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Intrahousehold Allocation of Resources: The Bolivian Family

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Abstract

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Recognizing that intrahousehold inequalities exist, this study focuses on the distribution of resources toward children across household types. A bargaining framework is used to test whether it matters who has control over resources. Results show that control over resources matters, as well as the characteristics of family members. The policy implication is that the education of mothers is important to improve child welfare, over and above the benefits of cash transfer schemes. Parental education campaigns should accompany child welfare programs, particularly among indigenous families. Children fare better when mothers are educated, both parents are present, and there are fewer children.

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I. INTRODUCTION

A growing body of literature points to serious errors in estimating the levels of inequality and poverty when the intrahousehold allocation of resources is overlooked (Haddad and Kanbur, 1990; and Apps and Savage, 1989). Moreover, numerous studies document and test theories underlying the reasons for intrahousehold inequalities across gender (Pitt, Rosenzweiz, and Hassan, 1990; Folbre, 1984; and Newman and Gertler, 1994), earnings potential (Rosenzweig and Schultz, 1982), and expected future benefits (Bernheim, Shleifer, and Summers, 1985; Cox, 1987 and 1990; and Cox and Jakubson, 1995).

The first goal of this paper is to find whether who controls household resources matters in the determination of child welfare. In order to do this, a bargaining household model, where members' bargaining powers are partly determined by their individual incomes, is compared to a traditional household decision-making model that pools household income under the assumption that an altruistic head of household controls the optimal distribution of resources. Previous empirical evidence suggests that bargaining plays a part in most household decisions. Some of the policy implications of this literature have resulted in targeting women for cash transfers in the context of social safety net programs, because studies find that children do better when women control more of the household resources (Lundberg, Pollak, and Wales, 1997; and Thomas, 1990 and 1994). However, cash transfers alone, rather than programs that improve human capital, may not be the best way to promote child welfare. To test this, the model presented in this paper controls for individual characteristics such as age and education to explore how families allocate their resources.

The second goal of this paper is to find whether household type is important in the distribution of resources toward children. A simple model is applied to a developing country where the household structure is demonstrably different from industrialized countries. In particular, the presence of extended family members may lead to important differences in the power relations within a household, and have an important impact in the distribution of resources toward children. If in fact household type is important in determining the allocation of resources toward children, then social programs targeting children must be tailored to reflect the heterogeneity of household types. Bolivia was chosen for this study as it is a developing country, for which statistics on household types and expenditures are readily available.

The rest of the paper is structured as follows: Section II sets up a theoretical framework for traditional and bargaining household decision making, followed by an empirical model in Section III. Then in Section IV, a description of the data and summary statistics is presented. Section V discusses the regression results, and Section VI presents a summary and conclusion.

II. THEORETICAL MODEL

One can specify three alternative household decision-making models: (1) the traditional household joint utility model;[2] (2) an autonomous-decision model where agents demand goods regardless of the rest of the family; and (3) a household bargaining framework.[3] In the traditional model, the household head maximizes his or her welfare(W), which depends on the utility function (U)of household members:

$$W = W[U_1(C_1,L_1),U_2(C_2,L_2),...,U_N(C_N,L_N)] = U_1^N(C_1,C_2,...,C_N,L_1,L_2,...L_N) \quad (1)$$

where C is a composite good, L is leisure, subscript 1 corresponds to the household head, and subscripts $2,...N$ correspond to other household members. This welfare function is maximized subject to the total household budget constraint:

$$\sum_{i=1}^{N} P_c C_i + \sum_{i=1}^{N} w_i L_i = \sum_{i=1}^{N} w_i T + \sum_{i=1}^{N} I_i \quad (2)$$

where w is the wage, P is the price of good C, I is nonearned income, i indexes family members, and T is total time available. Further, the individual household members' consumption must add up to total household consumption. Maximization of this relationship yields a household demand function of the form:

$$C = \sum_{i=1}^{N} C_i = \sum_{i=1}^{N} f\left(P_c, \sum_{i=1}^{N} (w_i H_i + I_i) \right) \quad (3)$$

where $w_i H_i$ is person i's earnings, and hours of work are defined as $H_i = T - L_i$.

The autonomous model, on the other hand, first maximizes each individual's utility subject to his or her own budget constraint, and then the resulting individual demands are added up to obtain total household demand. This is the case for households that are made up of independent members, such as college roommates. In other words, individuals maximize their own utility independent of the other members:

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[2] The traditional model, otherwise known as the "common preference" or the "consensus" model, draws its theoretical underpinnings from Samuelson's (1956) common preference model and Becker's (1974) altruist model.

[3] Household bargaining models with a Nash solution concept have their theoretical underpinnings from Manser and Brown (1980) and McElroy and Horney (1981). Other solution concepts have been explored in household models, such as noncooperative bargaining models in Lundberg and Pollak (1993).

$$U_i = U(C_i, L_i) \tag{4}$$

subject to their own budget constraints:

$$P_c C_i + w_i L_i = w_i T + I_i \tag{5}$$

yielding individual demand functions of the form:

$$C_i^* = f(P_c, (w_i H_i + I_i)) . \tag{6}$$

Total household demand is then determined by the sum of the individual demands:[4]

$$C = \sum_{i=1}^{N} C_i^* = \sum_{i=1}^{N} f(P_c, w_i H_i + I_i). \tag{7}$$

Unfortunately, since individual shares in household consumption are not available in typical data sets, it is impossible to distinguish this model from the traditional one. Finally, a Nash bargaining model will maximize a welfare function of the form:

$$\prod_{i=1}^{N} [U_i(C_i, L_i) - V_i(P_c, w_i, I_i, A_i)] \tag{8}$$

where V is the individual's threat point, and A is a set of individual characteristics that influences this threat point.[5] This welfare function will be maximized subject to (2) as shown earlier. The solution will yield the following demand functions which will add up to total household demand:

$$C_i^* = g[P_C, w_1 H_1, w_2 H_2, \ldots, w_N H_N, I_1, I_2, \ldots, I_N, A_1; A_2, \ldots, A_N], \tag{9}$$

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[4] Note that this solution precludes the consumption of collective goods.

[5] A cooperative Nash solution is the element of the possible set of outcomes that is individually rational and that maximizes the product of the gains from the agreement. This means that people will agree if and only if doing so makes them better off than acting on their own (i.e., the threat point), while at the same time maximizing the gains to all members.

Note that the main difference between the traditional and bargaining models is that in the latter case, household consumption depends on individual incomes. In the traditional model, household consumption depends on total household income, regardless of the source.

III. EMPIRICAL MODEL

Individual consumption data that can be distinguished across household members are difficult to find. Household surveys typically capture total household consumption of food and other goods. Following Browning and others (1994) and Lazear and Michael (1988), this study assumes expenditures on clothing are exclusive goods since sharing of clothing between adults and children is likely to be limited.[6] The Bolivian Household Survey separates data on household clothing expenditures into adult and children's clothes; this separation can show how expenditures on children's clothing vary with changes in individual and household characteristics. Although clothing is not the largest expenditure component, it is easily identifiable and exclusive to children's consumption. Assuming a linear expenditure system, the traditional household model can be specified as follows:

$$KC_h = \alpha + \beta \sum_{i=1}^{N} \left(w_{ih} H_{ih} + I_{ih} \right) + \sum_{j=1}^{M} \varphi_j Q_{jh} + \varepsilon_h \tag{10}$$

KC_h are monthly expenditures on children's clothing in household h, $w_{ih}H_{ih}$ are member i's earnings and I_{ih} is member i's nonlabor income in household h.[7] Finally, Q_{jh} is a vector of household characteristics.

This traditional approach can be augmented by including individual characteristics of all household members, as in Barnes and Gillingham (1984). If the altruist head of the household incorporates all of the attributes of each of the household members into his maximization problem, then it is reasonable to assume that individual characteristics will be determinants of the optimal solution and therefore should be incorporated into the estimation procedure. This augmented traditional approach would therefore yield the following relationship:

$$KC_h = \alpha + \beta \sum_{i=1}^{N} \left(w_{ih} H_{ih} + I_{ih} \right) + \sum_{j=1}^{M} \varphi_j Q_{jh} + \sum_{i=1}^{N} \delta_i A_{ih} + \varepsilon_h \tag{11}$$

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[6] A good is exclusive if people can be excluded from consuming it (Varian (1992), p. 414).

[7] Nonlabor income is defined as including pensions, alimony, gifts, rents, interest, etc.

where A_{ih} is a vector of individual i's personal characteristics, for all individuals in household h. Equation (11) nests equation (10) as $\delta_i = 0$ can be tested.

The main difference in the bargaining model is that household income is no longer pooled, and the income each family member controls matters. This can be specified as follows:

$$KC_h = \alpha + \sum_{i=1}^{N} \beta_i \left(w_{ih} H_{ih} + I_{ih} \right) + \sum_{j=1}^{M} \varphi_j Q_{jh} + \sum_{i=1}^{N} \delta_i A_{ih} + \varepsilon_h$$

(12)

The difference in the augmented traditional model is that each member's income is entered into the equation separately, and each one's impact on household spending can be different ($\beta_i \neq \beta_q$ is possible for members i and q in household h). Equation (12) nests equation (11) as the following restriction can be tested: $\beta = \beta_i$ for all individuals in household h.

The traditional model assumes that pooled household income is the relevant variable to use as a regressor, and implicitly assumes that who controls the resources does not matter because these resources are optimally distributed within the household.[8] In the unrestricted bargaining model, on the other hand, income enters separately for each individual.[9]

The reasoning for the inclusion of individual characteristics in the traditional model is that heads of households can take into consideration the characteristics of individual members before they make resource allocation decisions. In the bargaining framework, the interpretation is that individual characteristics determine the relative bargaining power of household members in the decision-making process. Either way, if individual characteristics are important determinants of resource distribution, then transfer schemes that target low income mothers may not be as efficient in improving child welfare as alternative schemes that also target family characteristics. Empirically, both individual and family characteristics are included in the regressions to distinguish the effects of income in the hands of women and her individual characteristics on child welfare. This would be consistent with controlling for individual "ability," which could lead to improving children's welfare over and above the contribution of having additional income. If women's individual characteristics influence household spending more significantly than their control over resources, then the policy implication is that wives need to be educated and granted abilities, rather than simply provided with targeted income transfers.

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[8] See equation 3 above.

[9] See equation 9 above.

In the next section, equations (10) through (12) are estimated for different household types, including single-headed households, couples where the wife may or may not work, and extended families. Further, a log likelihood ratio test is performed to test the alternatives for nuclear and extended families.

IV. DATA

The data used in this study are taken from the 1993 Bolivian Urban Household Survey conducted by the Bolivian National Statistics Institute in conjunction with the World Bank. The survey includes the nine most important urban centers,[10] covering 4,297 representative households and 20,160 individuals. Table 1 presents basic household characteristics, noting that 24 percent of households contain extended families and on average 79 percent of households have indigenous members in the household.[11] Table 2 presents the basic profiles of the average nuclear family while Table 3 presents the profiles of the average extended family household. Note the differences between nuclear and extended family characteristics. Average household income is higher in extended families, as are total expenditures. Monthly expenditures on clothing per child are slightly higher in nuclear families.

Table 4 further distinguishes nuclear and extended family characteristics according to the number of children in the household. Note that households with two children contain the most educated heads of family and spouses when compared to households with none, one, or more than four children, indicating that larger families are more prevalent in less educated households. Also note that the average share of expenditures for different commodities is fairly stable regardless of the number of children in the household or on whether the household contains extended family members. As expected, the share of spending on food is higher for bigger households.

Expenditures for all categories are derived from answers to the expenditure portion of the survey. Unfortunately, the survey does not contain information on the number of durable goods owned in each home so that the stock of durables in the home cannot be calculated. As a result, the value presented under durable goods only corresponds to current purchases of durable goods. Housing is treated as a flow of services, so rent must be imputed for owner-occupied housing. The survey contains information on housing characteristics, including the number of bedrooms, bathrooms, and kitchens in the home, as well as the materials used for the walls, ceiling and floors, and the availability of electricity and water. This information is used to construct a hedonic rent equation and impute rent values for

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[10] Eight of these are state capital cities.

[11] Indigenous people are defined with a dummy equaling one if the individual speaks one or more of the native languages, even if she speaks Spanish as well. See Psacharopolous (1993) for a similar treatment.

Table 1. Bolivia: Household Characteristics

	All Sample		Nuclear Families		Extended Families	
	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
Household compostion						
Number of household members	4.7	2.3	4.8	1.8	6.0	2.7
Number of household job holders	1.8	1.2	1.7	1.0	2.2	1.4
Number of infants under age six	0.7	0.9	0.8	0.9	0.8	1.0
Number of extended family members	0.5	1.2	0.0	0.0	2.1	1.7
Number of indigenous members	2.0	1.8	2.2	1.7	2.5	2.1
Percentage of indigenous members	44.8	34.9	46.9	33.6	43.5	32.6
Family composition						
Number of spouses	0.7	0.4	1.0	0.0	0.6	0.5
Number of sons/daughters	2.4	1.8	2.8	1.8	2.2	1.9
Number of in-laws	0.1	0.2	...	...	0.2	0.5
Number of grandchildren	0.2	0.8	...	...	1.0	1.4
Number of sisters/brothers	0.1	0.4	...	...	0.3	0.8
Number of parents	0.1	0.2	...	...	0.2	0.5
Number of other family members	0.1	0.4	...	...	0.3	0.7
Number of domestic workers	0.1	0.3	...	...	0.1	0.3
Number of nonfamily members	0.0	0.2	...	...	0.0	0.2
Total labor income (in Bolivianos)	1004.6	1745.2	896.7	1076.8	1202.5	1409.3
Total nonlabor income (in Bolivianos)	69.0	214.6	38.4	175.5	119.0	254.5
	(Percentage of households)					
Household characteristics						
Nucelar families	54.7	49.8	100.0	0.0	0.0	0.0
Extended families	24.0	42.7	0.0	0.0	100.0	0.0
Families with grandchildren	12.5	33.1	...	...	52.1	50.0
Families with grandparents	4.9	21.5	...	...	20.3	40.2
Families with brothers/sisters	5.2	22.3	...	...	21.8	41.3
Families with other family members	4.6	20.9	...	...	19.1	39.3
Characteristics of the head of household						
Head is male	81.3	39.0	99.7	5.5	69.3	46.2
Head is married	73.9	43.9	99.9	2.9	58.9	49.2
Head is indigenous	57.1	49.5	59.7	49.1	57.3	49.5
Head's age (in years)	44.5	14.4	41.3	12.3	49.8	15.8
Head's education (in years)	9.3	5.9	9.4	5.4	9.0	6.1
Head's monthly wage (in Bolivianos)	660.0	1,380.4	667.5	897.4	557.7	905.3
Head's unearned income (in Bolivianos)	57.4	194.8	33.2	162.8	87.6	220.7
Single income household	39.1	0.5	0.4	0.5	0.3	0.4
Households with extended family members	24.0	42.7	0.0	0.0	100.0	0.0
Households with indigenous members	79.0	40.7	82.0	38.4	84.6	36.1
Sample	4,297		2,350		1,031	

Source: Calculations based on the 1993 Bolivian Household Survey.

Table 2. Bolivia: Characteristics of the Average Nuclear Family

	All Sample		With Children		With No Children	
	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
Household size	4.5	2.0	5.0	1.7	1.4	0.5
Number of children	2.0	1.4	2.3	1.3		
Number of teens ages 12 to 21	0.7	0.9	0.8	1.0	0.2	0.4
Number of adults over age 20	1.8	0.4	1.9	0.4	1.3	0.6
Number of elderly	0.0	0.2	0.0	0.1	0.2	0.5
Number of household head's children	1.1	0.8	1.3	0.7		
Number of sons/daughters	2.6	1.9	3.1	1.7		
(Percent of family members)						
Indigenous members in the household	61.3	48.7	61.6	48.7	59.4	49.2
Children under age 6	0.4	0.4	0.4	0.4		
Children ages 6 to 12	0.5	0.4	0.5	0.4		
Teens ages 13 to 20	0.3	0.6	0.4	0.6		
Male children	0.2	0.3	0.2	0.3		
Employed adults	0.7	0.3	0.7	0.3	0.6	0.4
Employed teens	0.1	0.3	0.1	0.3	0.1	0.3
Employed children under age 12	0.1	0.3	0.1	0.3		
(In Bolivianos)						
Household earned income	807.5	1012.7	856.3	1018.2	519.2	929.9
Household unearned income	20.0	129.8	13.0	124.3	61.4	152.1
Per capita spending on child clothing	31.7	54.7	37.0	57.4		
Per capita spending on adult clothing	44.5	103.8	38.9	92.7	77.6	150.2
Total household expenditure	1003.4	785.9	1030.5	767.3	843.5	872.6
(Percentage of households)						
Households with a spouse	0.8	0.4	0.9	0.3	0.4	0.5
Households with female head	0.1	0.3	0.1	0.3	0.2	0.4
Households with no children	0.1	0.4	0.0	0.0	1.0	0.0
Household head's education(in years)	9.5	5.4	9.5	5.2	9.8	6.1
Head's wage rate (in Bolivianos)	3.3	4.3	3.4	4.4	2.9	3.6
Head's labor earnings (in Bolivianos)	660.8	914.3	691.8	914.2	477.6	894.7
Head's nonlabor income (in Bolivianos)	18.5	129.0	11.4	123.5	60.6	151.5
Head's age (in years)	37.7	9.8	37.0	8.3	41.7	15.6
Head's work week (in hours)	46.3	23.2	48.1	22.1	35.8	26.3
Ratio of children to adults	1.1	0.8	1.2	0.7		
Sample size	1719		1470		249	

Source: Calculations based on the 1993 Bolivian Household Survey.

Table 3. Bolivia: Characteristics of the Average Extended Family

	All Sample		With Children		With No Children	
	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
Household size	5.9	2.8	6.6	2.5	3.2	1.8
Number of children	1.6	1.5	1.9	1.5	0.4	0.9
Number of teens ages 12 to 21	1.2	1.2	1.3	1.3	0.8	1.0
Number of adults over age 20	3.2	1.5	3.5	1.4	2.0	1.2
Number of extended family members	2.2	1.7	2.3	1.7	2.0	1.8
Number of head of household's children	1.0	1.1	1.3	1.1		
			(Percentage of family members)			
Indigenous members in the household	60.6	48.9	60.4	49.0	61.5	48.8
Children under age 6	33.4	39.7	39.6	40.0	10.9	28.7
Children ages 6 to 12	39.7	41.7	45.9	41.1	17.1	35.7
Teens ages 13 to 20	56.2	88.4	65.3	90.3	23.0	72.4
Male children	16.7	30.3	19.9	32.1	4.9	18.8
Employed adults	57.1	30.5	60.3	26.2	45.4	40.9
Employed teens	17.8	34.0	18.2	34.1	16.1	33.9
Employed children under age 12	16.8	44.0	18.0	43.1	12.4	46.8
			(In Bolivianos)			
Household earned income	1126.1	1296.6	1274.4	1360.8	587.0	834.4
Household unearned income	106.6	208.9	103.4	202.4	118.5	231.3
Per capita spending on children's clothing	27.6	51.5	33.3	55.6	6.7	22.0
Per capita spending on adult clothing	34.5	77.8	28.2	53.7	57.5	130.3
Total household expenditure	1160.8	734.7	1243.0	767.1	862.2	500.8
Household head's wage rate	3.0	4.1	3.2	4.3	2.4	3.1
Household head's labor earnings	491.6	752.6	544.6	804.0	298.9	480.0
Household head's nonlabor income	75.7	170.7	74.5	173.8	80.3	159.4
Spouse's wage	1.6	4.4	1.7	4.5	0.5	0.6
Spouse's earnings	201.6	730.5	213.7	757.2	51.7	132.7
Spouse's nonlabor income	8.3	70.7	7.1	66.2	23.2	113.4
Average extended family's wage	2.6	3.0	2.6	3.0	2.6	2.8
Average extended family's nonlabor income	15.6	55.9	13.8	52.5	22.3	66.7
Average extended family's earnings	143.5	366.0	147.7	391.0	128.4	256.2
			(Percentage of households)			
Female head of household	30.2	45.9	26.7	44.3	42.7	49.6
Household with no children	21.6	41.2	0.0	0.0	100.0	0.0
Household head's education (in years)	8.8	6.0	8.6	6.0	9.5	6.0
Spouse's education (in years)	7.5	5.8	7.7	5.8	4.8	4.9
Average extended family's education	7.4	5.0	7.0	4.9	8.8	5.1
Household head's age	49.3	16.4	50.2	15.0	46.4	20.4
Spouse's age	45.0	14.4	43.9	13.3	58.3	20.0
Average extended family's age	31.3	21.8	31.9	22.1	29.4	20.4
Household head's hours of work per week	34.0	28.9	36.1	29.1	26.7	26.7
Spouse's hours of work per week	20.3	27.1	20.5	27.1	17.1	26.4
Average extended family's hours of work	15.0	22.0	15.4	22.3	13.8	20.6
Sample	663		520		143	

Source: Calculations based on the 1993 Bolivian Household Survey.

Table 4. Bolivia: Families with Spouse Present

	Nuclear Families One Son or Daughter		Extended Families One Son or Daughter		Nuclear Families Two Sons or Daughters		Extended Families Two Sons or Daughters		Nuclear families Four or More Sons or Daughters		Extended families Four or More Sons or Daughters	
	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
Education					(Years of education)							
Household head	9.9	5.4	7.7	6.1	10.8	5.2	9.3	5.9	7.8	4.7	7.9	5.4
Spouse	7.9	5.7	6.8	5.7	9.0	5.7	8.9	6.0	5.5	4.7	5.8	5.0
Son/daughter	3.9	5.5	8.5	6.3	4.4	4.7	8.1	5.6	5.8	3.0	7.9	3.7
Extended family			7.6	4.9			7.0	5.1			5.8	4.6
Age					(Years)							
Household head	39.3	14.8	53.3	18.1	38.7	11.7	49.0	16.0	42.0	8.0	48.2	10.7
Spouse	35.9	14.1	45.2	18.4	34.7	10.6	43.1	13.8	38.0	7.1	43.6	9.7
Son/daughter	7.8	9.8	22.3	15.5	9.1	8.1	18.3	11.9	12.9	3.8	17.6	7.1
Extended family			26.7	17.7			32.8	22.8			32.6	23.3
Region					(Percentage of households)							
East	37.7	48.5	38.0	48.7	39.2	48.9	35.2	47.9	35.2	47.8	25.0	43.5
Central	22.7	41.9	31.9	46.8	22.9	42.1	33.8	47.5	27.9	44.9	36.1	48.2
West	23.5	42.5	20.5	40.5	24.5	43.1	21.1	41.0	22.4	41.7	29.2	45.6
					(In Bolivianos)							
Unearned income	31	113	120	224	37	165	100	191	17	126	79	190
Earned income	859	1301	959	1102	1009	1253	1104	880	829	666	1662	1844
Total expenditures	971	698	1155	727	1115	780	1195	729	1043	673	1311	759
Household expenditures:					(Percentage of total expenditures)							
Food	48.3	16.4	48.3	14.4	49.1	15.6	50.3	14.9	52.3	15.6	50.3	13.8
Health	5.5	11.2	6.5	11.9	4.4	8.6	4.8	9.4	3.6	9.0	4.0	7.3
Transportation	9.6	8.1	10.6	8.1	10.2	8.1	11.0	7.7	9.4	8.0	9.8	7.3
Services	7.9	5.5	9.9	6.1	8.1	4.6	9.3	5.4	7.7	4.3	8.9	4.7
Education	1.5	4.0	2.9	5.1	3.1	5.6	4.2	6.0	3.2	5.1	3.5	5.1
Clothing	3.8	5.8	4.2	4.2	4.3	4.8	3.7	4.2	4.7	5.4	4.4	4.7
Nondurables	3.9	3.0	4.3	3.0	4.1	3.2	4.3	3.1	3.9	3.0	4.8	3.7
Durables	1.1	4.5	0.7	2.9	1.1	4.2	0.2	0.9	0.6	2.7	0.9	2.7
Housing items	18.5	17.8	12.8	13.3	15.6	16.1	12.2	14.7	14.7	16.0	13.4	14.7
Sample 1/	366		166		554		142		664		144	
Sample 2/	297		149		479		129		599		131	

Source: Calculations based on the 1993 Bolivian Household Survey.

1/ Sample size containing data on household characteristics and income.

2/ Sample size containing data on household expenditures.

owner-occupied housing.[12] Total expenditures are constructed from the sum of expenditures on food, health, transportation, services, schooling, clothing, housing, durables, and nondurables.

The sample of households that will be used in the regression analysis are households that have children but no nonfamily members present, and that have supplied responses for the necessary variables. The dependent variable in this study is monthly expenditures on children's clothing, where expenditures are measured on a monthly basis in Bolivian pesos. Table 5 presents some basic differences in expenditures on clothing across households in the sample. Note that 37.9 percent of households spend more on adult clothing than on children's clothing, 30.3 percent spend the same amount on adults as on children (this includes households that spend nothing on clothing at all), and 31.8 percent of the sample spend more on children than on adults. Note also that 79 percent of homes with children have both parents, 15 percent are single mothers, and the remaining 6 percent are single fathers.

Clothing is a relatively small share of total household spending. As shown in Table 4, it makes up only about 4 percent of total household expenditures for both nuclear and extended families. In addition, there may be important differences among households in the quality of clothing; these differences are not captured by the data on expenditures. Therefore, household inequalities beyond what is captured by the clothing variable are not observable. Data on food consumption would be more representative; however, as mentioned earlier, typical data sets do not contain individual shares on household consumption.[13] As a result, a different branch of literature has concentrated on the consumption of exclusive goods, such as clothing.[14] It is in this spirit that clothing is used in this study. However, given that clothing costs are a small share of spending, the policy implications should be interpreted only in relation to the child's welfare as measured by clothing expenditures.

Table 6 presents the average monthly expenditures on clothing by household type. First, note that nuclear families spend more on clothing per child than extended families, on average; however, this masks important differences across household types. In homes with no extended family members, single parents spend the least per child, while couples with a working mother spend the most per child. In households with extended families, households headed by single working mothers spend the most on children's clothing, followed by single

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[12] The results of this hedonic rent equation are available upon request.

[13] While some studies have used weight-for-height and height-for-age indicators as alternatives (Thomas, 1990 and 1994), these are subject to problems in the definition of standards. In addition, as pointed out by Pitt, Rosenzweig, and Hassan (1990), the unequal distribution of food may be because certain members require a higher calorie intake due to participation in activities in which productivity is sensitive to health issues.

[14] See Browning and others (1994); and Lazear and Michael (1988).

Table 5. Bolivia: Expenditures on Clothing

Clothing Expenditures	Mean	Standard Deviation
	(In Bolivianos)	
Per capita expenditures on children	7.74	13.62
Per capita expenditures on adults	13.59	29.29
Difference in clothing expenditures	-5.85	29.39
	(Percentage of homes)	
Homes spending more on		
Adults	37.9	48.5
Children	31.8	46.6
Equally on children & adults	30.3	46.0
Labor force		
Household head participates in the labor force	81.9	38.5
Spouse participates in the labor force	34.8	47.6
Extended family participates in the labor force	8.2	27.4
Presence in the household:		
Spouse present in the home	79.7	40.2
Extended family member present in the home	26.1	43.9
Types of homes		
Couples	79.1	40.6
Female-headed households	15.6	36.3
Single-female-headed households	15.0	35.7
Single working mothers	9.6	29.5
Single nonworking mothers	5.4	22.6
Married working mothers	34.3	47.5
Married nonworking mothers	44.9	49.7
Ratio of children/adults	1.40	0.95
Sample	2,762	

Source: Calculations based on the 1993 Bolivian Household Survey.

Table 6. Bolivia: Expenditures on Children's Clothing by Household Type

	Sample Size	Average Monthly Expenditure on Children's Clothing	Standard Deviation
		(in Bolivian Pesos)	
Nuclear families	2040	7.76	13.42
Extended families	722	7.70	14.16
Homes with no extended family members			
Single men	62	3.77	8.84
Single women	215	4.78	12.03
Couples	1757	8.22	13.56
Single working mothers	164	5.30	12.45
Single nonworking mothers	51	3.11	10.49
Married working mothers	767	9.20	15.19
Married nonworking mothers	990	7.47	12.10
Homes with extended family members			
Single men	83	7.02	15.18
Single women	200	9.08	18.33
Couples	429	7.12	11.45
Single working mothers	102	10.61	20.73
Single nonworking mothers	98	7.49	15.40
Married working mothers	180	7.15	10.60
Married nonworking mothers	249	7.10	12.06

Source: Calculations based on the 1993 Bolivian Household Survey

women. In both nuclear and extended families, children seem to fare better if women are economically active. The following regression analysis will help to disentangle some of these results.

V. REGRESSION RESULTS

Regression results are presented in Tables 7 through 9. Two questions are addressed. First, are the data best described by the traditional or the bargaining model, and subsequently do personal income or personal characteristics make the difference in household distribution? Second, does household type greatly affect the household distribution of resources? In particular, what is the role of the extended family in household decision making and in the distribution of household resources?

A. Bargaining vs. Traditional Models

Equations (10) through (12) were estimated on the subsample of nuclear and extended family households where both parents are present. As shown in Table 7, the traditional, augmented traditional, and the bargaining alternatives show that as household income rises, spending increases. Both the augmented traditional model and the bargaining model show that the level of education of the head of household and spouse positively and significantly affect expenditures on children's clothes. A log likelihood ratio test of the traditional versus the augmented traditional models rejects the null hypothesis that individual characteristics do not matter. Note that once individual characteristics are included in the regression, whether or not the household head is indigenous becomes insignificant. Household size and the number of children in the home have the expected significant impacts on spending, because as the household size increases, less is spent on children's clothing. Not surprisingly, if the number of children increases, monthly expenditures on clothing decrease. Finally, the dummy indicating whether or not there are extended family members in the household is insignificant.[15]

Regarding the bargaining versus the traditional model, a log likelihood ratio test rejects the null hypothesis that individual incomes should not enter separately in the regression equation. The head of household's and spouse's individual incomes are significant in the bargaining model. This leads to the conclusion that it matters who controls household income, and individual characteristics of family members have a significant impact on household spending decisions.

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[15] Unfortunately the data do not contain information on the relationship between the extended family and each of the spouses in order to test whether relationship to the head has an impact on bargaining power.

Table 7. Traditional Versus Bargaining Models: Nuclear and Extended Families 1/ 2/

	Traditional Model		Augmented Traditional		Bargaining Model	
	Estimate	Standard Error	Estimate	Standard Error	Estimate	Standard Error
Constant	16.851	2.196 **	6.938	3.442 *	4.094	3.394
Household income	0.007	0.001 **	0.006	0.001 **		
Household head's income					0.007	0.002 **
Spouse's income					0.006	0.002 **
Household head's education			0.511	0.169 **	0.459	0.173 **
Household head's age			-0.015	0.108	-0.015	0.108
Spouse's education			0.592	0.182 **	0.557	0.183 **
Spouse's age			-0.121	0.123	-0.115	0.122
Number of children	5.387	0.780 **	4.516	0.850 **	3.264	0.821 **
Household size	-3.291	0.752 **	-1.829	0.776 *	-0.481	0.717
Extended family	-0.720	1.841	-0.477	1.819	-0.075	1.806
Indigenous household head	-3.384	1.423 *	0.035	1.414	-0.217	1.420
Sample	2202		2202		2202	
Adjusted R squared	0.081		0.109		0.114	
Log likelihood ratio tests	86.33		14.29			

Source: Estimates based on the 1993 Bolivian Household Survey.

1/ Standard errors are heteroskedastic-consistent.

2/ Subsample where the spouse is present.

(*) and (**) denote statistical significanceat the 1, and 5 percent levels, respectively.

Table 8. Bolivia: Extended Families 1/

	Traditional		Augmented Traditional		Bargaining Model	
	Estimate	Standard Error	Estimate	Standard Error	Estimate	Standard Error
Constant	15.230	4.524 **	7.130	7.901	4.972	7.994
Household income	0.005	0.001 **	0.003	0.001 **		
Household head's income					0.005	0.002 *
Spouse's income					0.003	0.003
Extended family income					-0.002	0.005
Household head's education			0.230	0.278	0.103	0.287
Household head's age			0.240	0.316	0.242	0.311
Spouse's education			0.756	0.360 *	0.754	0.369 *
Spouse's age			-0.305	0.301	-0.296	0.296
Average extended family education			0.428	0.311	0.519	0.331
Average extended family age			-0.081	0.065	-0.091	0.064
Number of children	-1.678	1.016	-1.081	1.042	-0.166	0.972
Household size	3.121	1.123 **	2.876	1.302 *	1.998	1.271
Indigenous household head	-1.365	2.740	1.193	2.728	0.715	2.725
Sample	439		439		439	
Adjusted R squared	0.060		0.096		0.100	
Log likelihood ratio test	27.29		4.033			

Source: Estimates based on the 1993 Bolivian Household Survey.

1/ Standard errors are heteroskedastic-consistent.

2/ Subsample where the spouse is present.

(*) and (**) denote statistical significanceat the 1, and 5 percent levels, respectively.

Table 9. Bolivia: Household Type 1/

	All Sample		Single Head of Household		Couples		Indigenous Head of Household		NonIndigenous Head of Household	
	Estimate	Standard Error	Estimate	Standard Error	Estimate	Standard Error	Estimate	Standard Error	Estimate	Standard Error
Constant	0.387	3.043	-7.672	4.865	4.050	3.393	5.959	3.387	-0.062	7.055
Household income	0.007	0.001 **	0.008	0.002 **						
Household head's income					0.007	0.002 **	0.007	0.003 *	0.006	0.002 **
Spouse's income					0.006	0.002 **	0.005	0.001 **	0.008	0.004
Household head's education	0.785	0.122 **	0.499	0.196 *	0.465	0.174 **	0.234	0.194	0.875	0.338 **
Household head's age	-0.075	0.046	0.080	0.089	-0.014	0.108	-0.183	0.102	0.301	0.238
Spouse's education					0.555	0.183 **	0.559	0.206 **	0.535	0.367
Spouse's age					-0.116	0.122	0.015	0.119	-0.385	0.274
Number of children	4.149	0.729 **	-1.390	1.199	-0.481	0.718	0.234	0.814	-1.868	1.413
Household size	-1.642	0.656 *	4.046	1.424 **	-3.267	0.822 **	2.578	0.958 **	4.693	1.546 **
Extended family members	0.325	1.407	3.171	2.015	-0.126	1.811	0.3033	2.0926	0.1961	3.4079
Indigenous household head	-1.242	1.182	-2.118	1.797	-0.227	1.420				
Single female household head	3.587	2.110								
Couples	6.250	2.020 **								
Female household head			3.394	2.204	2.598	7.100				
Sample	2762		560		2202		1366		836	
Adjusted R squared	0.120		0.183		0.114		0.108		0.104	

Source: Estimates based on the 1993 Bolivian Household Survey.

1/ Standard errors are heteroskedastic-consistent.

(*) and (**) denote statistical significance at the 1, and 5 percent levels, respectively.

Table 8 shows the results of testing the traditional against the bargaining alternative with a subsample of extended families where the spouse is present. Of primary interest is whether extended family members' characteristics have an impact on the distribution of clothing expenditures. However, none of the extended family characteristics are significant. The spouse's level of education continues to be positive and significant, but in contrast to the previous sample, the bargaining model shows that all other individual characteristics for heads and spouses are insignificant. A log likelihood ratio tests rejects at the five percent level of significance the null hypothesis imposed by the traditional model when compared to the augmented traditional model. In other words, individual characteristics are important determinants of household spending. However, a likelihood test can not reject the null hypothesis imposed by the augmented traditional model when compared to the bargaining model. In conclusion, the individual characteristics, rather than control over income, are the most crucial in extended families.

B. Household Type

Table 9 presents regressions for different household types, beginning with a simple model for the entire sample of households with children. The model includes dummies for households that are headed by single females and those with couples. The results show that expenditure on children's clothing is higher for couples than single-headed households, if everything else is constant. This implies that children receive a greater portion of resources if they live in a home with both parents. However, the results cannot distinguish between the welfare of the child in a home where the parents get along, versus one where the parents do not get along.[16]

Table 9 also presents results for the sample of households where the head is a single parent, where there is a couple, and where households are differentiated between indigenous and nonindigenous household heads. In line with previous research on the importance of female education in indigenous families, the results for indigenous households imply that the spouse's income and education are a positive and significant determinant of spending on clothing, whereas they are insignificant for nonindigenous households.[17] [18]

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[16] See Lundberg and Pollak (1993) for household bargaining models where couples do not get along. Browning and others (1994) also find that household type matters, and that individual incomes matter differently for clothing demands for couples than for single individuals. Unfortunately, their analysis must be restricted to couples in order to allow for the assumption of exclusivity on clothing expenditures, therefore excluding the impact of children or extended families to the intrahousehold allocation. Finally, they do not explicitly account for a bargaining setting, or for the possibility that certain individual abilities may influence the distribution of spending.

[17] See Inchauste (2000).

[18] Additional regressions were estimated to test whether it matters if the extended family members are grandparents, grandsons, in-laws, brothers or sisters. However, the presence of particular kinds of extended

VI. SUMMARY AND CONCLUSIONS

A first objective of the study was to show that the distribution of resources depends on the power structure within the home. The results are in line with other studies, rejecting the traditional intrahousehold decision-making model in favor of a general bargaining alternative because control over household resources matters. Second, the results show evidence supporting the notion that human capital characteristics of mothers are what contribute to child welfare, and not higher incomes alone. A first policy implication of this study is that the education of mothers is important to improve child welfare, over and above the benefits of cash transfer schemes. In this context, parental educational campaigns should accompany child welfare programs, particularly among indigenous mothers.[19]

In terms of differences in household type, this study finds that couples tend to spend more on children than single-headed families, while the presence of indigenous or extended family members in the household does not have, in general, a significant impact on the resource allocation towards children.[20] This information could be considered to classify children in single-parent homes as more vulnerable. In contrast, a distinction between households with extended families or indigenous individuals may not be necessary, once household size and household income are accounted for.

The Bolivian Government has recently been debating a poverty reduction strategy, including the need to protect the most vulnerable, emphasizing the need to protect and enhance children's welfare.[21] The proposals are consistent with the conclusions of this paper, particularly in terms of the strategies proposed to reduce malnutrition, and improve health and education of the population. In this strategy, efforts to improve nutrition, further the education of mothers, and carry out public health programs are to be directed toward reducing the levels of chronic and severe malnutrition. The Program of Attention to Children under the age of six (PAN), currently underway, provides an integral approach to this problem including health, nutrition, and early education components.

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family members make no statistical difference in overall spending on children's clothing. The results of this regression are available upon request.

[19] For a discussion on potential transfer schemes see Gupta and others (2000).

[20] Further research could include information on the particular indigenous group to which the family belongs to allow for comparisons of family dynamics and patterns of resource allocations across family types. This would allow for improved social targeting.

[21] The Bolivian Interim PRSP approved by the boards of the IMF and World Bank is available at: http://www.imf.org/external/NP/prsp/2000/bol/01/index.htm. The full Poverty Reduction Strategy is being developed and is available on the Government's web site at: http://www.ebrp.gov.bo/id2.htm.

The basic health care service program envisaged in the government's strategy provides a key set of high-impact, low-cost health care services in order to ensure a reduction in maternal-child and child mortality. The education strategy aims at directing resources toward primary education, improving teacher training, and includes curriculum reform. In line with the importance emphasized by this study for the educational status of indigenous populations, the proposed strategy recognizes the cultural diversity in Bolivian society. The ongoing education reform includes the provision of textbooks in indigenous languages. In health, the strategy envisages a sensitization of medical personnel to the cultural barriers in service delivery and the use of mixed health services, which combine the virtues of traditional and western medicine

Finally, a word of caution. Some of the insignificant results in this study may be caused by the small share of total expenditures for clothing. Further understanding of the intrahousehold distribution of resources would benefit from richer data containing individual expenditure levels on exclusive goods. Additional research could test formally whether the extended family serves as a social safety net for poor families in developing countries, and also study the impact of extended families in a dynamic setting—preferably using panel data. Finally, policies for strengthening family safety nets would benefit from research using panel data in countries undergoing crises.

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