Parent Altruism, Cash Transfers and Child Poverty

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Discussion Paper No. 04/562

November 2004

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This version: 21 November 2004

Abstract

This paper investigates the contemporary sharing of household resources between parents and co-resident children, motivated by the increasing popularity of cash transfers targeted at children, and limited evidence of their efficacy. It argues that this provides information on parental altruism which, though commonly assumed, has been challenged in recent research. The main finding is that the within-household allocation of resources is consistent with altruism. A further finding is that households that smoke (spend on tobacco) systematically spend less on children.

JEL codes: C2 I2 O1 R2

Keywords: altruism, *m*-demands, intra-household allocation, cash transfers, child poverty, tobacco.

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Parent Altruism, Cash Transfers and Child Poverty

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1 Introduction

Parent altruism is a critical assumption in many economic models, ranging from models of education and child labour (e.g. Becker 1991, Basu and Van 1998) to models of macroeconomic policy (e.g. Barro, 1974). Although, for both biological and sociological reasons, it would seem a plausible assumption, the evidence does not lend it unanimous support. In the few microeconomic studies that set out to test parental altruism, it is rejected (e.g. Cox and Rank 1992, Altonji *et al* 1992, 1997, Hayashi 1995). Some other studies that are not directly concerned with parent altruism also exhibit results that suggest it merits investigation. For example, a recent study of the UK child benefit finds that it is spent disproportionately on alcohol (Blow, Walker and Zhu 2004). In their overview of the OECD-country literature, Blow *et al* (2004) argue that "there is little evidence to show that giving poor parents more money makes for better children". Mayer (1997) argues that incrementing the resources available to parents may not improve child welfare if parents are incompetent, myopic or selfish. In their survey of the determinants of children's attainments, Haveman and Wolfe (1995: p.1856) conclude that although there is often a correlation between parental SES and child outcomes, a causal effect of parental income has been harder to establish.

These studies are important from a policy perspective because they suggest that we cannot *assume* that cash transfers given to parents translate into child welfare.[1] Almost all governments in OECD and transition economies offer unconditional child benefits and, in developing countries, cash transfers targeted at children are an increasingly important element of anti-poverty programs. There is an

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[*] I am grateful to Martin Browning, Indraneel Dasgupta, Sylvain Dessy, Andrew Foster, Paul Gregg, Ian Preston and Alessandro Tarozzi for helpful comments. The paper has benefited from presentation at the NEUDC Meetings in Boston (Sept 2001), the AEA/AESM Meetings in Atlanta (Jan 2002) and seminars at the Research Department of the World Bank (Mar 2002), George Washington University (Mar 2002), the LSE (STICERD: May 2002), Bristol (Nov 2001), Cambridge (Sep 2001), Sussex/IDS (Nov 2001), the Indian Statistical Institute in Delhi (Dec 2001), and the Centre for Applied Microeconomics in Copenhagen (June 2004). The first version of this paper has been available as Bhalotra (2001).

[1] The fact that some other studies find positive effects on children of income controlled by parents does not change this.

evident agency problem when the transfer is controlled by the parent although intended for the child since parents may use it to finance tobacco or alcohol purchases, or to increase their own leisure. In sum, establishing whether or not parents are altruistic influences whether child poverty may be more effectively addressed by cash transfers or by input subsidies since unconditional cash transfers will only have the desired effect under parental altruism.

Altruism has been relatively neglected in the literature on household decision-making, which has been preoccupied with preference heterogeneity. In the non-traditional models that allow preference heterogeneity, agents can have egoistic or caring preferences (e.g. Browning and Chiappori 1998), and the extent of caring or altruism can influence allocations. There is limited research focused on this, although Browning and Lechene (2001) investigate income pooling (or *sharing*) together with the extent of *caring* within the family, using data on Canadian couples. The household literature has focused on couples, children have been cast as "..consumers of goods chosen and provided by loving or dutiful parents" (Lundberg and Pollak 1996). In contrast, previous research set in low-income contexts has often implicitly (e.g. Cigno 1991) or explicitly (e.g. Gupta 2000, Fyfe 1989, pp. 73-76) cast parents as selfish, having and using children to perform functions that markets fail to perform.[2] Rigorous empirical testing of these conflicting assumptions is limited.[3]

This paper investigates the relative weight on (above-subsistence) child consumption in the parents' utility function; the null of egoistic parents corresponding to this weight being zero. As this weight equals the ratio of the marginal income effects on child and parent consumption, the analysis draws attention to the fact that a possible explanation of small income effects on child outcomes identified in some earlier studies is limited altruism. Using data from rural Pakistan, *m*-demands (defined in section 2.2) are estimated to investigate whether child consumption exhibits a positive co-variation with adult consumption. Under the null of parental egoism, there is no such co-variation as marginal income is spent entirely on adult consumption: the case of a horizontal expansion path.

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[2] At the same time, historical and anthropological studies of child labour have adduced evidence suggesting parental selfishness (e.g., Parsons and Goldin 1989, Nardinelli 1990 (p.94), Burra 1995).

[3] In the working paper version of their JPE (2004) paper, Rogers and Swinnerton (2003) state that the only empirical studies of altruism that they are aware of are Parsons and Goldin (1989) and the earlier version of this paper, Bhalotra (2001).

Previous research on inter-generational altruism (e.g. Altonji *et al* 1992, 1997, Hayashi 1995; see Laitner 1997 for a survey) has tested the income transfer derivative restriction or income pooling[4], which is a strong version of altruism. Given that this is rejected in previous research, it is relevant to investigate the weaker definition of altruism that is adopted in this paper.[5] This weaker definition is also the relevant one if we are interested in how cash transfers are spent. According to this, parents are altruistic if they make positive transfers to children, at the expense of their own consumption, with the size of transfers being a function of the degree of altruism (e.g. Becker 1981). While previous research on inter-generational altruism (cited above) has focused on gifts and bequests flowing from parents to *adult* children living in separate homes, this paper is concerned with the intra-household allocation of resources to minors. Indeed, it is the first investigation of altruism towards young co-resident children. The emphasis on childhood is of particular importance given that parental expenditures at this time are known to have far-reaching consequences on the future success of their children. This is especially relevant in low-income countries where the role of the state in provision of health-care and education is limited, resulting in a larger role for parental income and parental preferences.

Research on cash transfers targeted at children has tended to implicitly assume parental altruism (e.g. Edmonds 2004, Attanasio and Lechene 2002, Kooreman 2000), although Duflo (2003) finds evidence consistent with grandmothers being altruistic while grandfathers are not. The data used in this paper do not contain information on a cash transfer. To the extent that there are labeling effects whereby transfers for children are spent disproportionately on children, the estimates in this paper will understate altruism. Therefore rejection of parental egoism is robust to the absence of data on transfers.[6]

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[4] Let A denote adult, C child, m income, and X consumption. For simplicity, ignore public goods in the household. Let T be the transfer from the parent to the child, given as the difference between the income and the consumption of parents, $T=Y_a-X_a$. Then $\partial T/\partial Y_a= 1-(\partial X_a/\partial Y_a)$ and $\partial T/\partial Y_c = -(\partial X_a/\partial Y_c)$. Now *if we use the income pooling restriction* that $\partial X_a/\partial Y_a = \partial X_a/\partial Y_c$ then it follows that $\partial T/\partial Y_c - \partial T/\partial Y_a = -1$. This is the income transfer derivative restriction. It says that a one dollar decrease in child income coupled with a one dollar increase in parent income will result in an increase in parental transfers of one dollar.

[5] In this paper, the null is a strict version of selfishness and, in earlier studies, the null is a strict version of altruism. It would not be surprising, *a priori*, to find that actual behaviour lies between these two extremes.

[6] Based on Bhalotra (2001) and discussion with me, Chris Schluter and Jackie Wahba have, in work-in-progress, employed the motivation and the core idea in this paper to perform a test of

This paper offers a useful illustration of the use of *m*-demands (section 2.2), which involve conditioning on the level of a reference good rather than on total expenditure. *M*-demands may have an advantage if the reference good is measured with less error. They are especially useful when, as is common, data on total expenditure are unavailable (see Browning 1998). The survey data analysed in this paper *do* contain total expenditure, and this fact is exploited to compare *m*-demand estimates with estimates of the corresponding *pair* of Marshallian demands (see section 2.3). An advantage of looking, in this way, at the *ratio* of income effects on child and adult consumption, rather than directly at the income effect on the child outcome, is that it nets out considerations of income uncertainty and lumpiness in expenditure (see Kooreman 2000, footnote 5 for example).

The main finding in this paper is that the null of egoistic parents is rejected. The *m*-demand estimates show that, for every additional rupee spent on adult clothing, expenditure on child clothing increases by 0.52 of a rupee. Estimates of a pair of standard Marshallian demand equations for child and for adult consumption show positive income effects on each, with a ratio of 0.67 (which is insignificantly different from 0.52). In both cases, expenditure[7] is instrumented with a polynomial in income (following Keen 1986, Blundell et al 1998, Browning 1998, Browning and Chiappori 1998), and the significance of the endogenous expenditure variable is subject to tests that yield the correct rejection probabilities even when the instruments are weak (Moreira 2002).

The main result is shown to be robust to a number of alternative specifications of the model. These include allowing for non-separability of child consumption and adult leisure, and allowing for the presence of child labour. Functional form, other controls, and other instruments are also investigated, and they produce no important changes in the results.

The main specification involves child and adult clothing. As a further robustness check, alternative specifications are estimated in which other categories of adult consumption constitute the reference good in the *m*-demand (see section 2.2). The results are robust to this change, with one interesting exception. This is the case

altruism using the Progresa data which have information on cash transfers. Their preliminary results corroborate those in this paper.

[7] In the *m*-demand, adult expenditure is the key regressor while, in the Marshallian demand, this is total expenditure.

when the reference good is tobacco expenditure, and the sample is restricted to households that "smoke" (purchase tobacco) in order to meet the requirement that the reference good is a normal good (see section 4.2). This specification shows that when tobacco expenditure increases, there is no contemporaneous increase in expenditure on child clothing. Using the full sample of households to predict expenditure on child clothing for the samples that do and do not purchase tobacco, we find that smoking households spend less on children, other things being equal. This is consistent with the addictive properties of tobacco, which may result in it behaving like a subsistence good. Given that, in these data, tobacco is disproportionately consumed by males, this finding is also consistent with the view that money in the hands of fathers translates into child welfare less effectively than does money in the hands of mothers (e.g. Thomas 1990).

An analytical framework is sketched in section 2, which also discusses the potential problem that the results of the analysis may be consistent not only with altruism but also with exchange motives. Section 3 describes the data and estimation issues. The main results are presented in section 4. Section 5 presents a range of specification checks, and section 6 concludes.

2 An Analytical Framework

As in previous research on inter-generational altruism, parents are treated as a unit. In line with previous research on human capital, it is assumed that parents decide on the allocation of resources to minor children. There is considerable evidence from field studies in south Asia that, when children work, they hand over their earnings to their parents.[8] The implied assumption that income-pooling holds for families with child labour is investigated in section 5.2, and confirmed. This paper is agnostic on the question of income pooling when the children have grown up to form their own households. As discussed above, this is precisely the question investigated in previous research, where the focus has been on adult children living independently of their parents (e.g. Altonji et al 1997).

This paper faces the endemic problem of distinguishing which of altruism and exchange motives dominate at the margin (e.g. Cox and Rank 1992). In other words,

[8] See Khan (2001) for Pakistan, Gupta (2000) and Burra (1995) for India, and the Bangladesh Bureau of Statistics (1996, Table 5.12, p.54) for Bangladesh. For several anecdotes suggesting parental power over children, see Fyfe (1989, pp.73-76).

parental expenditure on children may be motivated by the expectation of return transfers from their children once they grow up. The exchange hypothesis is undermined by problems of intergenerational contracting (e.g. Baland and Robinson 2000). Moreover, the distinction between exchange and altruism may be seen as *inherently* impossible to make. Thus, even when the child's utility is an argument in the parental utility function, parents are maximizing their own utility and, by that criterion, may be regarded as selfish, not altruistic (Becker 1981, p. 2). Becker clarifies that the definition of altruism that he proposes is one that is relevant to behaviour rather than to the more philosophical question of what "really" motivates people. This is also the case in this paper. Indeed, to the extent that this paper is motivated by the question of how effective cash transfers made to parents are, what matters is how (marginal) resources are divided between parents and children. The perspective is that expenditures on young children influence their future lifechances. Once children have received these "gifts", they may or may not choose to reciprocate. The question of reciprocity is of theoretical interest, and while relevant to other fields of enquiry, including the welfare of the elderly, it is largely irrelevant in the current context.[9]

The prediction of the altruistic model that is tested is described in section 2.1. As discussed, interpretation of the results of this paper in terms of altruism should bear in mind the caveat that, at a deeper motivational level, altruism may be contaminated by exchange. In section 2.2, *m*-demands are derived and defined, and compared with the conventional Marshallian demands. Section 2.3 shows that altruism corresponds to positive income effects.

2.1 The hypothesis

Altruism towards children is captured by a utility function for parents that depends upon child consumption.[10] The degree of altruism is the relative weight accorded to

[9] A similar problem of disentangling preferences from incentives or constraints arises in the literature on intra-household allocation that is motivated to test for "discrimination" against girls (e.g. Deaton 1989, Ahmad and Morduch 1993). As noted by Behrman (1997: section 3.3.2), these studies do not permit identification of whether observed effects of gender reflect preference weights, or whether they reflect differential market incentives such as arise if boys earn more on the labour market than girls with the same level of human capital. The same applies to studies of intrahousehold allocations to biological *vs* non-biological children that relate observed differences in expenditure to parental preferences (e.g. Case, Lin and McLanahan 2000).

[10] Becker, in fact used the more restrictive formulation of caring in which parental utility depends upon child utility, and this is often used for its greater tractability (e.g. Browning and

child consumption in the parental utility function, and the null of non-altruism (or egoism) is investigated as the restriction that this weight is zero. It is shown in the Appendix that, for the commonly used class of additively separable utility functions, the null implies that the demand for child goods is invariant to the level of adult consumption. This is the case of a horizontal income expansion path. Under the alternative of altruism, the demands for child and adult consumption exhibit a positive covariance. The underlying idea is very simple. When the adult cares about child consumption then, at constant prices, any increase in income is used to buy more of both the child and the adult good so that equality in the marginal rate of substitution condition is maintained. This is illustrated using the Stone-Geary case.

The Stone-Geary case

Consider the Stone-Geary preferences,

$$(1)\ U = (A_0 - \overline{A})^{\alpha}\ (C_0 - \overline{C})^{\beta}$$

where U is utility of the parent, $\overline{A}$ and $\overline{C}$ are the subsistence levels of adult and child consumption, and above-subsistence quantities are assumed positive. It is assumed that even the egoistic parent ensures that the child survives. For this illustration, there is just 1 A and 1 C good. The relative weight that parents place on child consumption is β/α. Solving the first order conditions gives

$$(2)\ X_C = \frac{\beta}{\alpha} X_A - \frac{\beta}{\alpha} \overline{X}_A + \overline{X}_C$$

where X_i is expenditure on *i=(C, A)* and $\overline{X}_i$ is the corresponding subsistence expenditure which, when demands are conditioned on demographics, may be assumed to be captured by the equation intercept. As income changes, the new optimal amounts of child and adult consumption are chosen so as to satisfy the equality in (2). Rearranging,

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Chiappori 1988). In a caring model, estimated demand parameters will reflect both parental preferences and the relation between child utility and child consumption. As long as child utility is increasing in child consumption, the prediction that is tested in this paper is not altered by using this specification.

$$(3)\quad \frac{dX_C}{dX_A} = \frac{\beta}{\alpha}$$

This shows that regressing X_C on X_A delivers β/α, a measure of altruism. If $\beta/\alpha=1$, child and adult consumption are given equal weight, if $\beta/\alpha>1$ then children are "favoured" and if $\beta/\alpha<1$, then adults are "favoured".

Altruism is a word that excites a host of interpretations. In this paper it is defined simply to refer to the marginal change in expenditure on children that is associated with a change in adult expenditure. Under parent altruism, adults cannot increase their own consumption of goods (or leisure) without increasing that of their children. [11]

2.2 *M*-Demands

The first order conditions of the altruistic model can be solved to write elements of child consumption, C_i, as a function of a category of adult consumption, A_j, and all prices ($\boldsymbol{p}$):

$$(4)\qquad C_i = f\,(\boldsymbol{p}, A_j)$$

These are *m*-demands which, with C_i and A_j set at their optimal values, describe the indifference curve between them. In a system of *m*-demands, item demands are expressed as a function of the quantity of a reference good, rather than total expenditure (see Browning 1998). In this case, A_j has been cast as the reference good.[12] A condition on the choice of reference good is that it be normal; this is established for the data used here (section 3.1). *M*-demands have been used, implicitly

[11] The first version of this paper that is available in the public domain (Bhalotra 2001), investigates not only expenditure on child clothing but also schooling and child labour; the work on human capital now being in a separate paper (Bhalotra 2004). Following presentation of this paper in 2001-2, Marco Manacorda has recently applied the basic idea of investigating parental altruism to data on parental and child labour in twentieth century America. His evidence, as that in Bhalotra (2004), is consistent with parental altruism.

[12] The "*m*" arises because *m*-demands can be derived from the marginal rate of substitution. It has no relation to the fact that total expenditure is denoted m. Closed form *m*-demands are obtainable from the first order conditions only for a particular class of utility functions (like the LES). However, the fact that we do not have to simultaneously solve for the budget constraint makes this approach more widely applicable than it is for Marshallian demands (Browning 1998). The choice of reference good is fairly arbitrary but if C_i were defined as the reference good instead of A_j, then the estimated coefficient would be $\partial A j/\partial C_i$, and this would be undefined under the null (see equation (8) below).

or explicitly, in Heckman (1974b), Altonji (1986), Meghir and Weber (1996) and Attanasio and MaCurdy (1997). Browning (1998) investigates the theoretical underpinnings of *m*-demands, and proposes them as useful in maximising the preference information that can be recovered from the data when information on total expenditure is unavailable.[13]

In the current context, *m*-demands offer a natural estimating framework since they directly deliver an estimate of the parameter of interest, $\partial X_{Ci}/\partial X_{Aj}$. Since data on total expenditure are available in the data used in this paper, for comparison, this parameter is also derived from pairs of Marshallian demands (see section 2.3). As discussed in section 1, estimation of *m*-demands or else *pairs* of Marshallian demands is useful compared with estimation of single Marshallian demands because comparison of the ways in which child and adult expenditures vary nets out considerations of income uncertainty and lumpiness in expenditure. This is relevant to our analysis of expenditure on clothing, which may be regarded as a durable good (see Kooreman 2000, footnote 5 for example). M-demands have a potential advantage to the extent that expenditures on sub-aggregates of consumption (A_j) are measured with less error than total expenditure.[14]

2.3 Ratio of marginal income effects

An alternative method of deriving *m*-demands that lends further intuition to the notion of altruism in this paper involves a pair of Marshallian demands:

$$(5) \qquad C_i = C_i\,(\mathbf{p}, m)$$

$$(6) \qquad A_j = A_j\,(\mathbf{p}, m)$$

where C_i and Aj are assignable child and adult consumption and m is household income (or total expenditure). As long as (6) is monotonic, guaranteed by A_j being

[13] Another advantage of *m*-demands, argued by Browning, is that it is not necessary to observe all quantities in order to model the demand for a subset of goods. In contrast, the usual practice of modeling demands as Marshallian involves invoking (often implausible) separability assumptions.

[14] Errors creep into the calculation of total expenditure through imputation of the value of home-produced consumption, consumption of wages in kind, gifts, remittances, and any public transfers. In addition, there are fundamental difficulties in incorporating into estimates of total expenditure, the value of durables and leisure. Measurement of A_j (e.g. adult clothing expenditure) does not encounter these problems.

normal through the range of incomes, it can be inverted to get $m = m(\mathbf{p}, A_j)$ (see Browning 1998). Substituting this in (5) gives:

$$(7)\ C_i = C_i(\mathbf{p}, m(\mathbf{p}, A_j)) = f(\mathbf{p}, A_j)$$

which is nothing but (4), the m-demand for child consumption. This formulation clarifies that income contains no additional information once the level of the reference good is held constant. Studying (7) also reveals that $\partial C_i/\partial A_j$ is simply the ratio of the income effects on the two goods, C_i and A_j:

$$(8)\ \frac{\partial C_i}{\partial A_j} = \left(\frac{\partial C_i}{\partial m}\right)\left(\frac{\partial m}{\partial A_j}\right) = \left(\frac{\partial C_j / \partial m}{\partial A_j / \partial m}\right)$$

If A_j is normal, the denominator of the final term in (8) is positive. Thus testing for altruism by investigating whether $\partial C_i/\partial A_j>0$ boils down to finding out if $\partial C_i/\partial m>0$, or if child consumption (C_i) is normal. In other words, altruism predicts that the demand for child goods is increasing in parental income.[15]

Although this fact has been exploited, for example, in Cox and Rank (1992), popular discussion of the size of the effect of parental income on child outcomes tends to neglect the fact that it contains information about altruism. This is surprising in view of the consistent rejection of altruism in the handful of studies that have directly investigated it (see section 1). The reason is, likely, that the starting point is typically a Beckerian model in which altruism is assumed (e.g. Laitner 1997). Empirical tests based on such a model are then tests not only of the phenomenon of interest but also of the assumption of altruism.

3 Data & Estimation

3.1 Data & variables

The data refer to 2400 rural households containing 18382 individuals interviewed for the Pakistan Integrated Household Survey (PIHS) conducted by the World Bank in conjunction with the Government in 1991. There is extensive information on income,

[15] The test has power against most relevant alternatives except for the one where there is no income effect on the child good as would be the case, for example, if preferences were quasi-linear (e.g. $U=A_j+v(C_i)$). I am grateful to Andrew Foster for pointing this out.

expenditure and the demographic characteristics of households. The average rural household spends 54% of its budget on food, a measure of their poverty.[16]

The dependent variable in the analysis is expenditure on child clothing and footwear (henceforth "child clothing", C). The reference good is expenditure on adult clothing and footwear (henceforth "adult clothing", A_1). Assignable clothing expenditures are commonly used in empirical research on intrahousehold allocation (e.g. Kooreman 2000, Blow *et al* 2004, Browning *et al* 1994). Alternative reference goods explored are tea and coffee (A_2) and tobacco (A_3)[17]. Expenditure on each of the adult items is quite small (see Table 1). As a check against measurement error, results are also reported for the aggregate of the three adult expenditures, referred to as A_4. It remains useful to consider A_1, A_2 and A_3 separately both because using multiple adult goods increases the power of the test, and because the test is then not dominated by properties peculiar to the individual goods. For example, tobacco is potentially addictive and is a predominantly male good. Neither of these considerations applies to expenditure on adult clothing. All expenditures are normalized, per adult and per child respectively. Inclusion in the model of variables describing the age-gender composition of the household allows for any scale economies. Table 1 reports elasticities of item expenditure with respect to total expenditure. This confirms normality of the adult goods (see section 2.2).

The conditioning variables in the model are as follows. Demographic variables that reflect the enormous observed heterogeneity between households appear additively in the specification. The logarithm of household size is included together with the proportions of household members in an exhaustive set of age-gender categories (under-10, 10-14, 15-24, 25-59 and 60-plus). Other exogenous variables allowed to influence the demand for child goods are the gender and the religion of the head of household, an indicator for whether the household owns land, a measure of the size of the plot (zero if no land is owned), indicators for land tenancy arrangements (whether renting or sharecropping land), an indicator for whether the household owns an enterprise, community-level wage rates for adults and children, indicators for the presence of a primary, middle and secondary school in the village

[16] Adjusting for demographics, foodshare is an (inverse) indicator of welfare (see Deaton 1997).

[17] Not alcohol because it is outlawed in Pakistan. While we cannot rule out the possibility that under-15s consume some tea or coffee, it is sufficient for our purposes that tea and coffee are predominantly consumed by adults.

(relevant to the full price of schooling), and province dummies to account for spatial price variation. Some variations on this specification are explored in section 5.

Following international convention, children are defined as under-15. The average household size in the sample is 9 and the average number of "adults" (age greater than 14) 4.5. Thus, while the theoretical discussion is cast in terms of parents and children, in an empirical context where integrated families are common, we are in fact investigating altruism of adults (that may include uncles, aunts, sisters-in-law and grandparents) towards children. This does not make the analysis less interesting from a biological perspective since household members in Asian households are typically closely related to one another. This is less true in sub-Saharan Africa where child fostering and adoption of orphans is widespread, and blood relations within the household can grow quite dilute (e.g. Case, Paxson and Ableidinger, 2002).

3.2 Identification & estimation

The estimated *m*-demands are

$$(9)\ C = \gamma_j A_j + \theta Z + e$$

where household-level subscripts are omitted to avoid clutter, C and A_j were defined in the preceding section as expenditures on child and adult consumption, Z is a vector of exogenous controls, and the coefficient of interest, γ_j, is β/α_j, where β is the weight on child consumption and α_j is the weight on adult consumption (section 2.1). Of course, γ_j is different for the different adult reference goods, (A_j, j=1,..,4), since each is allowed to have its own weight in the adult preference function. If γ_j>0, then the null of parental egoism is rejected, subject to the caveat regarding exchange motives that was elaborated in section 2.

In general, the reference good in an *m*-demand is endogenous just as, in Marshallian demands, total expenditure is endogenous (e.g., Deaton 1985, Browning 1998). Following Browning (1998), it is instrumented with a polynomial (a cubic) in household income. Given the level of the reference good, income should not affect consumption (see section 2.3). Previous studies of demand similarly take income to be a valid instrument for expenditure (Browning 1998: section 6.2, Blundell *et al* 1998, Browning and Chiappori 1998). The argument is that income is correlated with expenditure but uncorrelated with infrequency of purchase and with measurement error in expenditure (e.g. Keen 1986).[18] To investigate whether the IV strategy is robust to non-separability of adult leisure and child consumption, adult labour supply is included as an additional regressor (section 5.3).[19]

Estimation is initially by the two-step efficient generalised method of moments estimator (GMM). This is more efficient than 2SLS and robust to heteroskedasticity of unknown form, as well as to arbitrary intra-cluster correlation (see Wooldridge 2002: p.193). Since households living in close geographic proximity will tend to have some unobservables (like climate, soil or culture) in common, the reported standard errors are adjusted to allow for intra-cluster correlations (see Deaton (1997), Chapter 2). The Hansen-Sargan J statistic, a version of the Sargan statistic that is robust to heteroskedasticity, is presented as a test of the joint null hypothesis that the excluded instruments are valid (see Davidson and McKinnon 1993: pp.235-36). In no case is this rejected.[20] However, the instruments border on being weak. The first-stage R^2 is in the region of 0.20 and the F-test of the income instruments in the first stage is 8.65 in the equation that conditions on adult clothing. It is larger (and >10) for the adult goods aggregate, and smaller for tea & coffee and tobacco (see Table 2, panel 1). When there is a single endogenous regressor, a first-stage F statistic smaller than 10 indicates that the instruments are weak (Stock & Watson 2002, p.350). In this case, the asymptotic approximations that we rely upon when making inferences about coefficients on endogenous variables are unsatisfactory (see Bound, Jaeger and Baker 1995, Staiger and Stock 1997). Following Moreira (2002) and Moreira and Poi (2003), valid tests of the structural coefficients estimated by 2SLS and LIML are obtained, together with critical values of the Wald and likelihood ratio tests that yield correct rejection probabilities even when the instruments are weak. The LIML

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[18] The assumption that validity of the income instrument rests upon is that the dispersion of households over the same budget surface is independent of income. Households can have different incomes even if they have the same total expenditure so that, in instrumenting, we exploit variations between budget surfaces to identify the *m*-demand parameters (e.g. Browning 1998).

[19] The problem is that, if parents who have a taste for expenditure on children work harder, then the error in the child expenditure equation will be correlated with household income, an issue that is often ignored.

[20] Since the instruments are the level, the square and the cube of income, a test of overidentifying restrictions may be seen a test of functional form. In particular, if the Hansen-Sargan test had rejected the instruments, this would be an indication that the benchmark model (equation 9) is not linear, and that it should probably include higher-order terms in A_j. Functional form was directly investigated (see section 5 below) and the linear model could

estimates (Davidson and MacKinnon 1993, pp. 644-51) are reported in preference to the 2SLS estimates since they are known to perform better with weak instruments.[21]

4 Results

4.1 Main results

The estimated equations are of the form displayed in (9). Table 2, panel-1 reports the GMM estimates. For both adult clothing (A_1) and tea & coffee (A_2) (and also for the aggregate, A_4), the null of selfish parents is decisively rejected: increases in income are shared between increases in adult and child consumption, generating a positive covariance of the two. As shown in section 2.3, this corresponds to finding significant effects of household income on child consumption, given normality of adult consumption. As discussed in the preceding section, the 1st-stage F-statistic suggests weak instruments in all cases other than column 4. For this reason, size-adjusted tests of the significance of the endogenous variable (A_j) are obtained following the conditional approach of Moreira (2002). LIML estimates that are insignificantly different from the GMM estimates are shown, together with the associated adjusted LR and Wald tests (Table 2, panel-2). Figure 1 plots the adjusted and unadjusted confidence intervals for the LR test, which Moreira (2002) shows has better overall power properties. This confirms the main finding that, for reference goods other than tobacco, the null of a zero coefficient on A_j is rejected.

The *size* of $\partial C_i/\partial A_j=\beta_j/\alpha_i$ is not of central interest, but consider, for example, the coefficient of 0.52 or 0.56 in column 1, which indicates that the utility weight on child clothing is smaller than that attached to adult clothing. This is consistent with the assumption made in some theoretical research that the weight that parents attach to child consumption is positive but smaller than the weight they attach to their own consumption (e.g. Baland and Robinson 2000; also see Laitner 1997). Alternatively, if parents treat child goods as necessities (and adult goods as luxuries) then, at some point, increases in income will buy more adult goods relative to child goods. This is consistent with the finding in Lundberg, Pollak and Wales (1997) of a negative income effect on the ratio of child to adult clothing. It is also consistent with the idea

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not be rejected. Given linearity of the model, the test is a valid test (has correct size) since the three income terms are linearly independent- although it may have low power.

raised in Blow et al (2004) that child consumption may be protected against income variation.

Estimates of the other coefficients in the model are reported in Appendix Table A1 of the working paper version (Bhalotra 2004). They show some interesting patterns. For example, at a given level of adult clothing expenditure, expenditure on child clothing is higher if there are more girls (consumers of child clothing), and also if there are more women (decision makers that direct expenditure towards child clothing?). That more is spent on girls' than on boys' clothing is also seen, for example, in the Dutch data analysed by Kooreman (2000).

4.2 Smoking and child welfare

There is an apparent anomaly with tobacco (A_3) (see column 3, Table 2), the results for which suggest that, when tobacco expenditure is increased, there is no corresponding increase in child expenditure, consistent with parental selfishness. In order to satisfy the requirement that the reference good is normal (see section 2.2), these estimates use only the sub-sample (70% of total sample) of households with positive tobacco expenditure. A possible interpretation is therefore that there are deviations from altruism amongst those households that contain a smoker. In section 1, it was argued that this is consistent with the addictive properties of tobacco, and with it being a predominantly male good. It is also consistent with other similar findings in the literature. In their study of the impact on intrahousehold allocation of the transfer of child benefit from fathers to mothers in the UK, Lundberg, Pollak and Wales (1997: footnote 6) find no impact on alcohol consumption, although they do find a significant shift in clothing expenditures, in favour of women's and children's clothing. This is consistent with alcohol consumption being addictive or sticky. As discussed in section 1, another study of the UK child benefit finds that child benefit is spent disproportionately on alcohol (Blow et al 2004).

In order to investigate the tobacco effect further, the equation was re-estimated using the full sample, with a dummy denoting positive tobacco expenditure included as an additional regressor (Table 3). The dummy is significant and negative, and now

[21] The 2SLS results are very similar. The LIML estimates do not allow for clustering of standard errors (though the GMM estimates do), but the LR test has been shown by Moreira (2002) to be robust to departures from normality.

the coefficient on tobacco expenditure is positive and significant[22]. This equation is used to predict the level of child clothing expenditure in households that do and do not purchase tobacco. Comparing these predictions shows that children are systematically worse off in smoking households (see Table 3).[23]

The argument made above, that there may be deviations from altruism amongst households that contain smokers, implies that the selection of households with positive tobacco expenditure is endogenous. This creates a potential sample selection bias in the estimates in column 3 of Table 2. In particular, if unobservables that determine what is spent on children are correlated with unobservables (such as the discount rate) that determine whether or not a household smokes, then the tobacco coefficient may carry a (negative) bias. A good instrument for selection into smoking is difficult to find in the PIHS or, indeed, in other cross-sectional household survey data.[24] These estimates are therefore only valid under the assumption that, after conditioning on numerous sources of observed heterogeneity, the decision to smoke is exogenous to the child outcome. If this assumption is unpalatable, then it may be deemed that tobacco is not a good reference good, and the analysis rests on consideration of the results for A_1, A_2, and A_4 (defined in section 3.1).

The selection issue here is similar to that acknowledged but left unaddressed in Browning *et al* (1994). In that paper, which aims to test income pooling amongst Canadian couples, the sample is selected to contain couples without children and in which both partners are in full-time work. The authors reject income pooling but, given that selection into full-time work (and into zero fertility, though they do not discuss this) is endogenous, their results will have been biased towards rejection of

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[22] Investigation shows that estimating the equation on the full sample but failing to allow a distinct intercept effect for non-smoking households results in an insignificant coefficient on tobacco expenditure. Although censoring of a regressor is often ignored in the literature, these investigations show that allowing for it can make a difference.

[23] This result does not simply reflect the fact that poverty is positively correlated with both smoking and lower expenditures on children because the predicting equation includes the level of adult (tobacco) expenditure, which is lower in poorer households. We find that less is spent on children in precisely those households in which more is spent on adults (i.e. tobacco expenditure is positive). It is useful to note that the propensity to consume tobacco is similar amongst poor (bottom 30%) and rich (top 70%) households, being 69% in the former and 70% in the latter. The budget-share of tobacco is higher in poorer households, although nominal spending is lower.

[24] The PIHS community questionnaire does contain information on cigarette prices. Regression of expenditure on tobacco on this price produces a *positive* and significant coefficient. This result persists when the dependent variable is redefined as an indicator for

income pooling to the extent that each partner is more likely to choose full-time work when they suspect that the other partner is less likely to share (or pool) their income.

5 Alternative Specifications

For parsimony, results displayed in this section (see Tables 4, 5) are for the case where adult clothing is the reference good, and the benchmark model is that in column 1 of Table 2. Results using alternative reference goods are available on request.

5.1 OLS & additional instruments

Comparison of the GMM and LIML estimates with their OLS counterparts establishes the importance of allowing for endogeneity of the reference good (see Table 2). The OLS coefficients are biased downward in every case, although the income relation dominates heterogeneity for all definitions of the adult good. Similar OLS biases are observed in *m*-demand estimates using Canadian data, and an identification strategy similar to that pursued in this paper (Browning 1998). The interpretation of a positive correlation of, for example, child and adult clothing in terms of income effects, rather than heterogeneity is important if it is thought that tastes for child and adult clothing may be positively correlated. A further check against this is provided by using alternative reference goods: there is no reason to suppose that tastes for child clothing are correlated with tastes for tea & coffee.

In an alternative specification of the model, a set of overidentifying restrictions is added. These include the community unemployment rate and an interaction of this with household income, the years of schooling of the mother and father of the child, indicators for ownership of land or a household enterprise, and acreage of land operated by the household. The main results are robust to the choice of instruments. With the additional IV, we are able to test for the validity of the income instrument and, indeed, the C-statistic reported in Table 4, column 1 validates it. Since the F-test on the expanded IV-set is no larger (and <10), the preferred results remain those in Table 2.[25]

positive tobacco expenditure, and when functional form is changed. This seems to reflect the poor quality of the price data, and so this information is not used.

[25] Both the preferred strategy and the alternatives experimented with here are common in the literature, exemplified by, for example, Attanasio and Lechene (2003).

5.2 Allowing for child labour

The assumption of income pooling was defended in section 2. Nevertheless, two strategies are adopted to investigate the possibility that child labour affects the relationship of interest. First, the proportion of children in the household who work is included as a control variable, and this attracts a negative but insignificant coefficient (see Table 4, column 2).[26] A bargaining model in which child workers can claim a relatively large share of household resources would predict a *positive* coefficient on the child labour variable. These results are therefore consistent with income pooling. The second strategy is to estimate the model on the sample of households in which no child works (see column 3). In both columns 2 and 3, the key coefficient, $\partial C/\partial A_j$ is larger but insignificantly different from that in the benchmark case.

5.3 Controlling for adult labour

As discussed in section 3.2, income may not be a valid instrument if the implicit assumption of weak separability of adult labour and child clothing does not hold. This is investigated by including an indicator of adult labour supply as a regressor in the consumption model (as in Browning and Meghir 1991). In column 4 of Table 4, this is defined as the proportion of adults in the household who engage in any work that produces a marketable output. Column 5 replaces this with similar variables that distinguish men and women in the household.[27] The coefficient on adult expenditure is not significantly altered compared with the benchmark model. Moreover, the negative sign on all of the adult labour supply variables is consistent with altruism: For the same reason that altruism predicts a positive co-variation of child consumption with adult consumption, it predicts a positive co-variation of child consumption with adult leisure, and therefore, a negative relation with adult labour.[28]

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[26] The child labour variable is instrumented using the community level wage rates for adults and children, indicators for the presence of primary, middle and secondary schools in the community, and interactions of these community variables with the age of the child. The C-statistic for these additional identifying restrictions validates them. The qualitative results are unchanged if child labour is assumed exogenous.

[27] For the results shown, adult labour is assumed exogenous, just as husband's labour supply has been assumed exogenous in numerous studies of women's labour supply. Instrumenting adult labour with the education and age of the adults and interactions thereof (as in Browning and Meghir 1991) produced coefficients that were negative but insignificant, and there was no significant change in the coefficient relating child and adult consumption (available on request).

[28] A similar negative effect of adult labour supply on child clothing is identified in Kooreman (2000). However, he specifies a Marshallian rather than an *m*-demand, and interprets this effect as possibly reflecting the time costs of purchasing child clothing.

5.4 Endogenous fertility

Although economists acknowledge that fertility is a choice variable, this is commonly ignored in empirical work, where household size is routinely treated as an exogenous control variable. A justification of this is to argue that conditioning on size produces a short run effect, which may usefully be compared with the corresponding long run relation by omitting size (e.g. Deaton 1997: p. 221). Dropping size produces the results in column 6, Table 4, which show robustness of the key coefficient to this change.

5.5 Rich *vs* poor households

The model was re-estimated on sub-samples corresponding to the top 70% and the bottom 30%, respectively, of the distribution of log per capita expenditure. The GMM and LIML estimates were poorly determined, possibly on account of the reduced size of the sample. The OLS estimates showed no significant difference in altruism between the rich and the poor. The OLS coefficient on adult clothing is 0.18 in each sub-sample (full results available on request), and 0.20 in the full sample (see Table 2).

5.6 Functional form

The square of expenditure on the reference good was included as an additional regressor but in no case was it significant. This is backed by the Hansen-Sargan tests (see footnote 20). The equations were also estimated in shares, that is, with the dependent variable defined as the ratio of expenditures on C_i and A_j, but this produced a worse fit than seen in the reported equations. A further specification investigated was that in which all consumption expenditures are in logarithms (see column 1, Table 5). Estimates of the key parameters derived from the log models are not significantly different from unity (refer Wald tests in Table), suggesting consistency with the Cobb-Douglas specification. The pattern of coefficients is broadly the same as in the main results.[29]

5.7 Marshallian *vs* *m*-demands

Columns 2 and 3 of Table 5 show a pair of Marshallian demands, for child and adult clothing (refer section 2.3). The key regressor is now total expenditure rather than expenditure on a reference (adult) good. For comparability with the main results,

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[29] The main results are from a linear model (as in Blow *et al* 2004, Edmonds 2002, Kooreman 2000, for example).

total expenditure is instrumented with a cubic in income (refer section 3.2). The ratio of the expenditure coefficients is 0.67, which is not significantly different from the estimate of $\partial C_i/\partial A_j$ of 0.56 obtained from the benchmark *m*-demand.

7 Conclusions

This paper proposes a simple and intuitive test of parental altruism, which is applied to data on parents and young children in a village economy. Previous research on intergenerational altruism has investigated a stronger version of altruism -income pooling- amongst parents and adult children (see section 1), and previous research on child poverty and cash transfers has typically assumed parental altruism. The test proposed in this study involves studying the relation between the consumption patterns of adults and children. Under altruism, adults cannot increase their own consumption of goods (or leisure) without increasing that of their children. The evidence is consistent with parental altruism. This is non-trivial, given previous rejections of altruism. A more tentative finding is that households that consume tobacco spend less on children.

A number of recent anti-poverty programs in Latin America make cash transfers to poor families conditional upon their sending their children to school and taking them to health clinics (see World Bank 2001, Becker 1999). This is consistent with there being some doubt about parental altruism in the field. Alternatively, it may reflect some caution in assuming that parents know what is best for their children. The definition of altruism in this paper- and so also in the work of Becker (e.g. Becker 1981)- is a "working" definition with precise implications for parental expenditure decisions. It is not readily distinguished from "myopia" (or knowing what is best), or from "exchange" motives (refer the discussion in section 2).

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Table 1

Descriptive Statistics

	Mean across households	Standard deviation	Expenditure elasticity
Budget shares:			
Adult clothing & footwear (A_1)	0.043	0.035	0.76
Tea & coffee (A_2)	0.018	0.014	0.60
Tobacco (A_3)	0.020	0.028	0.43
Adult expend: aggregate of above three items (A_4)	0.082	0.051	0.68
Child clothing & footwear (C)	0.029	0.024	0.79
Food	0.537	0.165	0.74
Education	0.035	0.053	0.96
Health	0.103	0.137	1.13
Ceremonies	0.031	0.065	1.20

Notes: N=1340 households. The elasticities in column 3 are obtained as θ from simple regressions of the form $\ln X_k = \theta \ln X + u$, where X_k is normalised expenditure for the item in column 1 and X is total expenditure per capita. For the adult goods, the natural normalisation of expenditure is per adult. For child clothing and education, it is per child. For food, health and ceremonies, it is per household member. Every reported elasticity is statistically significant. A substantial fraction of households report zero spending on tobacco, ceremonies, health and education. In these cases the expenditure elasticity is computed for the sub-sample of households that record positive expenditure.

Table 2

M-Demands for Child Clothing Expenditure

	Adult clothing	Tea& Coffee	Tobacco (smokers)	Adult goods aggregate
	(A_1)	(A_2)	(A_3)	(A_4)
Panel 1: GMM Estimates				
adult expenditure	**0.560****	**1.693***	**0.325**	**0.292****
	[0.196]	[0.780]	[0.240]	[0.109]
Hansen J χ^2; p-value	0.68; 0.71	0.78; 0.68	1.55; 0.46	0.99; 0.61
1st stage F on IV; p-value	8.65; 0.00	4.59; 0.01	6.42; 0.00	11.94; 0.00
1st stage adjusted R^2	0.19	0.33	0.16	0.24
Panel 2: LIML Estimates				
adult expenditure	**0.519****	**2.51****	**0.159**	**0.337****
	[0.152]	[1.06]	[0.242]	[0.096]
LR test; 95% critical value	13.53; 4.41	13.22; 6.06	0.43; 3.57	13.88; 4.83
Wald test; 95% critical value	11.79; 3.66	5.86; 2.81	0.47; 2.55	12.35; 4.26
Panel 3: OLS Estimates				
adult expenditure	**0.206****	**0.234****	**0.100****	**0.135****
	[0.047]	[0.069]	[0.034]	[0.024]
R-square	0.22	0.13	0.18	0.20
N	1324	1324	926	1324

Notes: Robust standard errors in brackets; significance at the 10%, 5% and 1% levels denoted +, * and ** respectively. The dependent variable is expenditure on child clothing and footwear, and the regressor of interest is expenditure on adult consumption (A_j). The category of adult consumption varies across the four columns. For a discussion of estimators and tests see section 3.2. The GMM estimates have standard errors adjusted for cluster-based sampling. Since the F-test on the excluded instruments is <10 in col. 1-3, the LR and Wald tests reported after the LIML estimates are size-adjusted tests based on Moreira's (2002) conditional approach, and these provide the correct rejection probabilities even when the instruments are weak. Also see Figure 1. The F test has degrees of freedom (2, 1296), except in col. 3 where this is (2, 898). The Hansen-Sargan J statistic is distributed as χ^2 with degrees of freedom equal to the number of overidentifying restrictions. Estimates of this statistic and of the first-stage R^2 are identical under GMM and LIML (and 2SLS).

Table 3
Do Children Get Less in Smoking Households?
Tests of conditional mean differences

	GMM	OLS
Regression estimates		
tobacco expenditure	**0.973***	**0.091****
	[0.488]	[0.034]
1(tobacco>0)	**-49.015***	**-4.646***
	[24.063]	[1.974]
Hansen J χ^2; p-value	0.81; 0.67	
1st stage F on IV; p-value	6.18; 0.00	
1st stage adjusted R^2	0.28	0.13
T-tests		
Difference: $C_0 - C_1$	21.67	2.30
t-statistic	14.27	4.05
p<t: H_A: diff<0	1.00	1.00
p>|t|: H_A: diff≠0	0.00	0.00
p>t: H_A: diff>0	0.00	0.00
% change	-55.2	-9.0

Notes: The dependent variable is child clothing expenditure and the reference good is tobacco expenditure. This is similar to column 3 of Table 2 except that now all households are used and a dummy variable (D_S) is defined which equals unity for the 927 (70%) households that report positive expenditures on tobacco and zero for the remaining 400 (30%) households. So $C = \gamma_3 A_3 + \gamma_S D_S + \theta Z + e$. Row 2 shows that $\gamma_S<0$. LIML estimates were obtained though not displayed. The LIML estimate of γ_3 is 1.08, significant at 1%. The LR test statistic is 13.84 which, against a (Moreira-adjusted) critical value of 5.48 implies that we can reject the null that $\gamma_3=0$. The predicted level of C in a smoking household ($D_S=1$) is $C_1= \gamma_3 A_3 + \gamma_S + \theta Z$ and the predicted C in a non-smoking household ($D_S=0$) is $C_0= \theta Z$. The mean difference is reported as ($C_0 - C_1$), with its t-statistic. The null hypothesis is that the difference is zero. The p-values indicate whether the difference is statistically significant for the 1-tailed and 2-tailed tests defined in terms of the alternative hypotheses, H_A. The final row indicates the size of the difference. This is defined as $(C_0 - C_1)/C_0$, expressed in percentage terms.

Table 4

Alternative Specifications: Child Clothing Against Adult Clothing

	Additional IV	**Control for child labour**	**Sub-sample with no child labour**	**Control for adult labour**	**Control for male and female adult labour**	**Drop household size**
Adult clothing expenditure (A_1)	0.605**	**0.377****	**0.670****	**0.480***	**0.509***	**0.496***
	[0.0968]	[0.0882]	[0.232]	[0.198]	[0.201]	[0.294]
Child labour		20.00				
		[20.94]				
Adult labour				-7.833**		
				[3.015]		
Adult female labour					-1.887	
					[1.705]	
Adult male labour					-10.061**	
					[3.039]	
Hansen J χ^2; p-value	2.85; 0.97	4.70; 0.58	0.17; 0.92	0.52; 0.77	0.52; 0.77	2.23; 0.33
C-statistic χ^2; p-value	0.42; 0.94	4.66; 0.46				
1st stage F on IV; p-value	7.36; 0.00	13.71; 0.00	5.12; 0.00	7.63; 0.00	7.63; 0.00	4.76; 0.00

Notes: See Notes to Table 2, and Section 5. Table 2, column 1 is the benchmark model. These are GMM estimates. N=1324, except in column 3, where it is 780. The additional instruments used in column 1 are detailed in section 5.1. The C-statistic is a test of the orthogonality of a specified sub-set of the instruments. In column 1, this is the income cubic. In column 2, it is the set of variables added to instrument child labour (listed in section 5.2).

Table 5

Logarithmic and Marshallian Demands

dependent variable:	**logarithmic Child clothing, C**	**Marshallian Child clothing, C**	**Marshallian Adult clothing, A_1**
Adult clothing expenditure (A_1)	**0.844****		
	[0.178]		
Total household expenditure p.c.		**0.0299*****	**0.0444*****
		[0.003]	[0.013]
Hansen J $\chi^2(2)$; p-value	3.61; 0.17	0.55; 0.76	2.15; 0.34
F(IV); p-value	6.71; 0.00	25.51; 0.00	25.51; 0.00
1^{st} stage adjusted R^2	0.22	0.11	0.11
Wald test elasticity(γ_j)=1: $\chi^2(1)$; p-value	0.77; 0.38		

Notes: See Notes to Table 2, and section 5. These are GMM estimates. The Wald test is a test of the null that the elasticity $\partial \log C_i / \partial \log A_j$ (reported as 0.844 in column 1) is 1. Columns 2 and 3 together imply that $\partial C/\partial A_1 = (\partial C/\partial m)/(\partial A_1/\partial m) = 0.67$, which is not significantly different from 0.56 in Table 2, column 1.

APPENDIX TABLE A1

Child Clothing *(C):* GMM Estimates of *M*-Demands

	Adult clothing	**Tea& Coffee**	**Tobacco**	**Tobacco**	**Adult goods**
	(A_1)	(A_2)	(A_3); smokers	(A_3); all hhs	(A_4)
adult expenditure	**0.560****	**1.693***	**0.325**	**0.973***	**0.292****
	[0.196]	[0.780]	[0.240]	[0.488]	[0.109]
1(tobacco>0)				**-49.015***	
				[24.063]	
ln household size	6.634*	15.853*	8.376+	16.710*	8.945*
	[3.281]	[7.682]	[4.723]	[7.140]	[3.850]
prop 10-14 boys	-33.861**	-19.291	-18.697+	-20.518	-27.737**
	[10.063]	[13.758]	[9.877]	[12.917]	[9.415]
prop males 15-24	15.697+	47.424*	13.299	35.120+	25.828*
	[8.017]	[20.203]	[13.694]	[20.143]	[10.706]
prop males 25-59	11.297	37.935+	-6.700	17.542	12.058
	[12.762]	[21.931]	[11.591]	[14.852]	[11.836]
prop males >60	-2.109	28.933	-0.337	24.964	6.666
	[16.606]	[27.430]	[21.914]	[30.208]	[19.428]
prop 10-14 girls	-19.375+	-2.285	4.159	0.150	-9.427
	[10.777]	[12.965]	[11.831]	[13.035]	[10.087]
prop females 15-24	24.921+	54.086*	16.006	32.665	33.942*
	[12.924]	[25.818]	[16.685]	[22.207]	[15.420]
prop females 25-59	37.520*	62.120+	47.661*	69.108*	46.720*
	[16.549]	[32.157]	[22.622]	[29.881]	[20.162]
prop females >60	42.773*	84.113*	39.376	68.454*	56.677*
	[19.821]	[38.478]	[25.465]	[34.644]	[23.004]
non-muslim	7.028	12.360+	9.201	8.330	5.881
	[5.073]	[6.790]	[6.165]	[8.646]	[5.705]
female head	1.204	0.064	1.351	-6.096	-0.315
	[3.605]	[5.675]	[4.046]	[5.325]	[3.726]
acres	0.178	0.273	0.345	0.295	0.207
	[0.358]	[0.266]	[0.286]	[0.278]	[0.329]
rent	0.102	1.135	-0.966	-2.318	1.045
	[2.042]	[2.925]	[2.306]	[3.337]	[2.270]
sharecrop	-0.128	-0.453	0.707	-1.127	-0.818
	[1.757]	[2.842]	[2.425]	[2.711]	[1.724]
own land	-1.176	-3.360	1.622	-0.091	-0.705
	[3.087]	[3.201]	[2.849]	[2.974]	[2.873]
own enterprise	1.750	2.361	1.716	0.596	1.531
	[1.992]	[2.182]	[1.911]	[3.188]	[2.082]
primary school	2.135	5.083+	4.731+	3.608	2.348
	[2.051]	[2.837]	[2.441]	[3.172]	[1.947]
middle school	0.317	1.400	0.211	-0.458	0.667
	[1.849]	[2.667]	[1.924]	[2.994]	[1.953]
secondary school	0.647	-3.278	-0.986	-2.749	-1.188
	[2.090]	[3.110]	[2.407]	[2.614]	[1.873]
ln child wage	2.624	-2.171	-1.766	-1.972	0.132
	[2.341]	[2.400]	[1.663]	[2.042]	[1.683]
ln adult wage	-3.186	-2.513	8.394*	6.033	-0.127
	[6.984]	[8.667]	[3.549]	[6.307]	[6.404]

Notes: See notes to Table 2. Tests on IV are in Table 2. Province dummies included. *prop* is proportion, acres is of land owned, ln is log. Other than acres and log wages, variables are dummies.

Appendix: A Simple Test of Altruism

The utility function of the altruistic parent is :

(1a) $U = U(A, C, S)$

where A and C denote above-subsistence adult and child consumption respectively, and S is shared subsistence consumption. Both A and C are vectors of goods but, for simplicity, the exposition treats them as single goods. The utility function of the egoistic parent is a restricted form of (1a):

(1b) $U = U(A, S)$

It is assumed that even the selfish parent ensures that the child survives. The budget constraint is

(2) $p_a A + p_c C + p_s S = m$

where m is full income and $\boldsymbol{p=(p_a, p_c, p_s)}$ is a vector of prices. The null hypothesis is that parents are selfish. The first order conditions (FOCs) of interest are:

$$(3)\ g = \frac{U_C}{U_A} \leq \frac{p_c}{p_a} \equiv \theta$$

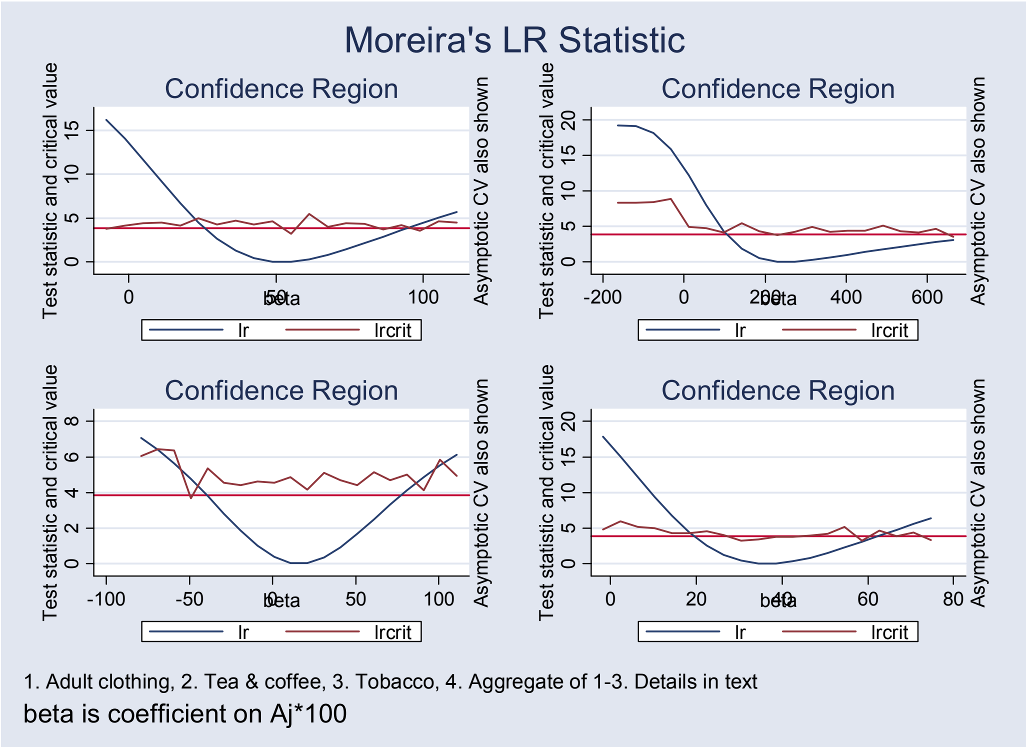
where U_i denotes the marginal utility that adults derive from consumption of good i. Equation (3) holds as an equality if $C<C^*$ where C^* is the level of C at which the marginal utility of C is zero. By the implicit function theorem, the equation $g(A, C) = \theta$ has a unique solution for C as a function of A in a neighbourhood of the optimal quantities of A and C. Moreover, for the solution C = f(A), the derivative of *f* is given by

$$(4)\ \frac{\partial C}{\partial A} = -\frac{\partial g / \partial A}{\partial g / \partial C}$$

The sign of the expression in (4) depends upon the signs of the cross-partials, $(\partial U_A/\partial C)$ and $(\partial U_C/\partial A)$, which are ambiguous in the general case. However, for the commonly used utility functions in the literature, these cross-partials are non-negative,[30] in which case altruism predicts $\partial C/\partial A > 0$. Imposing the restriction implicit in (1b) would yield $\partial C/\partial A = 0$.

[30] As an example, consider the additively separable utility function $U = u_1(A) + u_2(C)$, for which $U_{12} = 0$. In this case, (4) equals $\partial C/\partial A = (u_1'' u_2' / u_1' u_2'')$. Then, under the standard assumptions that $u_1' > 0$, $u_2' > 0$, and $u_1'' < 0$, $u_1'' < 0$ (diminishing marginal returns), $\partial C/\partial A > 0$. Alternatively, for the popular special case, the Cobb-Douglas function, $U = A^{\alpha}C^{\beta}$, $U_{12} \equiv (\partial U_A/\partial C) = (\alpha\beta U)/AC > 0$, and the result follows in a similar way. Separability of parent and child consumption is typically assumed (see Becker 1991, Baland and Robinson 2000).

Figure 1: Conditional Likelihood Ratio Test Statistics and Critical Values Adjusted for Weak Instruments



Notes: See Section 3.2 of the text. Beta is the (scaled) coefficient on the adult expenditure. The asymptotic critical value (CV) is the flat line (lr), the adjusted CV is the jagged line (lrcrit) and the confidence region is the region of the graph where the observed statistic (the smooth curve) lies below its critical value.