumental-variables estimator. The large increase in the coefficient estimates when instruments are used is due to the correction for measurement error and the fact that the second wage measure and the consumption data both refer to the time of the survey.

[a]Due to a minor discrepancy in the computation of lagged values, the sample for column 1 exceeds the sample for the dynamic fixed-effects test of the life-cycle model by 11 observations. This has no effect on the results.

empirical support for the model. The long delay in testing the model with micro data reflects the paucity of data on the extended family. Fortunately, the ongoing PSID now provides sufficient extended-family data to test the operative altruism model. The key prediction of the altruism model is that altruistically linked family members fully share resources in the sense that the division of their total consumption should be independent of the division of their collective resources.

This paper directly tests whether the distribution of resources affects the distribution of consumption among parents and children. We find overwhelming evidence that it does. Our test procedure is attractive because it does not require solving the extended family's dynamic programming problem or knowing either the precise level of extended-family resources or the boundaries of the altruistically linked extended family. According to the altruism model, all members of the extended family will have the same marginal utility of income, and their consumption demands can be written as functions of this variable and relative prices. Once one controls (through the fixed-effect technique) for the extended family's marginal utility of income, the resource position of particular extended-family members should not influence the consumption of those members.

In our tests we use total income, nonlabor income, home equity, and wage rates as proxies for the resource position of particular extended-family members. We find that each of these proxies is a significant variable in explaining the consumption of extended-family members even after one has controlled for the extended family's marginal utility of income. The strong rejection of the altruism model holds up for the subset of the sample consisting of rich parents and poor children. It also holds up whether or not labor supply is viewed as endogenous and whether or not the tests are run in levels or first differences.

In addition to showing that own resources matter given extended-family resources, we test the life-cycle model by asking whether only own resources matter (i.e., whether the resources of extended-family members have no effect on a household's consumption). Our results suggest that extended-family member resources have at most a modest effect on marginal household consumption decisions after one has controlled for the fact that extended-family resources help predict a household's own permanent income.

Despite our findings, we do believe that significant altruistically motivated transfers occur in the United States, particularly among the wealthy, who are underrepresented in the PSID. Our findings suggest, however, that very few U.S. households are altruistically linked at the margin in the sense that redistribution between the donor and recipient will be neutralized. The altruistically motivated transfers that one observes in the United States may come in the form of less than fully efficient educational support to liquidity-constrained children (as described by Becker [1974] and Allan Drazen [1978]), in-kind transfers by paternalistic altruists (as described by Robert A. Pollak [1988]), incentive-oriented transfers by altruistic parents concerned about free-riding children (as described by Kotlikoff and Assaf Razin [1988]), and end-of-life transfers by parents concerned that children will squander what they receive at an early age and ask for more (as described by Kotlikoff [1987], Lindbeck and Weibull [1988], and Bruce and Waldman [1989, 1991]).

While liquidity-constrained, paternalistic, and strategically constrained altruism may abound, our findings nevertheless indicate that changing the distribution of resources within the extended family significantly changes its distribution of consumption. Given this finding, the notion that an extended family, let alone an entire country, can be modeled as a single representative consumer with an infinite horizon seems highly questionable.

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