

mother—then the threat point will be affected by which parent receives the payment.<sup>15</sup>

It is straightforward to apply the separate-spheres bargaining model in a household production framework and to allow husband and wife to have different productivities in producing the public good. With constant returns to scale and no joint production, this is equivalent to assuming that the husband can purchase the public good at a different (presumably higher) price than the wife. Ignoring coordination problems, let the total amount of child services consumed by the couple be  $q = q_h + q_w$ , where  $q_h$  is purchased by the husband at a price  $p_h$  and  $q_w$  is purchased by the wife at a price  $p_w$ . There are now two ways in which the husband can influence his own consumption of child services in a noncooperative household: he can influence his wife's resources through supplementary transfers and he can purchase child services directly.

Under our assumptions about the wife's utility function, the husband faces a constant "price" of purchasing the public good via supplementary transfers, namely  $(1 - \alpha_w)/p_w$ . Hence, except in a razor's edge case, the husband will not simultaneously make positive supplementary transfers and direct purchases of the public good but will choose the method with the lower price. If the noncooperative equilibrium is such that  $q_h > 0$  and  $q_w > 0$ , redistribution between husband and wife will be neutral only if they face the same price for the public good. In a cooperative household, all child services will be purchased by the wife at the lower price.

We can relax our earlier assumption that divorce is impossible or prohibitively expensive and modify our analysis to recognize that, for some marriages, divorce is the relevant threat point. When both divorce and noncooperative marriage are possible outcomes, the relevant threat point will depend on the utility possibilities associated with these states and on the institutional rules governing divorce.<sup>16</sup> The separate-spheres model can be interpreted as the case in which the voluntary contribution marriage is Pareto superior to divorce, so that neither spouse can convincingly threaten divorce; hence, the voluntary contribution equilibrium is the relevant threat point for the bargaining game. On the other hand, if both spouses prefer divorce to any noncooperative marriage, then divorce is the relevant threat point. In general the recognition

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15. Nonneutrality at corner solutions also occurs in Becker's altruist model, although corner solutions in the two models have different interpretations.

16. One approach would be to assume that, at the beginning of the cooperative bargaining game, both spouses recognize that if they fail to reach an agreement, they will play a noncooperative game. Institutional rules must specify the outcome of the noncooperative game when one spouse prefers the voluntary contribution equilibrium within marriage. If unilateral, no-fault divorce is permitted, then divorce is the outcome unless both parties choose a voluntary contribution marriage. If, on the other hand, the rules permit divorce only with the consent of both spouses, then a voluntary contribution marriage will eventuate unless both spouses choose divorce. The expected utility for each spouse in this noncooperative postgame is the threat point for cooperative bargaining.

that divorce is the relevant alternative for some marriages attenuates the link between child allowances and intrafamily distribution. When divorce is the threat point, the two child allowance schemes we consider have identical distributional effects.

### **Marriage Markets with Binding Agreements**

As Becker has emphasized, the marriage market is an important determinant of intrahousehold distribution. Bargaining within a marriage is limited to the “surplus” generated by that marriage and thus depends on the alternatives available outside the marriage. If there are no information, search, or contracting problems, then a continuous distribution of preferences and traits in the population implies that distribution within marriage will be completely determined in the marriage market; there is no surplus to be bargained over in any particular marriage, because the next-best marriage is just as good. Stapleton (1990) provides a careful analysis of this extreme case.

If marriage market participants are heterogeneous, surpluses depend on the matching of men and women. Matching models (see Mortensen 1988; Roth and Sotomayor 1990) provide an analytical framework for investigating equilibrium or stable assignments of men to women in the marriage market, and such models typically possess multiple equilibria. Search costs further complicate the analysis of marriage market equilibria (see Mortensen 1982a, 1982b, 1988). Becker (1973, 1974a, 1974b, 1981) was among the first to recognize the relationship between distribution within marriage and “assortative mating” in marriage markets. Lam (1988) analyzes the effect of household public goods on marriage patterns and shows how different assumptions yield results very different from those predicted by Becker.

The noncooperative distribution of household resources described in the previous section will depend upon the value of the transfer,  $t$ , determined in the marriage market. To analyze the short-run effects of a new child allowance scheme (that is, its effect on distribution in existing marriages), it was appropriate to take the value of this transfer as predetermined. In the long run, however, new marriages will form taking the new policy into account. In this section, we show that, when prospective couples can make binding, costlessly enforceable prenuptial agreements about the minimum level of transfers, a “Ricardian equivalence” result emerges: new marriages will completely offset the effects of any change in the child allowance scheme.

In this model, a marriage contract specifies a transfer that is not contingent on the realized values of income. We denote the marriage of female  $i$  to male  $j$  by the pair  $(i, j)$  and the transfer that the male is obliged to make to the female by  $t_{ij}$ ; a negative value of  $t_{ij}$  thus implies a transfer from female  $i$  to male  $j$ . We denote a marriage contract by  $(i, j, t_{ij})$ .

A marriage market structure is a set of marriage contracts:  $S = \{(i, j, t_y)\}$ . Both female  $i$  and male  $j$  evaluate a prospective marriage contract  $(i, j, t_y)$  in terms of the expected utility associated with it; this utility can depend on attributes of the spouse as well as on consumption of the private good and the public good. To calculate expected utility, the expectation is taken over the joint distribution of incomes and transaction costs facing the pair  $(i, j)$ . The reduced-form expected utility functions can be written as  $V(i, j, I_{0i} + t_y, I_{0j} - t_y)$  and  $V^j(i, j, I_{0i} + t_y, I_{0j} - t_y)$ , where  $I_{0i}$  and  $I_{0j}$  are the noncontingent components of female and male income.

Child allowances can be easily introduced into the model. If a child allowance,  $a$ , is paid to the husband, then the reduced-form utility functions are  $V(i, j, I_{0i} + t_y, I_{0j} + a - t_y)$  and  $V^j(i, j, I_{0i} + t_y, I_{0j} + a - t_y)$ . If the child allowance is paid to the wife, then the reduced-form utility functions are  $V(i, j, I_{0i} + a + t_y^*, I_{0j} - t_y^*)$ , and  $V^j(i, j, I_{0i} + a + t_y^*, I_{0j} - t_y^*)$ , where  $t_y^*$  is the transfer from the husband to the wife when the wife receives the child allowance.

In the long run the marriage market can undo any short-run distributional effects achieved by paying child allowances to wives rather than to husbands. That is, the set of equilibrium marriage market structures is independent of the child allowance scheme. When the child allowance is paid to wives rather than to husbands, the marriage market structure with the same pairing of women and men, but with transfers from men to women reduced by the amount of the child allowance, is an equilibrium. With binding transfers, therefore, the distributional effect of a policy changing the recipient of child allowances will persist only within marriages in existence at the time of the policy change. For subsequent generations of marriages, adjustments in prenuptial transfers will exactly offset the shift in child allowances. This Ricardian equivalence result, of course, depends on the assumption that prospective couples in the marriage market can make binding, costlessly enforceable agreements.

### **Marriage Markets without Binding Agreements**

Even without binding agreements, the requirements of equilibrium in the marriage market can generate substantial differences between the short-run and the long-run effects of child allowances. In this section, we focus on a simple special case to illustrate the range of long-run outcomes that are consistent with this model. We assume that all individuals live as adults for two periods. In the first period everyone participates in the marriage market. Those who do not marry in the first period remain unmarried in the second period. Those who marry in the first period remain married in the second period; divorce is impossible or prohibitively costly. We assume that the only differences among individuals are differences in the utility associated with remaining unmarried: all men have identical (nonstochastic) incomes, and all women have identical

(nonstochastic) incomes. Distribution within marriage is determined by bargaining, and since divorce is ruled out, the threat point is a noncooperative marriage. We assume that the representative marriage is at a corner solution with respect to supplementary transfers, so that a change from the child allowance scheme that pays fathers to the scheme that pays mothers will increase the utility of married women and decrease the utility of married men.

Under our assumptions that all women are identical except in the utility of remaining unmarried, and that all men are identical except in the utility of remaining unmarried, the utilities associated with a particular marriage—say  $(i,j)$ —are independent of  $i$  and  $j$ . Individuals contemplating marriage can compare the utility of the representative marriage with the utility of remaining unmarried. Since all marriages are identical, the only function of the marriage market is to determine which individuals marry and which individuals remain unmarried.

To analyze equilibrium in the marriage market, we introduce a function  $G^w(U^w)$  showing the number of women for whom the utility of being unmarried is less than or equal to the utility of being married,  $U^w$ ;  $G^h(U^h)$  is the corresponding function for men. The value of the function  $G^w(U^w)$  is, of course, the number of women willing to marry when the utility of married women is  $U^w$ .

Instead of focusing on just two child allowance schemes—one paying fathers and the other paying mothers—we can consider a continuum of child allowance schemes in which a portion of the child allowance is paid to mothers and the remainder to fathers. We denote the child allowance payment to mothers by  $\gamma a$  and the payment to fathers by  $(1 - \gamma)a$ . Thus if  $\gamma = 0$  the entire child allowance,  $a$ , is paid to the father; if  $\gamma = 1/2$  the child allowance is divided equally between the parents; and if  $\gamma = 1$  the entire child allowance is paid to the mother.<sup>17</sup>

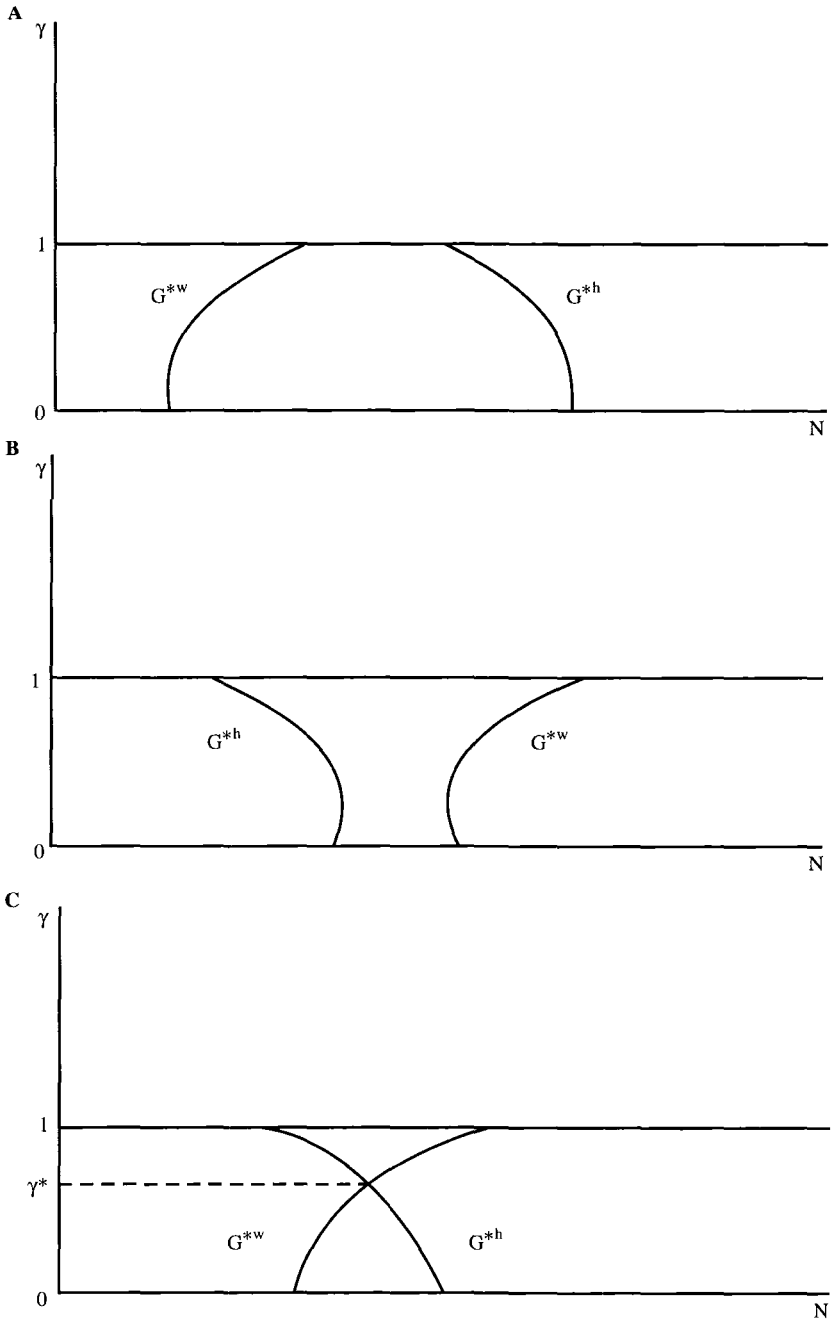
We now use  $\gamma$  to reparameterize the “willingness to marry” functions,  $G^w(U^w)$  and  $G^h(U^h)$ . Because  $U^w$  is an increasing function of  $\gamma$ , we can define a new function:  $G^{*w}(\gamma)$  by  $G^{*w}(\gamma) = G^w(U^w(\gamma))$ ;  $G^{*w}(\cdot)$  is an increasing function of  $\gamma$  (more precisely, a nondecreasing function of  $\gamma$ ). Similarly,  $G^{*h}(\cdot)$  is a decreasing (more precisely, nonincreasing) function of  $\gamma$ . The number of marriages corresponding to various values of  $\gamma$  is given by  $N = \min\{G^{*w}(\gamma), G^{*h}(\gamma)\}$ .

There are three interesting cases, illustrated in Figure 5.2A–C, distinguished by whether women or men are in short supply in the marriage market at various values of  $\gamma$ . In case A,  $G^{*w}(\cdot)$  is less than  $G^{*h}(\cdot)$  for all  $\gamma$  in the interval  $[0,1]$ , so that more men than women wish to marry. A change from the child allowance scheme that pays fathers to one that pays mothers will increase

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17. Values of  $\gamma$  outside the interval  $[0,1]$  correspond to imposing a lump-sum tax on one spouse and paying the child allowance plus the lump-sum tax to the other spouse. To avoid invoking lump-sum taxes, we confine ourselves to values of  $\gamma$  in the interval  $[0,1]$ .

**FIGURE 5.2** The marriage market and division of the child allowance



the utility of married women and decrease the utility of married men; such a change will also increase the number of marriages, because the number of women willing to marry is the binding constraint under both child allowance schemes. Individuals who were unmarried under the old scheme and marry under the new scheme experience a welfare gain.

In case B,  $G^{*h}(\cdot)$  is less than  $G^{*w}(\cdot)$  for all  $\gamma$  in the interval  $[0,1]$ . In this case the number of men willing to marry is the binding constraint at both endpoints of the interval. Shifting the child allowance payment toward mothers will increase the utility of married women and decrease the utility of married men; such a shift will also decrease the number of marriages. Individuals who were married under the old scheme but remain unmarried under the new scheme will experience a welfare loss.

In case C, the curves  $G^{*h}(\cdot)$  and  $G^{*w}(\cdot)$  intersect at some value  $\gamma^*$  in the interval  $[0,1]$ . There is, however, no mechanism to drive  $\gamma$  to  $\gamma^*$  because individuals cannot make binding agreements in the marriage market. In case C, the effect on the number of marriages of a change from the child allowance scheme that pays fathers to the one that pays mothers is indeterminate: as we have drawn the curves, the number of marriages is the same under both child allowance schemes.

This section has analyzed long-run implications for distribution between spouses when binding agreements cannot be made in the marriage market in a very restrictive special case. Even when all individuals of the same gender are perfect substitutes in the marriage market and differ only in the reservation utility for marriage, the range of possible outcomes is very wide. This suggests to us the impossibility of obtaining strong general results. Although there is much to be said for models that allow additional heterogeneity among individuals and hence assortative mating, such models are likely to be consistent with an even wider range of possible outcomes.

## Conclusion

In this chapter we have introduced the separate-spheres bargaining model, a new model of distribution within marriage. To compare the separate-spheres model with the leading economic models of distribution within marriage—Becker's altruist model and the Manser-Brown/McElroy-Horney divorce-threat bargaining model—we have emphasized the distributional implications of alternative child allowance schemes that differ only in their treatment of two-parent families. Under one scheme payments go to the father; under the other they go to the mother; under both schemes, in the event of divorce, the mother gets the children and the child allowance. In the altruist model and the divorce-threat bargaining model, these alternative child allowance schemes imply identical distributions between mothers and fathers in two-parent fami-

lies. In the separate-spheres bargaining model, these schemes can imply different distributions.

The separate-spheres bargaining model, like the divorce-threat bargaining model, views marriage as a cooperative game. The separate-spheres model differs from the divorce-threat model in its specification of the threat point. In the separate-spheres model, the threat point is a noncooperative equilibrium within marriage defined in terms of traditional gender roles and gender role expectations. Because the child allowance schemes can imply different non-cooperative equilibria, they can imply different distributions in two-parent families.

Any redistribution between women and men resulting from the choice of one child allowance scheme rather than the other may be transitory. If binding, costlessly enforceable prenuptial agreements can be used to specify transfers within marriage, then the marriage market will undo any redistribution. If, on the other hand, binding prenuptial agreements are impossible, then the choice of one child allowance scheme rather than the other can have long-run effects on distribution in two-parent families. We show, however, that even without binding agreements, the requirements of equilibrium in the marriage market can generate long-run results that differ substantially from short-run results.

Bargaining models of marriage have almost invariably treated marriage as a cooperative game, and the separate-spheres bargaining model follows this tradition. Recent advances in noncooperative bargaining theory provide an alternative approach: specifying the bargaining process as a sequence of moves and a corresponding information structure, and analyzing it as a game in extensive form. Rubinstein (1982) analyzes a bargaining game in which the players take turns making offers and shows that a class of alternating offer games have unique, subgame perfect equilibria. Binmore, Rubinstein, and Wolinsky (1986) show that the Nash bargaining solution, a standard axiomatic solution concept for cooperative games, can be reinterpreted as the solution to a noncooperative alternating offer game if the threat point is suitably interpreted. On the basis of these results, we might reinterpret the Nash bargaining solution to our separate-spheres bargaining model as the solution to a specific noncooperative bargaining game.<sup>18</sup>

We have two reservations regarding this approach. First, we doubt that marriage is best formulated as an alternating offer game. Solutions to extensive-form games are sensitive to the details of their specifications, and this particular extensive-form game does not seem to capture the essential features of marital bargaining. Second, we have doubts about whether marriage is best formulated as a noncooperative game: cooperative game theory may provide a

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18. Kanbur and Haddad (1994) apply the results of Binmore, Rubinstein, and Wolinsky (1986) to the analysis of intrahousehold allocation.

more fruitful framework for analyzing distribution between spouses. Discussing cooperative games, Shubik (1989:103) writes as follows: “The game in extensive form provides a process account of the detail of individual moves and information structure; the tree structure often employed in its description enables the researcher to keep track of the full history of any play of the game. This is useful for the analysis of reasonably well-structured formal process models where the beginning, end and sequencing of moves is well-defined, but is generally not so useful to describe complex, loosely structured social interaction.” It is difficult to think of many better examples of a “complex, loosely structured social interaction” than marriage.



## 6 Separate Spheres and the Conjugal Contract: Understanding the Impact of Gender-Biased Development

MICHAEL R. CARTER AND ELIZABETH G. KATZ

Economic development can extend new opportunities unevenly to members of households based on their gender. How important is the gender bias of development, and, in particular, of development strategies explicitly induced by public policy? To answer this question, and in order to understand whether, when, and how gender bias matters, the complex interplay of the individual and mutual interests, expectations, and activities that characterize the household must be understood.<sup>1</sup>

Among economists, the best-known model of household resource allocation is Becker's (1981) *household-welfare-function model*, which relies on notions of altruism to aggregate preferences of individuals within the household into a single decisionmaking logic (sometimes called the "common preferences" or "unitary" model). Yet qualitative studies of household behavior from other social science disciplines suggest that although altruism plays some role in household labor supply and consumer demand decisions, gender-based norms, divisions, and conflicts are equally, if not more, important in the

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This work is part of a project on the socioeconomic impact of nontraditional agricultural export growth in Guatemala, which has been generously supported by grants from the Tinker Foundation, the University of Wisconsin (MUCIA), the Inter-American Foundation, the John D. and Catherine T. MacArthur Scholars Program at the University of Wisconsin-Madison, the Land Tenure Center, and the U.S. Agency for International Development. None of the views expressed here should be attributed to either employing or supporting organizations. The authors also thank the reviewers of this volume for their thoughtful and insightful comments on the work.

1. In the agricultural sector, providing incentives for the introduction of new crops is a common policy prescription for raising rural incomes, and, in the case of export crops, generating foreign exchange. In a study of the impact of such policies on the intrahousehold allocation of labor and expenditures in the highlands of Guatemala, for example, Katz (1994, 1995) finds a pronounced gender bias in the distribution of the costs and benefits of agricultural diversification, a bias that largely manifests itself in a series of complex transactions and negotiations within peasant households. Similarly, International Food Policy Research Institute (IFPRI) studies in five developing countries found that gender-specific phenomena such as control over income substantially altered the impact of cash cropping on nutritional outcomes.

determination of household resource allocation (Hochschild 1990; Wolf 1990). This latter view states that the household is better conceived as consisting of separate, gendered spheres of decisionmaking and activity that are related to one another by a “conjugal contract”—the terms under which household members exchange goods, incomes, and services among themselves (Whitehead 1981).

Both the common preferences and conjugal contract views of the household can imply the existence of intrahousehold patterns of inequality that may evolve over time. However, the conjugal contract theory developed here suggests that intrahousehold inequality is relevant for policy analysis precisely because its pattern is mutable, economically endogenous, and shaped by gender bias in development and development policy. Specifically the conjugal contract model allows us to explore

1. whether and how the adoption of a new economic opportunity depends on its gender bias;
2. whether gender-biased development can fundamentally alter the intrahousehold terms of exchange implicit in the conjugal contract; and
3. whether and how the gender bias of a new economic opportunity will affect intrahousehold expenditure and welfare patterns.<sup>2</sup>

This chapter explores these questions by putting forward a model of the household economy composed of separate gender-specific spheres of economic activity and resource allocation linked by a conjugal contract. While building on other critiques that have challenged the unitary model’s assumption of unified household preferences, the conjugal contract model also modifies the assumption—characteristic of both the unitary model and many of its critics—that the various sources of household income are pooled into a single fund from which household members draw in order to obtain goods. Research in developing countries (for example, Dwyer and Bruce [1988]) has shown that household budgeting patterns vary widely, with full income pooling being the exception rather than the rule. Income itself, and not just the goods and services it can buy, is most appropriately seen in many cultural contexts as the private property of the individual who earns it, although it may be subject to the claims of other household members.

### **The Conjugal Contract Model: Autonomy and Interdependence in the Household Economy**

The alternatives to the conjugal contract model that are prevalent in the literature include the unitary model; the cooperative-bargaining model, suggested by McElroy and Horney (1981) and Horney and McElroy (1988); and Chiappori’s (1992) Pareto-efficient model.

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2. The unitary model also allows this.

To varying degrees, the following issues distinguish and drive these four models of intrahousehold resource allocation:

1. Individualism of preferences. Can the preferences of household members be aggregated to the level of the household (that is, is a household utility or social welfare function appropriate)?
2. Interdependence within the household economy. What are the bases for interdependence and cooperation within the household economy? Interdependence can be generated by conventional consumption externalities (caring about one's partner's consumption); jointly consumed intrahousehold public goods; and labor market imperfections that make family labor relatively more productive than hired labor.
3. Property rights, information, and autonomy within the household. Do "property rights" (broadly defined) and information costs give individuals autonomous control over their income, or is all income pooled as "marital property"? Without pooling, intrahousehold transfers of labor power and income—the conjugal contract—become relevant as a way of dealing with interdependence in the household.
4. Exit options. What is the nature of the individual's alternative to participation in the household economy? The individual's alternative or exit option is ultimately a social as well as an economic phenomenon.
5. Voice within the household. How are individual preferences mediated? In particular, is it a one-sided or a dictatorial process, or do all individuals enjoy "voice"—the right and ability to bargain?

The four models of the household economy can be distinguished along these five dimensions. In the unitary model, individual preference heterogeneity and autonomous control over income are not important. McElroy and Horney's model differs from the unitary model because preferences—but not budget constraints—are individualized.<sup>3</sup> Chiappori's model allows for both individualistic preferences and autonomous income control, but without any form of interdependence among household members. The conjugal contract model to be developed here characterizes the household economy as a site of independent preferences and resource allocation decisions bound together by various forms of interdependence—what Sen (1990) calls "cooperative conflict." The conjugal contract model also considers the ways in which the social construction of patriarchy is reflected in the alternative or "exit" options individuals have to the household economy, as well as the determination of the degree of

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3. The cooperative-bargaining model's reformulation of the household economy has a major impact on the analysis and interpretation of inequality and specialization within the household. For example, changes in intrahousehold resource allocation induced by relative price shifts do not necessarily appear as a noncontentious response to a new price set in order to maximize collective well-being. Instead price shifts and other phenomena can generate shifts in bargaining power and the relative weight of each individual's preferences in the final decision.

“voice” that individuals have to bargain with over the terms of the conjugal contract.

*The Simple Conjugal Contract Model of the Household Economy*

In the conjugal contract model, individuals are relatively autonomous in the allocation of their resources, and resource allocation decisions are linked through the mutual need for each other’s contributions to the production of a public good ( $z$ ) produced through a simple household production process. Formally, a simple version of the conjugal contract model can be represented as shown in equation (6.1):

$$\begin{array}{ll}
 \max U_f(x_f, z \mid \Theta) & \max U_m(x_m, z \mid \Theta) \\
 x_f, \hat{l}_f^z, l_f^w & x_m, \hat{l}_m^z, l_m^w \\
 \text{s.t.} & \text{s.t.} \\
 p_f x_f \leq w_f l_f^w + \Theta & p_m x_m \leq w_m l_m^w - \Theta \\
 z = a_z(\hat{l}_f^z + \hat{l}_m^z) & z = a_z(\hat{l}_f^z + \hat{l}_m^z) \\
 \hat{l}_f^z + l_f^w \leq L_f & \hat{l}_m^z + l_m^w \leq L_m
 \end{array} \tag{6.1}$$

where each household member’s utility ( $U_f, U_m$ ) is a function of a private good ( $x_f, x_m$ ) and  $z$  and is conditional upon the level of the net income transfer that makes up the conjugal contract ( $\Theta$ ). Each person is constrained in her or his purchase of  $x$  by the income she or he can earn by supplying labor to the market at a gender-specific, parametric wage rate ( $w_f, w_m$ ), net of whatever income transfers she or he receives from her or his partner. The  $Z$  good is produced using inputs of time according to a linear production technology,  $z = a_z l_z$ , where  $l_z$  is simply the sum of male and female time allocated to  $Z$ -good production ( $\hat{l}_f^z + \hat{l}_m^z$ ). Here,  $\hat{l}_m^z$  represents the man’s  $Z$ -good labor supply contributions anticipated by the woman, and  $\hat{l}_f^z$  represents the woman’s contributions anticipated by the man.<sup>4</sup>

Simultaneous solution of the choice variables in the constrained maximization problem in equation (6.1) can be modeled as a two-person, strictly competitive game of complete information, which means that no coordination is required for the two household members to choose equilibrium strategies (Friedman 1986:31–32). Each person solves his or her optimization problem,

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4. The specification of autonomous intrahousehold subeconomies, or separate spheres, in equation (6.1) is, in part, a statement about property rights and information. To the extent that individuals are considered to exercise exclusive rights over the income they earn, or to the extent that asymmetric information lets individuals hide what they earn, there is no reason to assume automatic income pooling. Note that asymmetric information can also give individuals autonomy over their resource allocation decisions. Direct bargains over such allocations would be enforceable only at some cost. For example, the amount of labor time and effort devoted by an individual to household  $Z$ -good production may not be directly observable by one’s partner, meaning that the individual’s time allocation is relatively autonomous and subject only to indirect control.

treating the partner's behavior as fixed at some expected level. For each individual, this noncooperative optimization behavior results in a set of conditional demand and supply functions that depend on expectations or conjectures about the partner's behavior. These functions can be viewed as "best-reply mappings"—that is, they give the optimal resource allocation for one individual, given the behavior of the partner. Equilibrium (for a given net income transfer) is then found by the simultaneous solution of each player's conditional supply and demand functions.

For each individual ( $f, m$ ), the maximization problem in equation (6.1) can be rewritten as a Lagrangian function after using the time constraint to substitute out for  $l_k^e$ . For the woman, the Lagrangian will appear as

$$\mathcal{L}_f = U_f(x_f, a_z(\hat{l}_m^e + \hat{l}_f^e)) + \lambda_f(w_f(L_f - \hat{l}_f^e) + \Theta - p_f x_f) \quad (6.2)$$

where  $\lambda_f$  is the shadow price of female-controlled income. Assuming interior solutions, the first-order necessary conditions can be written as

$$\lambda_f = \frac{\partial U_f / \partial x_f}{p_f} \quad (6.3a)$$

$$(\partial U_f / \partial z) a_z = \lambda_f w_f \quad (6.3b)$$

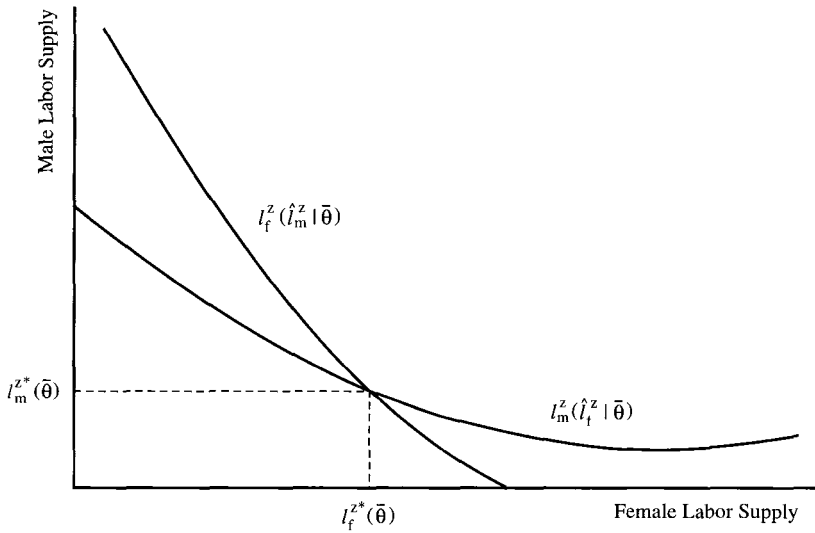
$$w_f(L_f - \hat{l}_f^e) + \Theta - p_f x_f = 0 \quad (6.3c)$$

Condition (6.3b) indicates that the woman will allocate labor to Z-good production until the utility-valued marginal returns to that labor ( $[\partial U_f / \partial z] a_z$ ) just equal the opportunity cost of labor ( $w_f$ ) marked up by the shadow price of her own cash income ( $\lambda_f$ ). For a woman with relatively little cash income and low levels of consumption of  $x_f$  such that the marginal utility of  $x_f$  ( $\partial U_f / \partial x_f$ ) is high, condition (6.3a) shows that the value of  $\lambda_f$  will be high. This supports a tendency to supply relatively little of her labor to the intrahousehold public Z good, in order to allocate time to her own income-earning activities, even if  $w_f$  is low. Note that positive income transfers to the woman will boost her consumption levels, reduce  $\partial U_f / \partial x_f$ , lower the shadow price of own-income, and thereby alter labor allocation in favor of Z-good production. Thus intrahousehold income transfers effectively operate as inducements to modify individuals' autonomous time allocation decisions. In contrast the unitary and cooperative bargaining models use only a single, household-level shadow price of (pooled) income to value the use of time in home versus market activities, thereby guaranteeing that the trade-off between income and leisure is equalized between partners (barring corner solutions).<sup>5</sup>

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5 Because of full income pooling in the cooperative-bargaining models, the household achieves a conventional "tangency rationality," equating the marginal rates of substitutions between all pairs of goods (as judged by the bargained preferences) to the relative prices of those goods. Labor time is always allocated according to a comparative advantage rationality, once the decision to cooperate has been made.

FIGURE 6.1 Equilibrium Z-good labor supply (transfer level fixed at  $\bar{\Theta}$ )



Depending on conjectures about the behavior of the other individual in the household, solution of the system of equations (6.3a–c) defines “best-response” or conditional demand and supply functions:

$$x_k^c = x_k^c(\hat{l}_j^c | \Theta) \tag{6.4a}$$

and

$$l_k^c = l_k^c(\hat{l}_j^c | \Theta) \tag{6.4b}$$

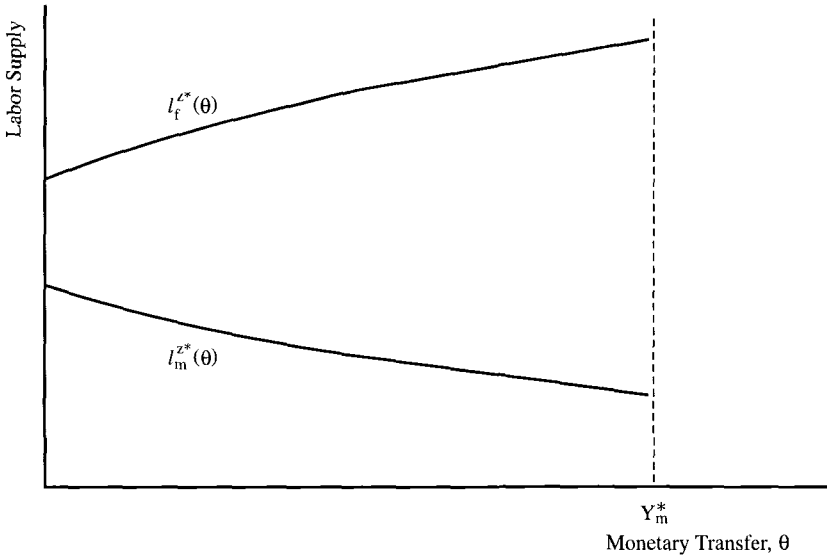
where  $\hat{l}_j^c$  represents individual  $k$ 's conjecture about the behavior of partner  $j$ . If each individual (myopically) treats the partner's behavior as fixed and non-responsive to changes in his or her own behavior, the special case of a Nash-noncooperative equilibrium is defined as

$$x_k^*(\Theta) = x_k^c(l_j^{z*}(\Theta) | \Theta) \tag{6.5}$$

$$l_k^*(\Theta) = l_k^c(l_j^{z*}(\Theta) | \Theta)$$

Note that this equilibrium is stable in the sense that there is no incentive for deviation from the equilibrium. Each individual's equilibrium behavior is the best response to the equilibrium behavior of the partner. For the sake of clarity, denote the equilibrium values given by equation (6.5) as the conditional

FIGURE 6.2 Conjugal contract and Z-good labor supply

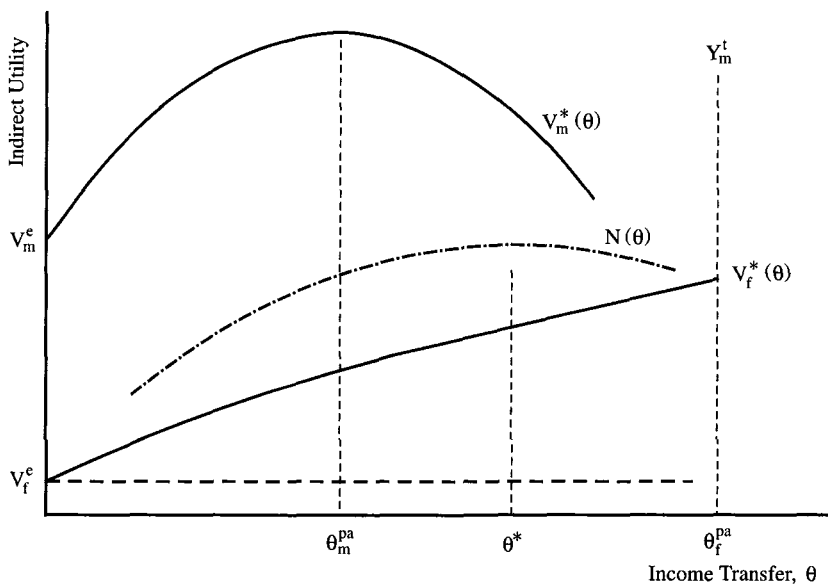


equilibrium values, to emphasize their dependence on  $\Theta$ . Figure 6.1 illustrates equilibrium Z-good labor supply for the male and female household members.<sup>6</sup>

As the net intrahousehold transfer income varies, the conditional equilibrium values given in equation (6.5) will also vary. Figure 6.2 shows the impact of increasing levels of  $\Theta$  on the amount of male and female supply of labor to Z-good production, assuming males and females have identical preference structures and that the male wage rate exceeds the female rate. Starting at a position of zero income transfer, increases in  $\Theta$  (male to female income transfers) indirectly induce greater female supply of labor to Z-good production under fairly general assumptions. As discussed in the previous section, higher values of  $\Theta$  reduce the  $\lambda_f$  markup the woman applies to her own earnings, thereby indirectly increasing her Z-good labor supply. Male supply of labor to Z-good production will correspondingly decrease.

Building on Figure 6.2, Figure 6.3 shows the impact of  $\Theta$  on conditional indirect male and female utility defined by the maximization problem in equation (6.1) and the conditional equilibrium values in equation (6.5). Denoting these indirect utility functions as  $V_f^e(\Theta)$  and  $V_m^e(\Theta)$ , Figure 6.3 shows that

6. See Katz (1992) for comparative static analysis of this equilibrium, which illustrates the impact of a rise in male wages on labor allocation.

**FIGURE 6.3** Conjugal contract and intrahousehold welfare

female indirect utility will be strictly increasing in  $\Theta$ .<sup>7</sup> Male indirect utility,  $V_m^e(\Theta)$ , will initially increase in  $\Theta$  (reflecting the gains from cooperation within the household). Eventually,  $V_m^e(\Theta)$  will decrease in  $\Theta$  as the male-to-female transfers approach total male income,  $Y_m^t(\Theta)$ .

Intrahousehold resource allocation and welfare depend, in part, on the transfer level  $\Theta$ . Figure 6.3 portrays the potential gains available to each partner from these intrahousehold income transfers. The values of  $\Theta$  denoted  $\Theta_f^{pa}$  and  $\Theta_m^{pa}$  illustrate those intrahousehold income transfer levels that would respectively maximize female and male indirect utility. The flexibility of  $\Theta$  will determine the agility with which the household deals with the interdependencies between the autonomous intrahousehold economies. Note, however, that unlike models in which a comparative advantage-based labor allocation can be achieved separately from consumption allocation decisions, the transfers required to induce labor supply response in the conjugal contract model precommit income to a particular expenditure pattern. The following section develops an approach to the determination of  $\Theta$ , or more generally, the conjugal contract, which reflects the interplay of economic logic and the social forces that construct the degree of patriarchy.

7. The notation indicating the dependence of indirect utility on wages, prices, and other external factors is suppressed.



*Exit, Voice, Patriarchy, and the Determination of the Conjugal Contract*

The ability to have “voice” in the determination of the conjugal contract and the nature and strength of “exit” options from the conjugal contract are what shape the process by which the equilibrium  $\Theta$  is determined. As fundamentally social constructions, both voice and exit reflect a complex of attitudes, mores, and opportunities exogenous to the household that can be labeled the “degree of patriarchy.” Although patriarchy is largely exogenous to the household, it is precisely its mutability within the development process that underlies the importance of intrahousehold models that emphasize that individual preferences cannot be uniquely aggregated.

“Voice” within the household refers to the degree to which both partners can influence, or bargain over, the determination of  $\Theta$ . A strongly patriarchal social structure would be one in which women have no voice—that is, they would have no socially recognized right to bargain over the conjugal contract.<sup>8</sup> In such a world, determination of the conjugal contract could be represented as a principal-agent process, with one partner (say, the man) acting as the principal, selecting the value of  $\Theta$  to maximize his well-being, and subject only to a “competitiveness constraint” to keep his partner present in the household. Within less patriarchal social structures, which grant women voice, determination of the conjugal contract could be modeled as a bargaining process.

As for the exit condition, this might be given by the indirect utility the individual could gain by dissolving and leaving the household (McElroy and Horney 1981). For women, in particular, the feasibility and strength of this indirect utility option outside the household depend on social attitudes toward and opportunities open to them. Alternatively exit from the conjugal contract could take the form of noncooperation within the household. In Jones (1983: 122) noncooperation takes the form of “no transfer of income . . . between husband and wife, although each continues to be responsible for their particular household maintenance expenditures.” Lundberg and Pollak (Chapter 5, this volume) suggest “a division of labor based on socially recognized and sanctioned gender roles.” Here noncooperation within the household is represented by a zero net income transfer; that is, partners continue to allocate their labor between home and market, but without the mediating influence of  $\Theta$ .<sup>9</sup> In terms of Figure 6.3, the noncooperation exit constraint would be given by  $V_j^*$ , that is, by the level of  $V_j^*$  at the point of its intersection with the vertical axis. The dashed line in Figure 6.3 extends this exit constraint horizontally across the graph. When  $V_j^*(\Theta = 0)$  is the relevant exit constraint and there is strong patriarchy (no female voice), the maximizing male principal would not be

8. But note that, as modeled here, such women still have their sphere of autonomous economy defined by property rights and guarded by asymmetric information.

9. Katz (1992) expands this notion of noncooperation to include zero transfers of land and income-generating labor time as well as income.

bound by the exit constraint and would simply select his individually preferred level of  $\Theta$ ,  $\Theta_m^{pa}$ .<sup>10</sup> Alternatively, a Nash-cooperative bargaining concept gives the following model for the determination of the conjugal contract:

$$\begin{aligned} \max_{\Theta} N &= \left[ V_f^*(\Theta) - V_f^e \right] \left[ V_m^*(\Theta) - V_m^e \right] \\ \text{s.t.} \\ \Theta &\leq Y_m^*(\Theta) \\ V_f^*(\Theta) &\geq V_f^e \\ V_m^*(\Theta) &\geq V_m^e \end{aligned} \quad (6.6)$$

where  $V_f^e$  and  $V_m^e$ , respectively, are the exit indirect utilities for female and male members of the household. Again the notation indicating dependence on prices and other external factors is suppressed. The inequality restriction on  $\Theta$  simply reflects the fact that the male-to-female monetary transfers cannot exceed (male) monetary income  $Y_m^*(\Theta)$ . Note that if it were assumed that all household resource allocation decisions could be bargained and enforced, then there would be no individual autonomy, and the problem in equation (6.6) could be reduced to McElroy and Horney's model. Property rights over and information about income are thus key factors that distinguish the conjugal contract and cooperative-bargaining models.

The first-order condition for this problem is simply

$$(\partial V_f^*/\partial \Theta)G_m + (\partial V_m^*/\partial \Theta)G_f \geq 0 \quad (6.7)$$

where  $G_m = [V_m^*(\Theta) - V_m^e]$  is the male gain from the bargain and  $G_f$  is the female gain from the bargain. An interior solution to this problem requires that  $\partial V_f^*/\partial \Theta$  and  $\partial V_m^*/\partial \Theta$  take different signs, since the  $G_x$  terms must be nonnegative. As discussed earlier and shown in Figure 6.3, this condition is met for large values of  $\Theta$ . More straightforwardly, allowing for women's "voice" in the bargaining process will necessarily move the equilibrium value of  $\Theta$  to the right of the "no-voice," or principal-agent transfer value  $\Theta_m^{pa}$  shown in Figure 6.3. The cooperatively bargained transfer value would be a point such as  $\Theta^*$ , which corresponds to the maximum of the Nash-bargaining objective,  $N(\Theta)$ , illustrated in Figure 6.3.

The following section employs this model of the conjugal contract to examine the impact of gender-biased development on intrahousehold resource allocation and welfare.

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10. Note that in this instance information costs and property rights over income allow the woman to achieve utility above her reservation level, despite the fact that she has no voice with which to bargain

*Gender-Biased Development and Intrahousehold Allocation and Welfare in the Conjugal Contract Model*

Consider an increase in  $w_m$ , the male wage rate. Working back through the autonomous intrahousehold maximization problems and equilibrium conditions reveals that such an increase in the market value of male time shifts down male supply of labor to Z goods (the  $I_m^*(\Theta)$  curve in Figure 6.2). For any given  $\Theta$ , equilibrium female supply of labor to Z-goods production ( $I_f^*(\Theta)$ ) would shift up in response to the diminished male Z-good labor supply.

However, with fixed  $\Theta$ , male labor supply response would be less elastic than in unitary and income-bargaining models, because there is a limit to women's willingness to reallocate their labor time away from income-generating activities without some sort of compensation. Thus failure to renegotiate the conjugal contract following the wage increase would dampen response to the new opportunity.

Note also that the higher male wage increases the male's indirect utility exit constraint while leaving unchanged the female exit opportunity. Let  $V_{m0}^e$  denote the male exit indirect utility prior to the wage increase, and let  $V_{m1}^e$  denote the same measure after the wage increase. Female exit utility remains fixed at  $V_f^e$ . Assuming that the cooperative bargaining problem given in equation (6.6) determines the equilibrium  $\Theta$ , the new conjugal contract will be determined by maximization of the following objective expression:

$$[V_f^*(\Theta) - V_f^e][V_m^*(\Theta) - V_{m1}^e] \tag{6.8}$$

which, by adding and subtracting  $V_{m0}^e$ , can be rewritten as

$$[V_f^*(\Theta) - V_f^e][(V_m^*(\Theta) - V_{m0}^e) + (V_{m0}^e - V_{m1}^e)]$$

or

$$[(V_f^*(\Theta) - V_f^e)(V_m^*(\Theta) - V_{m0}^e)] + [(V_f^*(\Theta) - V_f^e)(V_{m0}^e - V_{m1}^e)] \tag{6.8'}$$

The first term in square brackets in expression (6.8') generates the reallocation effect of the wage increase on the conjugal contract. The second term generates the bargaining power effect. The reallocation effect refers to the redistribution of household resources that occurs to take advantage of a new economic opportunity, holding bargaining power constant—that is, the effect predicted by the unitary model. Here, however, this intrahousehold resource reallocation is modified by whatever shifts in relative bargaining power may have been brought about by the introduction of the new opportunity: in the case of a male wage increase, the male's bargaining power will be enhanced in such a way as to shift the benefits of the wage increase to him, as manifested, for example, in an expenditure pattern more consistent with his individual preferences.

### A Conjugal Contract Model of the Peasant Household Economy

Applying the conjugal contract model to a rural, developing-country setting requires recognition of at least two distinguishing features of peasant households. First, there tend to exist well-defined gender-specific responsibilities for the different categories of expenditures made by the household; thus it is possible to know what types of goods a person is likely to acquire within his or her budget. Second, in the peasant household the interdependence of the resource contributions of household members to both Z-good production and income-generating activities is even more pronounced than in economic contexts in which the sites of production and consumption are more highly specialized. That is, the material basis for intrahousehold exchange is greatly expanded by the fact that peasant households draw extensively on their own land and labor with limited mediation from external, often imperfect, markets.<sup>11</sup>

Modifying the model presented in equation (6.1) to incorporate the material bases for cooperation in a stylized peasant household yields

$$\begin{array}{ll}
 \max U_f(x_f, x_m, z \mid \hat{l}_m^s, \Theta^m, \Theta^l) & \max U_m(x_f, x_m, z \mid \hat{l}_f^s, \Theta^m, \Theta^l) \\
 \hat{l}_f^s, \hat{l}_f^z, x_f, \hat{l}_f^h & \hat{l}_m^z, \hat{l}_m^s, x_m, \hat{l}_m^h \\
 \text{s.t.} & \text{s.t.} \\
 p_f x_f \leq Y_f + \Theta^m & p_m x_m \leq Y_m - \Theta^m \\
 Y_f = Q_A[(\hat{l}_f^s - \Theta^l + \gamma \hat{l}_f^h), T_f] - w \hat{l}_f^h & Y_m = Q_M[(\hat{l}_m^s + \Theta^l + \gamma \hat{l}_m^h), T_m] - w \hat{l}_m^h \\
 z = z[x_f, x_m, (\hat{l}_m^s + \hat{l}_f^z)] & z = z[x_f, x_m, (\hat{l}_f^z + \hat{l}_m^s)] \\
 \hat{l}_f^z + \hat{l}_f^s \leq L_f & \hat{l}_m^z + \hat{l}_m^s \leq L_m \\
 \hat{l}_f^s \geq \Theta^l & \hat{l}_m^s \geq -\Theta^l
 \end{array} \tag{6.9}$$

where the transfers that make up the conjugal contract are defined as net male-to-female monetary transfers:

$$\Theta^m = (\Theta_m^y + \Theta_m^p + \Theta_m^r) - (\Theta_f^y + \Theta_f^p + \Theta_f^r)$$

and net female-to-male labor transfers:<sup>12</sup>

11. Jones's (1983) adaptation of the cooperative-bargaining model to a West African context incorporated these two distinguishing features—gender-specific expenditure responsibilities and direct labor exchange for income-generating activities—of the peasant household. Jones's empirical observation of the reluctance of women to transfer labor to high-return, male-controlled agricultural projects contradicts the joint income maximization rationality of the cooperative-bargaining model. By disaggregating the budget constraint, the conjugal contract model deals with Jones's anomalous observation. Why should women necessarily allocate their unremunerated labor time to male-controlled rice production when they have no guarantee of receiving any of that income for their own expenditure responsibilities? Although the notion of a conjugal contract does not analytically preclude a woman from working on her husband's more highly remunerated crops, it does explicitly link this decision to an expectation regarding her own level of intrahousehold compensation for this work.

12. Transfers of land among household members may also play an important role in establishing the basis for interdependence and cooperation in the household; such transfers are

$$\Theta^l = \Theta_f^l - \Theta_m^l$$

The components that make up the net monetary transfer are transfers from earned income ( $\Theta_m^v$  and  $\Theta_f^v$ ), transfers from unearned property income ( $\Theta_m^p$  and  $\Theta_f^p$ ), and transfers from remittance income ( $\Theta_m^r$  and  $\Theta_f^r$ ). Although the fungibility of money makes these transfers perfect substitutes for each other in this model, households may, in practice, separately account for monetary transfers based on their source. Similarly, in this model, male and female labor times perfectly substitute for each other and can be aggregated into the single net-labor-transfer measure. But if timing and seasonality matter, it is entirely possible that positive amounts of female-to-male ( $\Theta_m^l$ ) and male-to-female ( $\Theta_f^l$ ) labor transfers could be observed. Finally denote the ratio  $\Theta^m/\Theta^f$  as the intra-household terms of exchange. The transfer parameters that make up the conjugal contract are set by a bargaining or a principal-agent problem.

In equation (6.9), each household member's allocational decisions result from a maximization of utility, defined over one's own goods as well as one's partner's, and over joint Z goods that are produced in the home, using labor and (some) purchased commodities. As in Jones (1983), female (male) goods should be interpreted as goods for which the woman (man) has primary responsibility to purchase, and not necessarily as "private goods" that only one individual consumes.<sup>13</sup> Individuals thus care directly about commodities purchased by their partners, as well as caring about them indirectly to the extent that the purchased commodities assist in the production of the jointly consumed Z good. Note that choice variable  $l_k^i$  is the labor supplied to all household income-generating activities, so that  $l_f^i - \Theta^i$  is the amount of labor a woman supplies to activities the income from which she controls.<sup>14</sup>

Male and female monetary incomes are produced according to the two strictly concave (diminishing returns) production technologies,  $Q_m$  and  $Q_f$ , which depend on inputs of efficiency labor and a fixed asset,  $T$  (perhaps land). These production functions are most easily thought of as representing agricultural production processes, but they are general enough to represent an array of activities ranging from agriculture to petty commerce to supply of labor to a

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certainly empirically observable in a number of cultural contexts. For simplicity's sake, however, intrahousehold land transfers are abstracted from this discussion.

13. Among the Massa in northern Cameroon, for example, women are responsible for food purchases and men for cattle purchases (Jones 1983). In the central highlands of Guatemala, typical male expenditures are for agricultural inputs and equipment, land, and prestige items, whereas women tend to spend their money on food, small animals, and domestic goods (Katz 1995).

14. Because of the consumption interdependence in this specification (for example, males care directly about commodities purchased by women), individuals might independently transfer resources from their sphere to that of the spouse (for example, men might independently transfer income to women). However, notation indicating choice of transfers is suppressed on the assumption that the bargained  $\Theta$ s always require a higher level of transfer than that which would be undertaken independently.

market in which employment probability (or search costs) diminishes (increases) with the amount of labor supplied (Carter and Kalfayan 1989). Household male and female labor is considered a perfect substitute in efficiency labor terms, whereas hired labor time,  $l_h^i$ , has a lesser productivity than household labor, as shown by the efficiency labor discount factor,  $\gamma$  ( $0 < \gamma < 1$ ). This specification of hired labor conforms to the notion that hired wage labor will tend to be less productive per hour than labor provided by family members, who have some interest in the residual income generated by the production process. In addition, family labor may be subject to a set of disciplinary controls that are not legitimately employed against hired labor.

This specification of the income-generating process, and ultimately the vision of the labor market on which it is based, create a strong material basis for cooperation within the peasant household economy. However, as the next section will indicate, the ability of the peasant farm to exploit its comparative advantage in cheap labor will ultimately depend on its ability to mobilize its household labor. Indeed some analysts (Friedmann 1980; Bennholdt-Thomsen 1988; Reinhardt 1988) have noted that the competitiveness of peasant family farming is ultimately a reflection of patriarchy in the sense that it relies on the mobilization and exploitation of cheap family labor. According to such a view, as certain tenets of patriarchy are challenged at a societal level—here understood as the social legitimation of female bargaining voice and extrahousehold exit opportunities—the hyperproductivity and competitiveness of peasant family farms are diminished accordingly.

*Resource Reallocation and Renegotiation of the Conjugal Contract in the Peasant Household following Gender-Biased Development*

Although more empirically compelling than the earlier specification, the complex interdependencies of the peasant household erase the simplicity that made relatively sharp comparative static results possible. Nonetheless, using the basic mode of analysis developed earlier, it is possible to characterize generally the nature of reallocation and renegotiation in the conjugal contract model.

Consider an increase in monetary returns to the male production function,  $Q_m$ . Such a change could occur for a variety of reasons, including extension programming, cooperative enterprise, or farming contracts that target either men or crops traditionally contained in the male sphere of activity. The discussion that follows assumes that (marginal) returns to labor are sufficiently high in  $Q_m$  and that male land stock is sufficiently large that the man desires to supplement his efforts with spousal labor, hired labor, or both.

In the unitary and cooperative-bargaining models, such a development would lead to a reallocation of labor time based on comparative advantage, with the woman, for instance, shifting time from her activities to her husband's. Allocation of the increase in pooled family income would be a separable issue,

subsequently undertaken in accord with the nature of common household or bargained preferences. In the conjugal contract model, no reallocation of female labor time to the  $Q_m$  will occur without renegotiation of the conjugal contract.<sup>15</sup> Separability between labor allocation and the determination of the consumption bundle breaks down. Female labor will only be shifted to male agricultural production by renegotiating the conjugal contract in a way that elicits female labor by precommitting funds, via a monetary transfer, to the female expenditure sphere.

Following the increased returns to the male activity, the woman has muted incentives to reallocate her time to an activity that generates income controlled by the male, income that will be allocated to commodities in his sphere. The man is, of course, anxious to circumvent the imperfections in the labor market and employ family labor that is cheap in efficiency wage terms. Indeed, to the extent that female labor is mobilized at the expense of reduced earnings in the female sphere, the male has muted incentives to worry about the opportunity cost of additional female labor. However, in the absence of changes in the conjugal contract necessary to bring forth additional female labor, the man will reallocate his labor time away from any Z-good production and toward the now more remunerative commercial activity. Reduction in  $\bar{l}_m$  will lead the woman to increase  $\bar{l}_f$ , her Z-good labor time, compensatorily and reduce her labor supply to income-earning activities,  $\bar{l}_f$ , diminishing her monetary earnings,  $Q_f$ , given the fixed  $\Theta^f$ . The net effect of these first-round reallocations is to leave the woman more tightly income constrained than before, with a higher shadow value of own-income— $\lambda_f$ .

Thus two countervailing changes are induced by the increased returns to the male activity: the man's incentive to mobilize family labor increases and the woman imputes an even higher shadow value to her own income. Renegotiation of the conjugal contract confronts direct and indirect coordination problems. Increased female labor supply to the male activity can be negotiated directly. But the male-to-female income transfer needed to compensate for the labor supply increase has indirect effects. As in the simple model given earlier, the monetary transfer, via its effect on  $\lambda_f$ , influences the allocation of the woman's time between her income-earning activities ( $Q_f$ ) and Z-good production.

To summarize, the conjugal contract model proposes a way to analyze the reallocation of household resources following a new economic opportunity. It suggests an array of factors that may condition the elasticity of the household response to the new economic opportunity. Finally the model implies that a

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15. Strictly speaking, if consumption externalities were strong enough, or if Z-good production were highly dependent on male-purchased commodities, it would be possible for the woman to allocate labor beyond that contractually required to the male activity. The discussion that follows will ignore this possibility and assume that the conjugal contract always binds female and male behavior

change in the intrahousehold terms of exchange is a preliminary indicator of the intrahousehold distribution of the gains of the new opportunity.<sup>16</sup>

### **Conclusions and Policy Implications**

The conjugal contract model is intended to capture in a formal way the internal complexity of the household economy. In the context of a peasant economy, the exploration of the balance between individual preferences, income control, and labor and expenditure responsibilities, on the one hand, and resource exchange reciprocity, on the other, has largely taken place in fields other than economics, and it has not been systematically incorporated into the design and assessment of economic development initiatives. The model developed in this chapter has sought to characterize households as simultaneously sites of conflict and cooperation, of autonomy and interdependence, and to analyze the way in which they respond to changes in their economic environment in light of this internal richness of material relations.

Perhaps the central methodological contribution of the model is its recognition of the key mediating role of resource exchanges that occur within the household. These internal exchanges play two important roles in the household economy. First, expectations regarding the level and type of exchanges determine each household member's decisions about how to allocate labor time and income among competing uses. Second, changes in exogenous economic parameters, such as prices and wages, are absorbed by the household in part via their effects on the relative claims that individual household members have on one another's resources. Although previous economic models of the household have allowed for the differential impact of economic change on household members, conceptualizing this impact in terms of an alteration in the intrahousehold terms of exchange is quite new.

Such a model has several implications for economic policy. The model encourages the prior careful identification of gender-based spheres of economic activity, including remunerated and unremunerated labor, as well as expenditure responsibilities where these are well defined. Such prior identification allows policymakers to better predict whether the intervention they are considering—a price subsidy, for example, or the introduction of a new agricultural technology—will have a more direct effect on men or women. Second,

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16. Katz (1995), for example, finds that adoption of male-biased export crops in Guatemala flattens the intrahousehold terms of exchange between male cash and female labor transfers. Women in export-crop households work longer in their husbands' fields, gain little in the way of increased monetary transfers, continue to devote undiminished amounts of labor time to market activities to earn their own income, and are relieved from unpaid domestic labor only insofar as they can tap into their older daughters' labor time. The study also finds that export crop income is more likely to be spent on items in the male expenditure sphere, such as land and agricultural equipment, and less likely to be spent on "female" goods such as food and household items.



economic policy design must recognize the types of resource exchanges that occur within the boundaries of the household and the way in which these exchanges mediate the household's collective response to policy initiatives and the distribution of the costs and benefits of such initiatives. For example, although increasing opportunities for male agriculturalists may sound like an unambiguously positive development strategy, when intrahousehold resource transfers are taken into account, enhancing men's economic opportunities may have the effect of increasing male claims on female resources such as land and labor, while decreasing female claims on male resources such as income, with further implications for collective household welfare if expenditure responsibilities are taken into account. By recognizing the central role of the "conjugal contract" in the determination of household behavior and welfare, policies could be designed to enhance productivity and well-being without contributing to intrahousehold inequality, and perhaps even alleviating it.

## **7 Endowments and Assets: The Anthropology of Wealth and the Economics of Intrahousehold Allocation**

JANE I. GUYER

Four related themes in this volume deserve further comment: the need for interdisciplinary collaboration between economics and anthropology with respect to household and gender issues, the emergence of “assets” as a possible theme for common attention, the current divergence of approach to that theme, and the shared problem of generating adequate data on it. In this chapter I examine each discipline separately and then consider the problems each faces in addressing the concerns and analytical terms of the other. It should be said at the outset that my vantage point is that of anthropology, which inevitably affords a limited view of economics. This chapter discusses the potential connections and problems only as they present themselves from the household literature. There may well be other methods within the broader repertoire of the discipline for addressing some of the issues raised here. If so, their import into household studies would clearly strengthen both disciplines, so shortcomings in this rendition of economics in fact represent not only this author’s own limited knowledge of current work but also new frontiers to explore in the study of intrahousehold dynamics.

The first theme to address is the need, expressed in many of the chapters in this volume, for more interdisciplinary work, in particular, between economists and anthropologists. At the same time, there is a sense that collaboration is particularly difficult. Although the two disciplines may be studying similar phenomena—for example, households and gender relations in non-Western economies—the chasms between them are wide and the bridges fragile. This is the case even though each discipline contains varying theoretical paradigms (neoclassical, neo-Marxist, public choice theory, postmodernism, and so forth), some of which create conditions more conducive to interdisciplinary connection than others. Some of the intellectual bases for disciplinary differences in the field of household studies will be briefly illuminated in this chapter.

Second, in the very recent past the economics and anthropology of households have appeared to be edging toward a new convergence of concern around the nature and use of assets, particularly by populations that are conventionally thought of as “poor.” Much of this convergence is implicit and constitutes the

logical next step beyond this volume on intrahousehold allocation. However, this convergence could profitably be more strongly connected to both the “anthropology of wealth” and the “economics of saving and insurance.” Neither of these two literatures is yet strongly represented in intrahousehold thinking, which is focused—in both economics and anthropology—on the units and processes of decisionmaking about material needs.

Third, many of the assets of the poor are intrinsically and necessarily polyvalent, particularly in the absence of formal-sector financial institutions; that is, people with few goods are likely to prefer to invest in, and maintain, goods that have multiple uses. But this observation may be differently approached by anthropology and economics. Anthropology has been directly concerned with the polysemic (multimeaning) character of cultural elements and social practices. It attempts to describe and explain how elements form configurations, and how, into what, and under what conditions meanings can be transformable. Economics, in contrast, rarely deals with configurations and transformations. At this level, however, the disciplinary difference is not totally intractable. It can be bridged by the application of different analyses to the same data; “consumption” items can be regrouped and reanalyzed as both consumption and investment.

The more profound problem is that differences of analytical instruments are linked to diverging assumptions about the nature of the dynamic processes studied. Sociocultural anthropology has become oriented toward understanding the social and cultural dynamics of configurations such as assets (their creation or destruction and delegitimation) and their transformations through the rules for convertibility. Most chapters in this volume, in contrast, work from the methodological individualism of decisionmaking theory, in which decisions are made, given an exogenous endowment structure. Often these endowments are viewed as static; these models use a single-period time horizon in which assets are treated as exogenous (with the exception of human capital investment, to be discussed separately). Even the economic models that are dynamic (namely those relevant to discussions of the intertemporality of insurance and savings) are focused, it appears, not on the history of asset creation and transformation in society and culture, but on the cyclical and structural processes of asset management by decisionmakers over life cycles, across periods of crisis, or in relation to the predictable risks of seasonal production. In brief, anthropological dynamics deal with nominal variables, socially composed, over historical time, and economic dynamics in household models tend to deal with continuous variables, individually managed, over cyclical time. These are two different endeavors, albeit with strong potential for complementarity.

In many respects, the concern with gender finds fuller play in the study of asset creation than it does in the study of asset management, because the differences in consumption “preferences” between men and women can often

most plausibly be traced to profoundly different asset endowment and control. Feminist advocacy has everywhere focused precisely on improving women's access to and control of assets, especially as new kinds of assets are created. It is, however, obvious that study of both the nature and the management of assets should be part of an economics of gender.

Finally, whatever the temporal frame in which one works (seasonal, life cyclical, historical), economists and anthropologists have similar problems of data availability and interpretation. It may well be here, in the research design problems of studying dynamics over time, that interdisciplinary discussions about "new methodologies" may be most profoundly beneficial to both disciplines.

### **Disciplinary Bases**

To an anthropologist's eye, there appears to be a substantive gap in intrahousehold economic studies that almost exactly matches the theoretical branch of economic anthropology's greatest strength, namely the study of "wealth." Although concepts such as "endowment" and "human capital" increasingly enter into economic analysis, the explanations of the phenomena that make up these categories are comparatively limited (see, for example, Thomas 1991). One gets hardly any tangible sense of the florescent abundance of items considered to be "wealth" that appears in ethnography. To a significant degree and in spite of being largely devoted to populations conventionally understood as "poor," anthropology has devoted some of its most acute analytical thinking, over at least 80 years, to wealth and value creation, rather than poverty and scarce resources. The elaboration of theories of different social and cultural systems stresses phenomena that are powerfully and self-consciously present, rather than those that are comparatively—and perhaps, unconsciously, to the people themselves—absent or scarce.

The chapters by economists on intrahousehold allocation in this volume manifest a distinct and generally endorsed movement toward incorporating a more complex set of personal endowments into the analysis of poor households. There will remain unbridgeable barriers between the theoretical "central tendencies" in the two disciplines, but this newly introduced topic of assets does constitute a kind of narrows: from a bedrock of comparable strength in each discipline, it offers one promising connection by a fairly short route.

#### *The Anthropology of Wealth*

The anthropological emphasis on wealth is foundational to the discipline. Some of the greatest landmarks in this discipline's history have been devoted to the study of the creation and valuation of items for which use had to be sought at the level of social function, so relatively impractical did they seem. Malinowski (1922) went so far as to compare the famous kula shell

valuables—so powerfully emotive that they were laid on the breast of a dying man to give comfort and joy—with the British crown jewels. Mauss (1925) created an entire social theory and, ultimately for him, a political morality on the basis of his study of *The Gift*, that is, of exchanges of goods imbued with power and value by virtue of their capacity to create relationships rather than by their use in (literal) consumption.

The development of the study of exchange and valuation from these seminal works has taken place within anthropology almost completely independently of the discipline of economics, thanks, at least in part, to the polemic stance these “founding fathers” took against the tendency of economics to universalize what they saw as particular—and Western—modes of rationality. By now the literature on value and exchange constitutes one of the largest and most challenging within anthropology. Five very recent contributions are mentioned, none of which is deeply indebted to economic theory. Thomas (1991) has traced out in detail the processes by which novel Western goods were incorporated into the economies of the South Seas in the eighteenth and nineteenth centuries. Humphrey and Hugh-Jones (1992) have examined the social incidence and history of barter. Weiner (1992) critiques the theory of reciprocity and develops the concept of “inalienable possessions.” Guyer (1993) has reexamined the Africanist concept of “wealth in people” whereby the ultimate goal of material wealth has been seen as the transformation of goods into rights in people. Ferguson (1988, 1992) has questioned an ordinal scale (“ranking”) approach to wealth and poverty, arguing that “the extent to which one form of wealth is transformable into another is an empirical question” (1992:59).

The topics of production and consumption that have animated household economics (Becker 1981; Sen 1985b; Chayanov 1986) come very late into the history of economic anthropology, and largely as a product of the development philosophies of the post-1960 world and political-economic theory. Oscar Lewis’s famous book (1959), subtitled in part *The Culture of Poverty*, was a departure from past tradition and highly controversial within the discipline. Anthropological studies of production took great stimulation from debates about the European peasantry (see, for example, Brenner [1985] on production and exchange), and then from the historical importance of market demand for goods (see, for example, Thirsk 1978). Within the classic, ahistorical, anthropology of non-Western cultures and societies, the study of consumption had already been stimulated by symbolic and structural analysis (see, for example, Levi-Strauss 1969 and Goody 1982), but the analysis was performed in terms of classifications, exchangeability, and relative status, rather than quantitative variables such as calorie consumption or indexes of welfare. The conceptual frameworks themselves militated against studying the kind of variable that would define standards of living as distinct from ways of life. Even when theoretical work devoted to commodities and consumption began to be written

in the mid-1980s (Appadurai 1986; Rutz and Orlove 1989), it was self-consciously innovative in its terminology compared with the older tradition, and its “homing instinct” remained oriented toward wealth, value, aspiration, and inspiration. Faced with poor populations who, in spite of their poverty, finance temples, go on pilgrimages, donate resources to causes, purchase arms to engage in “peasant wars” (see Wolf 1969), and so on, anthropology has found its older literature on value on the whole more illuminating than the newer economic approaches to production and consumption. In fact, the apparent stubborn reluctance to move from “values” to “prices” and from qualitative to quantitative attention to the “quality of life” has earned some angry exasperation from heavily studied groups such as Native Americans. It may be that the convergence of anthropology and economics around household issues has been too short and too partial for this history and these intradisciplinary backward linkages to be apparent to economists.

### *The Economics of Households*

With this background in mind, it is striking how much of household economics is concerned with production and consumption, and how little with wealth for its own sake (rather than as a means to achieve a desired level of consumption). As Haddad and Kanbur (1990:867) write, “the object of interest is the well-being of individuals, which is measured by some agreed standard (consumption, nutrition, and so forth).” Putting aside for the moment the issue of differential wealth in the conventional sense (for sample- and class-stratification of unitary households), it is one of the most interesting innovations of the collective household models that they have highlighted the importance of differential wealth control within the household and what determines that control, that is, phenomena variously designated as “endowments” (Pitt and Lavy 1992), “extra environmental parameters” (McElroy 1990), “public goods” (Lundberg and Pollak, Chapter 5, this volume), and “human capital” (Pitt and Lavy 1992).

Two achievements result. First, in substantive terms, the intrahousehold studies implicitly recognize that even poor households and poor people are units invested with value as well as being consumption units; otherwise, the complex distribution of their collective and individual “endowments” could not make such major differences to patterns of consumption. Poor people do not just have values in the sense of preferences, given by culture and expressed in market choices; they also control different “things” with different values (or powers) relevant to consumption decisions. Second, in terms of the logic of analysis, wealth (“endowments,” “capital”) now enters into the equation as an active element in economic processes that influences the process of decision-making, rather than entering into empirical analysis as only a passive indicator of the characteristics of population categories.

Parallel to the question of why poverty came so late into anthropology is the question of how wealth came so late into household analysis. Though

Becker (1965) contends that a household “is truly a small factory,” with “capital goods, raw materials, and labor,” this model has been applied mainly in its production and consumption modes; capital goods were given far less attention in household analysis than was labor. One possibility is that the major populations for whom household studies and the theory of consumer choice were developed did not really own assets—if the concept of assets is understood in the narrow sense of the term for capitalist economies—until the advent of new developments in consumer credit in midcentury. Small-scale capital has always fit rather awkwardly, both theoretically and politically, into capitalist dynamics.

Housing as a lower-middle-class asset is an example. In a fascinating review of British housing policy, Daunton (1990) points out that petty bourgeois families of the nineteenth century saved throughout their working lives to invest in a house for the rental market, since this could provide a regular and reliable income for men in retirement or in case of disability, and for women, whose class position and associated social symbolism allowed them very limited access to the labor market, especially in old age or widowhood. The ownership of a house, apart from the one in which a family lived, was therefore a major economic and social asset for that segment of the population. Daunton points out, however, that these owners of “house capital” were in an untenable political situation in the early twentieth century, allied for some purposes with the conservative (rural) landed interests and for others with the progressive (urban) industrial interests. Over a period of decades, they largely lost out, to be replaced by the ideal of the owner-occupier, supported financially by bank mortgages and building societies. Assets that were petty and nonproductive by capitalist standards fell out of the political configuration. Thus this category of “capital” has possibly always been analytically difficult, just as it has been politically ambiguous.

For those recognized as poor, the issue of assets was made more or less irrelevant as welfare systems took over much older criteria of eligibility that presumed the beneficiaries to be propertyless. In the United States, asset holding is generally incompatible with receipt of benefits, and there is some moral outrage when recipients try to develop small asset portfolios (the “welfare Cadillac”); hence, perhaps, the limited development of the idea of assets in the poor and lower middle classes. The theoretical concomitant of the low political profile of small capital is that, in systemic terms, it is not really investment (in the sense of being devoted to production), but neither is it only consumption (in the sense of being used up).

One might argue (and a sociocultural anthropologist certainly would) that, in fact, the poor have a special need for small-scale assets, for example, the single big-ticket item that can be pawned when necessary to float consumption over a bad patch but can also be displayed to validate reputation in good times, or the network of solid relationships that can be tapped for remittance income and hand-me-down clothing, and for information about jobs and

bargains. The more fragile regular income sources are, the greater the importance of valuables that lend themselves to multiple uses, including leverage of short-run credit and income infusions. It is only marginally flippant to endorse the advice that, in an era of women's low status relative to financial and labor force access, "Diamonds (really) are a girl's best friend": you can wear them (for status validation or to attract a new male patron), pawn them, save them against price rises, loan them (thereby investing in social relations [Berry 1989]), endow them to a daughter, or, in extremity, sell them. A fur coat and a Cadillac are even more polyvalent, since the first keeps you warm and the second gets you from place to place, although both suffer from the deterioration of classic consumer items; unlike diamonds, they are not "forever."

In countries with limited state and banking institutions to fill some of these demands, the case for looking at assets is still stronger than it is in other contexts. The house of a Nigerian *mai gida* (head of household) is the basis of his business; he runs a major interregional trading system or international money-changing enterprise from his lodging chambers, storage rooms, and front porch (Cohen 1969). And his "investment in social relations"—as Berry (1989) develops this idea in order to extend the concept of investment—is a constant outlay that creates, reaffirms, and extends the reputation and trust on which the entire enterprise rests. The poorest landless laborer may develop a portfolio of assets, and lack of any such investments is a sign not just of poverty, but of total destitution.

The chapters in this volume, and other recently published works that use collective household models, begin to incorporate assets as an active component in household processes. McElroy's bargaining model locates the "threat point" for collective solutions in accordance with "extrahousehold environmental parameters" that may include individual and collective rights under divorce laws, the tax code, the welfare structure, and even kinship practices according to which a wife may have the right to return to her parents' house in case of separation (1990:566, 571). Schultz (1990) and Thomas (1991) both focus on the importance of individually owned "non-earned income," which "has a distinct association with the family's labor supply and reproductive behavior" (Schultz 1990:623). The sociological concept of "endowment" is used and extended to apply to personal biological characteristics such as individual susceptibility to illness (Pitt and Lavy 1992).

This direction of thinking could clearly be related to the study of savings and insurance (see Alderman and Paxson 1992), since some—at least—of these "endowments" implicitly relate to the logic of income smoothing. The problem with this particular "marriage" of literatures appears to be that the savings-insurance literature is written largely in terms of the unitary, rather than the collective, household. The most important "endowments" for the intrahousehold models are precisely those that, in effect, "insure" particular elements (such as the wife's economic viability, irrespective of the fate of the



marriage) rather than the continuity of the unit as a whole. In other words, exactly who is insured in Modigliani's life cycle theory of savings is a critical question (Besley 1993), since it is ultimately individuals and not households that have life cycles.

In summary, assets are becoming an important component of intrahousehold models. A dynamic approach to investment, however, seems to be embedded in a branch of economics that still uses the unitary household model. Neither approach takes the substantive and historical approach to assets—their creation, maintenance, and polyvalent transformations—that is embedded in sociocultural anthropology. Both of them, however, seem to be moving in on the same set of phenomena.

Before moving on to the potential conjunctures, it is worth noting that certain works in political science address the investment rules and preferences of kin and community groups (but not yet disaggregated households, as far as I know, and usually not in a historical context), with a view to explaining the role of local capital in political dynamics (see, for example, Bates 1990).

## **Anthropology-Economics Interfaces**

### *Economics*

The potential link from a focus on assets to the anthropology of value can be clearly recognized: in collective models, differential wealth access and control is no longer a simple variable for classifying households prior to the analysis, but a complex, gendered variable that crosses the threshold of the household and enters the analysis. The next step is more difficult, however. Owing to the demands of model-building for short-run decisions, endowments are viewed as exogenous. None of the households or individuals analyzed in the chapters in this volume is seen as systematically saving up to buy land or a house, maintaining clientage ties, purchasing gold jewelry, bribing officials, or storing cloth or enamel bowls for a dowry, unless these transactions figure as “consumption” of housing, household furnishings, clothing, and business expenses. In these models, people may have property, reputation, and social insurance as endowments before the bargaining begins, but they do not yet seem to be actively working at or investing in them, except as human capital in the form of educated and healthy children. These chapters endow people and households with assets, but they do not show people investing in them: maintaining, increasing, scheming, and planning. Admittedly these temporal processes are difficult to document because of the lack of panel data and so on. But part of the problem—a point to which this chapter will keep returning—lies in both the incomplete nature of the intrahousehold model's embrace of assets and investment and the intrinsic ambiguity of these goods at any one point in time, especially in poor populations.

The first issue can be pinpointed through a brief comment on Thomas's (Chapter 9, this volume) analysis of the data for 38,000 urban households in Brazil. Taking the sample as a whole, nonlabor income is an important income source. Forty-three percent of male heads of households and 23 percent of female heads report some nonlabor income. For male heads, nonlabor income sources make up 25 percent of their income; for female heads, they account for 40 percent, although the absolute level of nonlabor income for women is only 26 percent of that for men. In general, then, these are people with some level of assets, both financial and social (pensions, social security), even if one restricts the notion of assets to the conventional definition and thereby does not include "investment in social relations," which, in this case, would surely include ceremonial expenditures. On the expenditure-consumption side, "investment" figures as expenditures on education, health, and recreation, construed as "human capital." The interesting implication, then, is that the less well-endowed, poorer partner (the wife) is performing a disproportionate amount of the total investment of the household as a unit.

Once the idea of investment has been brought in, one is not simply in the realm of gendered consumer "preferences" to account for this odd finding. One logical inference to draw would be that the woman is trying to increase the value of her own asset endowment (in the broadest, nonconventional meaning of assets or endowment), that she is trying to raise the level of her (inferior) asset control. Perhaps a woman is investing because she is so relatively asset poor, compared with a man (that is, the lower the assets, the greater the marginal propensity to invest). Or she may be following a gender-specific compensatory strategy: since key assets that ensure lifetime income smoothing are male specific (pensions and social security, for example), she needs to cover the same long-term needs through other instruments, such as human capital investment in healthy and educated children. Or alternatively—and to raise the cooperative instance of Sen's "cooperative conflict"—there may be a total household investment portfolio, implicit in the gender division of expenditure, such that members of poor families maximize and then place in complementarity each individual member's access to whatever they can best invest in, given external social, structural, and labor market constraints. These asset dynamics, in the broadest sense of the concept, are not clear, unless investment is more broadly considered. The link must be forged between women's endowment and women's investment, between men's endowment and men's investment, and between the dynamics of the two in collective activities. To explore these issues, one would need to know what other kinds of investment might be undertaken, particularly by men, that are perhaps hidden by having been construed—as "health" and "education" also could be, if one did not coin the term "human capital"—simply as consumption "expenditures."

Economic modeling faces three problems, not all of them tractable within a decisionmaking frame of analysis: (1) the intrinsically multifaceted nature of

small-scale assets, which has already been mentioned; (2) the processual aspect of their formation, both exogenous and endogenous; and (3) the great likelihood that the processes of asset creation are locally and historically specific.

THE MULTIFACETED NATURE OF SMALL-SCALE ASSETS. Small-scale assets veer unnervingly between “investment,” “consumption,” and “prestige” expenditures, precisely because—as has been claimed many times for many different theoretical purposes—families are not, in fact, factories, if only for the reason that they tend intransigently to resist going totally out of business in the face of adverse conditions. The marriage may break up, but the parenthood of at least one party does not. And the claims that kin who were once co-members of the same household can make on each other, regardless of residence, can be lifelong and realizable under a vast variety of conditions. McElroy’s (1990:566) possibility of a woman’s returning to her parents’ house is an extraenvironmental parameter to her at that time, but it may depend on her investment in her parents’ current or future welfare. It is precisely their multifaceted nature, which is the result of layers of “investment” over the long term, that gives these relationships the status of parameters. In social terms, they are emphatically not “givens” but “creations,” often resulting from extraordinary diligence and cultivation. Declaring total family bankruptcy, á la the factory model, is social suicide. People’s interests lie in creating and maintaining at least some goods and some relationships that are multipurpose, that can veer from investment to consumption to status signifiers as needed.

Conceptually, this is home territory for anthropologists. The intrinsically polysemic (multiple-meaning) character of “things of value”—people’s punctilious attention to creating and recreating those meanings and selectively substituting one meaning for another in differing situations—has been a terrain of enquiry since Levi-Strauss’s (1949) early work on structures of exchange and Richards’s (1956) study of people’s understandings of the symbolism in female initiation rituals.

The challenge to household studies is to define more clearly the space into which things of value (in anthropological terms) and small-scale investments in assets (in economic terms) could be imported explicitly. The incorporation of investment into intrahousehold models has already been carried out to the greatest degree with respect to children’s nutrition and health. The multifaceted nature of children as consumption and as assets has already been acknowledged. Schultz’s (1990) analysis of the ways in which fertility and remittance income by children are connected in Thailand demonstrates the investment facet of a mother’s interest in her children and shows how different an interpretation can be given to “consumption” (the demand for children) if it is looked at as an investment in future income sources.

Intrahousehold analyses, by showing that the gender and generational control of such endowments matters, have created the space to extend this kind

of analysis beyond children and health. For example, Hausa women buy small livestock (Hill 1972). Like Monroe's diamonds, they are portable, loanable, and savable and resist depreciation. They can also be given away to create patronage ties, set loose on gardens to provide manure, eaten for Muslim festival meals, or sold for cash. At any one moment, they are potentially all of these: gift, savings, investment, consumption. Historically, their absolute importance and the relative relevance of their various potentials may wax and wane with the politics of marriage and the state of the economy: the incidence of divorce, the ease with which a woman is able to return home, the presence of own or fostered children to tend them, the levels of religious consumption, the vicissitudes of women's incomes and alternative expenditures.

INVESTMENT AS A PROCESS. The nature of investment in endowments by individuals and families as a process does seem to be problematic for econometric analysis, since variables must be unambiguously either exogenous or endogenous to the decisionmaking process. However, people may create conditions for themselves through endogenous processes of resource allocation that will incrementally alter the "threat point." With a view of asset formation as a process, the threat point becomes variable over time. In anthropological terms, people are at one and the same time embedding their decisions in both short- and long-term frameworks, in which present consumption or expenditure decisions express, confirm, or create a potential claim over the longer term. The optimal solution meets both sets of expectations and predictions.

Moreover, ordinary people's ordinary strategies must extend into time frames beyond the individual life cycle, either through basic philosophies of existence or through *realpolitik*. Most really critical social and cultural assets fall into this long-term category. *Kula* valuables, massive gold earrings, caches of cloth, sacred amulets, and so on are not primarily intended to bring about income smoothing over the life cycle or the seasons, even if they can be adapted to fulfill that function. They are relevant to reproduction over much longer time frames: in some cases, the cycles of age grades; in others, the succession of alternate generations; in yet others, the rebirth of individual souls; and in some currently critically important cases, the continuous preservation of material symbols of an ethnic historical identity in an increasingly unstable world (temples, libraries, ritual positions, ethnic festivals). It may be that household economics cannot easily address this level of "investment," even if rather large amounts of resources are involved, since the investment breaches the tight logical assumptions of life-cyclical dynamics and is undertaken in terms of collectivities much larger than households. But if investment as an intrahousehold process—as distinct from endowment as an exogenous state of being—is to be broadened to at least some other goods and services, the expectations and forecasting (the time frames) that are intrinsic to the cultural analysis of social value necessarily become part of the economic analysis.

A fully anthropological approach would embrace this extension. It is axiomatic to anthropology that assets are imbued with their value through social and cultural processes much larger than the household or family, extending over much longer time frames than the life cycle. Since the sociocultural anthropology of the past 25 years is an anthropology that has been increasingly focused on dynamics and history (valuation rather than values, cultural construction rather than the structure of culture), the study of assets would become the study not only of the assets themselves, or of asset management (in the life-cyclical sense), but of asset creation (in the active, historical sense). Both policies and popular processes create assets. Policies can define things as assets and set up conditions of access and use. Asset creation is something governments and banks, often together and in concert, can do and are doing all the time. This is one area in which gender has probably been more important than in any other context, namely in the struggle to ensure equal access to economic and social assets as they are created and reworked, and to define women's claims and controls with respect to assets that have been (as Strathern [1988] would put it) "jointly authored" with men.

*LOCAL AND HISTORICAL SPECIFICITY.* The third problem, that of local and historical specificity, follows logically from the previous one. Even in highly formalized economies, there are popular processes of asset formation. This topic may, then, lead down what must seem to be an inexorably slippery slope toward cultural specificity for economics, a discipline that tends to be formal in method. In particular cultural contexts, different goods and qualities are considered to be assets. Under honor systems, a wife's seclusion within the home and the sexual modesty of daughters are family assets: they cost, they bring returns, and, under unstable and competitive political conditions, they can become highly vulnerable to theft (rape). In parts of Africa, a woman's capacity to work outside the home is a family asset: it elicits marriage payments and commands health expenditure, and it brings returns. Not only are personal and collective assets valued externally to the household, but the goods themselves often originate and are stored, accessed, and passed on beyond the household boundaries. This means that intrahousehold processes relative to assets are necessarily extrahousehold processes as well, contingent on the wider society (see Guyer and Peters 1987).

For analysis of formal-sector assets, however, the conceptual problem may be much less problematic than cultural anthropology insists, simply because the processes and models used by policymakers throughout the world in the late twentieth century now owe something to a common, collective, and internationalized tradition of governance. Since policymaking is explicitly about the mobilization of parts of that repertoire in new contexts, it may be that it is here—in addition to its more familiar terrain of popular asset creation—that anthropology could make a stronger contribution than it has made so far: by addressing the full range of ways in which policies that originate in this

internationalized collective repertoire have created and destroyed assets and defined or undermined gendered access and control, and by studying the ways in which formal and popular processes have influenced one another.

### *Anthropology*

At this point a classic barrier is faced, namely the long-term reluctance (bordering on intransigence) at the theoretical centers of anthropology to import a capitalist vocabulary—investment, capital, and so on—into the analysis of noncapitalist systems. Since this chapter is oriented toward economics rather than anthropology, and since other chapters to come summarize well a productive kind of interdisciplinary engagement, only one or two additional points need be made here. First of all, it is worth noting that one of the points of contention in the new literature on “commodities” in anthropology is a new version of the same, much older question, namely whether the concept of “commodities,” originating as it does in the theory of capitalism, can be lifted out of the full-fledged capitalist context at all (see Guyer [1993] for a brief summary). Present thinking seems to be generally somewhat more open than it has been. Hart (1982) suggests that “commodity” can legitimately bridge the noncapitalist-capitalist divide, as long as some key subcategories of commodity types are recognized. Appadurai (1986), and many archaeologists, simply use the term “commodity” whenever something is sold. Political economists of otherwise somewhat different theoretical convictions apply capitalist vocabulary without any of the elaborate self-scrutiny that characterizes certain kinds of current anthropology: Bates (1990) applies the concepts of capital, investment, and risk to African household and kinship strategies that clearly lie outside capitalist dynamics; Berry (1989) applies the concept of investment to social relations. Cultural anthropologists, in contrast, either remain much more skeptical and avoid the capitalist terminology altogether (using instead wealth, valuables, authorship, redistribution, and so on) or else demote the analytical content of these terms and use them as simple descriptive words, without any necessary theoretical implications.

Although there is still a great deal to be gained from the classic culturalist view that every system is built from its own premises, the fact is that all peoples now deal to some degree with formal-sector assets of the kind developed within capitalist contexts: either with their increasingly defined and regulated presence or their policy-driven absence. And sociocultural anthropologists frequently work in capitalist economies and societies, which are now varied enough to be subject to comparative cultural analysis. The ideas of capital and investment are used by people themselves. In the situation in which capitalism is now plural (capitalisms), in which many of the capitalist institutions have been selectively domesticated in different contexts, and in which continuities with the local precapitalist past seem quite striking, the methodological assumptions of classic cultural anthropology (variety, cultural prem-

ises, locally specific innovation) can be adapted quite readily to the study of capitalism itself.

## **Conclusion**

There may be a limit to the elasticity of collective decisionmaking models to take on fully all the implications of “endowment” as an anthropologist would see them, including long temporal frames of investment and the historical-political process of asset creation and destruction. And there are certainly limits to cultural anthropology’s enthusiasm to embrace the calculative, means-end implications of the concept of investment when it comes to multifaceted valuables with polysemic characteristics and multiple temporal referents. But by incorporating investment more boldly and broadly, the interface between complementary types of study could be strengthened, as it should be, in order to appreciate fully the social and cultural creativity of everyday life among poor populations.

The study of small-scale assets necessarily involves social, cultural, and policy analysis in a dynamic framework. It builds in the study of differentiation and control within and beyond households and families. It opens household analysis in economics a little more widely to other branches of anthropology, branches that nevertheless deeply inform some of the gender and kinship analyses with which household economists are more familiar. And it would possibly open the anthropology of value a little more widely to the economics and economic history of those assets and investments that make up the repertoire of options in the—now very substantially shared—capitalist traditions of modern policymaking.

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## **PART II**

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# **Measuring the Outcomes of Intrahousehold Resource Allocation**



## 8 Testing Competing Models of Intrahousehold Allocation

JOHN HODDINOTT, HAROLD ALDERMAN, AND  
LAWRENCE HADDAD

The chapters by Pitt, Chiappori, McElroy, Lundberg and Pollak, and Carter and Katz develop the two aspects of intrahousehold distribution that are the focus of this book: the determinants of allocations among individuals and the decisionmaking process that leads to these allocations. The purpose of this chapter is to assess empirical tests of the underlying models of household decisionmaking. A comprehensive review of all the empirical evidence on intrahousehold resource allocation in developing countries is not attempted here; such a review would constitute a book in itself. Thorough summaries of this literature include Behrman and Deolalikar (1988), Behrman (1990, 1996), Strauss and Beegle (1995), and Strauss and Thomas (1995). Some, though by no means all, of the studies that these reviews cover depend critically on the assumptions underlying the unitary model. The objective in this chapter is to review tests of those underlying assumptions.

### **Direct Testing of the Unitary Model**

#### *Are Incomes Pooled?*

The unitary model assumes that all income sources within the household are pooled. This implies that the identity of the individual earning income has no effect on household demand for goods and leisure, except through the wage (price) effect on the substitution of leisure and commodities. However, the view that income is not pooled within the household has figured prominently in sociological and anthropological studies. Other arrangements that households adopt include systems in which one person manages all finances and expenditures except for personal spending money; a “spheres of responsibility” system in which, for example, a husband gives his wife a set amount for purchasing specified commodities; and an “independent management” system in which each individual has his or her own income and is responsible for certain expenditures, and neither has access to all household funds (Pahl 1983). A consequence, though perhaps not a surprising one, is that differential control

of income translates into different patterns of expenditures. It is widely perceived that men spend a higher share of their income on goods for their personal consumption than do women. Alcohol, cigarettes, status consumer goods, and even “female companionship” have been noted. In contrast, women are believed to be more likely to purchase goods for children and for general household consumption. Guyer (1980) is particularly noted for this observation, although a number of other researchers have commented on the phenomenon as well.<sup>1</sup>

This proposition has been tested in a number of settings. Von Braun (1988) finds a positive relationship between the proportion of cereals produced under women’s control and household consumption of calories in Gambian households. Garcia (1990) finds that raising the share of income accruing to wives in Philippine households increased acquisition of calories and protein. However, by using women’s income as a regressor, both studies implicitly make the strong assumption that labor supply decisions are exogenous. If this is incorrect, there will be a correlation between the explanatory variable—women’s income—and the error term that incorporates factors influencing labor supply decisions. Thus the parameter estimates in these studies may be biased.

Since these studies do not distinguish the impact of individual prices (wages) from income control, they do not constitute a strict test of the income pooling hypothesis. Suppose an exogenous change occurs that, by raising women’s wages, induces an increase in women’s labor market participation. In the unitary model, any change in expenditures may reflect cross-price effects of wages. The reallocation of members’ time may lead women to purchase maize flour rather than grind maize themselves. Although the cooperative bargaining model does not rule out such changes, it also predicts that women may renegotiate the gains from marriage on the basis of this new (or enhanced) earning opportunity. Thus changes in wages could alter the distribution of income within the household or change a woman’s potential earnings should the marriage dissolve. This could affect the pattern of household expenditures. Thus the same outcome is predicted by both approaches.

Similarly one may have a unitary household in which the correlation between women’s cash income and acquisition of certain goods reflects differences in purchasing productivities. If women are working as traders in the marketplace, the household may economize on transaction costs if women purchase food in the market (and the man’s income is used to purchase other goods). It is difficult to distinguish this household from one in which an increase in women’s earnings outside the household changes expenditure patterns because it raises the woman’s bargaining power (either because her threat

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1 See, for instance, Kumar (1979), Tripp (1981), Pahl (1983), and Engle (1993), as well as the studies cited in Dwyer and Bruce (1988) and Bruce (1989a).

point is higher or because her perceived contribution within the household has increased). This is a problem of “observational equivalence”—the phenomena observed by these studies can be explained by either the unitary or the collective model. For this reason, economists have sought additional means of gaining insights into household behavior.

Hoddinott and Haddad (1995) partly control for this possibility in their study of expenditures in Côte d’Ivoire. Using Ulph’s (1988) noncooperative model as a guide, they use two-stage least squares estimation with budget shares and women’s predicted cash share of household income being treated as jointly endogenous. They assume that certain variables—such as the proportion of landholdings operated by women, women’s share of household business capital, and the ratio of women’s to men’s education—will influence women’s share of cash income, but not expenditure shares, directly. They find that doubling women’s share of cash income within Ivorian households raises the budget share of food and lowers the budget shares of alcohol and cigarettes. These results are conditional on their identifying restrictions. However, their results are robust to changes in functional form, are reflected in reduced-form estimates, and concur with budget shares obtained from an examination of single-sex households.

Haddad and Hoddinott (1994b) use the same framework in analyzing child health in rural Côte d’Ivoire. Using fixed-effects estimation to control for household-level unobservables, they find that increasing women’s share of cash income raises boys’ health anthropometric status relative to girls’. The explanation of this finding draws on two separate strands of the intrahousehold literature. The first, as outlined in Behrman, Pollak, and Taubman (1982), emphasizes that allocation of resources among children reflects both equity and efficiency considerations. Here, equity concerns take the form of a desire to equalize health outcomes across genders—specifically to compensate boys for their poorer initial health endowment. Efficiency concerns manifest themselves in that because sons are a form of old age support, investing in them produces a higher return. Second, for women’s income to have greater impact, different adults must also see different gender-specific returns to such investments, or weigh equity concerns differently, or both.

Another means of formally testing the pooling assumption has been the use of gender-specific nonlabor or nonearned income. (Direct tests of this assumption, using labor income, are problematic because of the endogeneity of income.) Provided that this is independent of labor choices, Schultz (1990: 601–602) notes that “The challenge to the neoclassical model of household demand arises if nonearned income of different family members is observed to affect differently the household’s allocation of resources. If nonearned income (or ownership of the underlying asset) influences family demand behavior differently depending on who in the family controls the income (or owns the asset), then the preferences for that demand must differ across individuals and such families must not completely pool nonearned income.”

An example is given by Thomas (1990). Drawing on survey data from Brazil, he examines the differential impact of nonlabor income in the hands of men and women. Thomas rejects income pooling in the demand for per capita caloric and protein intakes, fertility, child survival, and weight-for-height for children less than 8 years old. The results for child survival are particularly powerful—the increase in the probability of child survival is 20 times larger with a marginal increase in female earnings than with a comparable increase in male earnings.

Thomas's (1990) results could be interpreted as providing a further test of the cooperative, collective approach. Such a claim must be made cautiously, as nonlabor income may be conditional on being in a particular state. For example, individuals may be receiving unearned income in the form of sick benefits because they are temporarily ill. Such income cannot be considered a pure threat-point shifter. Similarly some unearned income (such as dowry) may be conditional on being married; it too cannot be considered a threat-point shifter. Distinguishing between such possibilities is central to Thomas's contribution to this volume (Chapter 9). He tests whether these results are robust to treating nonlabor income as an aggregate or using only asset income. Under both definitions, income in the hands of women is associated with a larger increase in the share of the household budget devoted to human capital and leisure.

Schultz (1990) finds that unearned income has a significant effect on women's labor supply. "This pattern is clearest in the case of Thai women, where the own nonearned income effect on participation is six times as large as that of their spouse's nonearned income. The preponderant sign of all the labor supply effects of transfer and property income is negative, as anticipated." However, he also finds that women's transfer income is positively and significantly related to fertility, whereas women's property income has no such effect. He notes (1990:623) that "the connection between transfer income and fertility may reflect the reverse causation to that hypothesized here, where women with more children to support are more likely to receive transfers from family and other groups in society."

Horney and McElroy (1988) examine data from a 1967 sample of American married men and women, residing in households in which both partners worked. They disaggregate nonlabor income into transfer (pensions, veteran's payments, workmen's compensation, other disability payments, and Aid to Families with Dependent Children) and business (business, farm, rental, and interest) income. Transfer income is of particular interest because a number of its components (such as disability and veteran's payments) are independent of marital status. They find limited evidence that male and female nonlabor income has a differential impact on the leisure choice of males (male transfer income reduces male labor supply), but not on that of females or a composite consumption commodity.<sup>2</sup>

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2. They attribute the weakness of their results to difficulties in obtaining complete information on rights to unearned income within the household.

A number of recent income-based studies derive a set of testable restrictions requiring only the assumption that household decisions are Pareto efficient. As Chiappori (Chapter 3, this volume) provides a detailed discussion of this approach, only a brief summary is provided here.

Browning et al. (1994) develop the idea that certain goods within the household are exclusive—that is, they are consumed by only one person. They show that this concept can be used to recover the household's sharing rule. They use expenditure data from childless Canadian couples who work full time. Using women's clothing as an exclusive good, they recover the sharing rule parameters. They also compare a sample of couples and two subsamples of singles: the unitary restrictions are rejected for the former, but not for the latter. This would be the case if the rejections were due to a sharing process negotiated between family members.

Bourguignon, Browning, and Chiappori (1994) construct a general model that encompasses the unitary and collective frameworks as special cases. This approach generates two hypotheses: (1) if income is not pooled, the coefficients for male and female income in an expenditure equation should be significantly different from each other; and (2) the existence of a cooperative model requires that certain restrictions be placed on the coefficients of total household- and individual-level incomes. Using French data consisting of married couples working full time with no children or one child, income pooling is rejected, but the cooperative approach is not rejected.

Browning and Chiappori (1995), analyzing data on consumption, find that Slutsky symmetry is rejected for couples, but not for singles, whereas the collective generalization of symmetry is not rejected for couples. Thomas and Chen (1994) apply this model to data from Taiwan. They strongly reject the unitary model; that is, the distribution of both individual total (instrumented) and individual nonlabor income affects budget shares.

The concept of exclusive goods that allows for identification of sharing rules in Chiappori (Chapter 3, this volume) is also employed by Deaton (1989, 1995) to study how consumption patterns are affected by the demographic composition of households. This outlay-equivalency methodology tests whether parents reduce expenditures on adult goods more severely in the presence of an extra (young) girl than for an extra (young) boy and thus is a means of studying which decisions are made, more than the actual process of decisionmaking. Nevertheless, a natural extension could complement the evidence on income pooling. This extension would test whether the reduction in expenditure on adult *male* goods is equal to the reduction in expenditure on adult *female* goods in the presence of an additional boy or girl. To date, no such test has been performed.

Finally, an additional perspective on income pooling is found in a study of informal credit programs in Bangladesh (Pitt and Khandker 1994). This study (which is further discussed later in this chapter) finds that credit affects household education and consumption choices differently if it is obtained by women

rather than men. As the study employs a fixed-effect methodology that treats the availability of credit much as an experiment, it is able to control for the fact that credit choices reflect household preferences.

### *Studies of Labor Supply*

Although leisure is conceptually similar to other commodities, it is recognized as an exclusive good, even in the context of unitary models of households. Thus the literature on labor supply provides a number of alternative approaches to testing models of intrahousehold allocation. In a unitary model, cross-substitution wage effects must be equal—“the effect of an income-compensated increase in the husband’s wage on the wife’s labor supply must be identical to the effect of an income-compensated increase in the wife’s wage on the husband’s labor supply” (Lundberg 1988:225). However, evidence presented in Ashenfelter and Heckman (1974), Killingsworth (1983), and Alderman and Sahn (1993) rejects the equality of these effects. Using panel data to control for unobserved fixed effects, Lundberg (1988) rejects the hypothesis that the husband and wife’s labor supply is jointly determined, as predicted by the unitary model. Similarly Fortin and Lacroix (1993) estimate a general model of labor supply in which both the unitary and the collective framework can be tested as special cases. Using data from Canada, they find that, although the unitary restrictions are strongly rejected, the collective are not.

Furthermore, there exist a variety of studies that support the claim that labor is not pooled within the household. Jones’s (1983, 1986) study of rice cultivation in north Cameroon provides several results of interest:

- Women supply a suboptimal amount of labor to their husbands’ rice fields, preferring to spend time working on their own sorghum plots. A profit-maximizing household would increase the amount of women’s labor supplied to rice production.
- Women receive compensation, in cash and kind, for labor they provide to their husbands. This amount rose as more labor was supplied. In addition, senior wives in polygamous households and women whose husbands still owed bride-price received higher levels of compensation. As Jones (1983: 1053) notes about the husband, “He can ill-afford to dispute his wife’s right to compensation since he needs the additional income he receives from his wife’s labor on a second rice field.”
- The level of compensation paid is less than the market wage: “One might wonder why women continue to work for their husbands if they are compensated at a rate much lower than what they could earn working as hired labor. The answer is that, in principle, married women are expected to work on their husbands’ fields if they are not working on their own. If they refuse to work on their husbands’ fields, they risk a beating” (Jones 1986:111).



Udry (1996) develops a series of tests on the efficiency of the nonpooling of labor, as well as other agricultural inputs, in farm production in rural Burkina Faso. He finds that relative to Pareto-efficient allocations, too little labor and other inputs are used on plots controlled by women. Reallocating the factor usage on women's plots could increase output by as much as 20 percent. Although methodologically different from most studies in the literature, Jones's and Udry's results are not isolated examples.<sup>3</sup> More general discussions of this literature include Roberts (1979), Guyer (1981), Gladwin and McMillan (1989), Whitehead (1990a), Kabeer (1991), Quisumbing (1994a), and Dey Abbas (Chapter 15, this volume). Udry's study (and to a degree, Jones's as well) challenges much of the intrahousehold literature as it rejects Pareto efficiency in production, rather than addressing the question of allocation conditional on an assumed efficient use of resources in income generation. From a policy standpoint, the message of most of these studies vis-à-vis the issue of labor pooling within the household is succinctly summarized by Whitehead (1990a: 452): "More than one study has identified women's refusal to perform the family labor that the project had planned for or demanded of them as contributing to the failure of the development project."

### **Indirect Tests of the Unitary Model**

#### *Are Households and Families Characterized by Altruism?*

As discussed by McElroy (Chapter 4, this volume), though there exist a number of rationales for the assumption of a single household welfare function, Becker's "rotten-kid theorem" is the most persuasive. It relies on the assumption of an altruistic head. Though altruism undoubtedly plays a role in many households, its universality is open to question.

There is considerable evidence that domestic violence is prevalent in both developed and developing countries (Levinson 1989). This issue might appear tangential to issues of household modeling, but that is not the case. Violence clearly refutes the altruism justification for the unitary household model (though it is consistent with a dictatorial head). As already noted, Jones (1986) relates that respondents claimed that the threat of being beaten influenced their labor allocation.

Altonji, Hayashi, and Kotlikoff (1992) test whether income is pooled across generations. They note that "if parents and children are altruistically linked, their consumption will be based on a collective budget constraint, and the distribution of consumption between parents and children will be independent

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3. Other case studies documenting conflict, compulsion, and negotiation over women's labor allocation include Conti (1979), Haugerud (1982), Koenig (1982), Burfisher and Horenstein (1985), Spiro (1985), McMillan (1987), Babalola and Dennis (1988), Carney (1988a), Funk (1988), Ongaro (1988), and Leach (1991).

of the distribution of their incomes.” Drawing on panel data from the United States, they reject this hypothesis. They find that the resource position of a particular family member—as measured by total income, nonlabor income, home equity, or wage rates—influences the consumption of that member. The study is fairly robust to alternative measures of income and to dynamic and fixed-effect formulations. Although it is still possible that the rejection of altruism is due to a definition of the functional family that is different from that used by the household, the study provides a convincing rejection of a polar case of intergenerational altruism.

A related framework also appears to refute the notion that altruism justifies the existence of a single welfare function. In the context of intergenerational transfers, the unitary model implies that benefactors have no incentive to behave strategically—that is, to manipulate intentionally the behavior of the recipient. In other words, kids—even rotten ones—do not attempt to raise their consumption at the expense of others, because an altruistic benefactor will automatically reduce the size of the transfers made to them. This hypothesis is testable. If Becker’s model holds, evidence should not be found of benefactors behaving strategically, for example using bequests to obtain attention or monetary transfers from their offspring. Behrman (1996) discusses the literature on transfers and bequests in detail. Empirical studies from developing countries include Lucas and Stark (1985) and Hoddinott (1992a). Both of these studies find that parents behave strategically; increased holdings of inheritable assets lead to higher monetary transfers from non-resident members in Botswana (Lucas and Stark) and from sons who anticipate receiving an inheritance in western Kenya (Hoddinott). Cox and Jimenez (1992) investigate whether social security payments “crowd out” private transfers from younger to older generations. They find some evidence of crowding out in that these transfers would have been about 20 percent higher without social security benefits. However, this displacement is significantly less than that predicted by purely altruistic motives.

### *The Significance of Extrahousehold Environmental Parameters*

A few recent studies use extrahousehold environmental parameters (EEPs) to support collective models. Although such studies do not generally set up formal restrictions to falsify unitary models, given that EEPs have an explicit role in some collective models, they provide additional indirect support for such models. In principle, differences in EEPs can be used as a natural experiment to test predictions of household models, although in the absence of randomized experiments, the question of the exogeneity of the environmental differences must be addressed. As an illustration, consider Rao and Greene’s (1993) analysis of the impact of bargaining on fertility in Brazil. This study is sensitive to the possible endogeneity of individual choices and thus concentrates on regional-level variables as the main evidence for bargaining over

fertility choices. They find a negative relationship between fertility and the ratio of males aged 25–29 to females aged 15–19 in the region. One, although not the only, reasonable interpretation of this result takes it as an indication of the availability of alternative spouses. As this ratio increases, women have a greater chance of remarrying, hence a greater ability to bargain for the smaller families they prefer. Regions that have a lower average preference for fertility, however, will also have higher male-female ratios (owing to the age gap in the measure). Thus variations in regional preferences may also contribute to their finding; the suggestive results may not be completely free of simultaneity bias.

Though Pitt and Khandker (1994) do not explicitly refer to the collective literature, their results are consistent with shifts in EEPs influencing intra-household distribution. They observe that communities where a credit program is in place have a higher demand for schooling than other communities. Although EEPs may be one possible explanation for this difference, it could also be due to different expected returns mediated by economic impacts of credit or to preexisting differences between communities for which they did not fully control.

In a related vein, several studies indicate that EEPs affect domestic violence. In a case study, Erchak (1984) found little spouse abuse in rural Liberia, where neighbors quickly interfered in domestic disputes. In contrast, in urban areas of Liberia, where external intervention was less prevalent, the incidence of abuse was higher. Rao (1994) uses data on domestic violence in India to explain differences in household investment in nutrition. He shows that food purchases are influenced by the probability of violence. Moreover, he also finds that EEPs may determine the probability of violence. Tauchen, Witte, and Long (1991) present further evidence that community factors, including access to public assistance and places of refuge (such as the ability to seek shelter with family and friends), reduce domestic violence.<sup>4</sup>

### **Limitations to Empirical Tests of Intrahousehold Models**

Central to many of the empirical studies that test alternative models of intrafamily or intrahousehold allocation are tests of whether the impact of women's income differs from that of men's income. Despite the range of evidence

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4. Hoddinott (1996) presents some preliminary findings based on changes in EEPs over time using data from Canada. This study examines the impact on female rates of suicide of changes to provincial legislation dealing with the partition of estates upon divorce. In all provinces save Quebec, these laws were altered during the period 1975–79, going from a system under which wives' share of estates was effectively determined by their husbands to one under which household wealth was, with some minor variants, divided equally between partners. Drawing on data from Quebec, Ontario, and British Columbia, and controlling for provincial economic and demographic characteristics, Hoddinott finds evidence of a structural break in the trend of female suicide; in all provinces except Quebec, it falls sharply in the post-1975 period. Male rates of suicide are unaffected by this change.

acquired, there are legitimate econometric issues on which challenges to the interpretation of the results can be based. As already noted, it is widely recognized that observed wage income is an inappropriate variable for testing models of intrafamily allocation, since that income reflects household choices about nonmarket activities as well as the allocation of leisure within the household. In studies in which this question is addressed via instrumenting women's income, as in the work by Haddad and Hoddinott, the issue becomes that of the appropriateness of the identifying conditions. Thus nonlabor income (transfers and pensions as well as returns on assets) is offered as an exogenous measure of resource control. Furthermore, to be a credible candidate to test models dependent on a threat point, the nonlabor income must not be contingent on remaining in a marriage.

However, as noted by Schultz, certain forms of transfer income may be endogenous. For example, women with more children may receive larger transfers from other family members. Nonlabor income from assets or in the form of pensions may be considered endogenous in a life cycle context if it originates from previous labor participation rather than, say, inheritance or dowries.<sup>5</sup> Any current unobserved differences in tastes and productivity may also have been present in the past and thus have influenced asset accumulation. This issue is widely recognized: Behrman (1996) provides an extensive discussion of endowments in the context of unitary models. Both Pitt and Thomas (Chapters 2 and 9, this volume) indicate how such unobserved differences could affect econometric results. Yet many studies of income pooling ignore these, effectively testing a compound hypothesis that these are unimportant and that pooling does not occur.

Since it is difficult to assign ownership to one individual, asset income may also not be assignable. Interviewers responsible for obtaining the data used in subsequent econometric tests, however, may make assignment on a nonrandom basis to avoid either omissions or double counting; often joint asset income is assigned to a male. Similarly, if control over resources is enhanced by concealing income, both female and male respondents may have an incentive to underreport income. Moreover, asset income is subject to measurement errors that may differ by type of asset and may indirectly be systematically correlated with other household characteristics. Even in the absence of endogeneity, measurement error that differs by source of income can generate spurious patterns of differences in expenditures by income source, that is, increase the chance of a false rejection of pooling restrictions.

In this context, Thomas's results (Chapter 9, this volume) are roughly consistent with larger errors in measurement for male nonlabor income than for female. That said, errors in variables cannot explain the difference in patterns

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5. Even these forms of transfer income have been challenged as unlikely to provide unbiased instruments because of intergenerational links of unobserved productivities.

toward daughters and sons found by Thomas (1994). Although that result may be explained by reverse causality—mothers with daughters chose to work or invest differently than those with sons—this explanation strains credibility. The reverse-causality interpretation is further undermined by the household fixed-effects model in Thomas (1994).

Furthermore, rejecting pooling is not the same as accepting an alternative model. Various tenable bargaining and sharing models can generate conditions under which income pooling is rejected, EEPs contribute to consumption patterns, or both. Thus there is a particular appeal in the approach taken by Chiappori since, if one good is assignable, a sharing rule can be derived for the entire decision process. Although this approach is in contrast to the greater structure that must be imposed in order to recover the details—if not necessarily the flavor—of the bargaining process, it nevertheless does offer a means of distinguishing between alternative models. However, the consumption of many goods of interest to policymakers, such as child health, cannot be unambiguously assigned to one household member. This is a further limitation of this approach. Assignability of goods is particularly difficult in household-equivalency models, since the consumption of adult goods may not be separable from fertility choices (Strauss and Beegle 1995).

Commodity demand models also generally reject the restriction of weak separability of leisure and goods (Browning and Meghir 1991; Alderman and Sahn 1993). Although both commodity and labor allocations are used to test models of intrafamily decisions, few commodity models have addressed the potential bias from ignoring labor supply. Moreover, one study that explicitly tests restriction implied by a Nash bargaining model (Horney and McElroy 1988) is limited as it poses a demand system in which leisure and commodity demand are separable.

In addition to having testable single-equation restriction on income and, in some cases, cross-equation restriction on commodity substitution, collective models may offer testable restriction regarding the impact of EEPs on demand. These are particularly interesting as they may suggest policy measures that can achieve reallocation toward, say, children's consumption. As with testing of income pooling, however, testing of restrictions on the impact of EEP faces econometric challenges and data limitations. EEPs are unlikely to vary much in cross-sectional data sets. Where variation may be found—over time or across regions—regional differences in tastes or the impact of community unobservables may be credible alternative explanations for the patterns observed. These would provide alternative explanations for findings such as those in Rao and Greene's analysis of bargaining over fertility in Brazil.

The work of Browning et al. (1994) is based on a sample restricted to childless couples working full time. It could be plausibly argued that their results are biased by the selectivity processes that generate such a sample. For example, issues relating to pooling of resources in such couples might differ

from those in households in which children are present. They avoid issues relating to the endogeneity of income by an appeal to economic and legal conditions that make the assumption of fixed labor supply plausible. In turn, this approach illustrates the possibility that specific tests of bargaining and sharing will depend on economic, social, cultural, and legal structures that differ significantly in developing countries. In many countries, households are larger, more apt to contain more than one adult of the same gender and generation, and more likely to contain three generations than French or Canadian households. Similarly, separation and reformation of households owing to migration and child fostering will affect allocation processes differently in different contexts. The fact that cultures differ is not, of course, a direct limitation of their analysis of French or Canadian consumers, but rather a caveat that reiterates the need to perform a range of studies before generalities can be drawn. The findings of Thomas and Chen (1994) are valuable in that they suggest that the Pareto-efficient model extends beyond the conditions found in developed countries.

For many purposes, studies of household resource allocation take the household structure as predetermined. Yet, clearly, the formation and dissolution of households—or even seasonal separations owing to labor migration—are central to any questions of intrafamily allocation. Central to McElroy's contribution to this volume is the contention that the phenomena that shift threat points in Nash cooperative bargaining models also affect the gains from marriage realized in a marriage market. This situation allows for a number of empirical applications of bargaining models to fertility and marriage. However, it also means that it is extremely difficult to model household formation simultaneously with budget allocations conditional on household structure. Thus the comparisons between the demands of married individuals and those of divorced individuals offered by McElroy (1990) are difficult to implement because of an inability to account for selectivity into particular marital states.

The issue of whether family structure can be regarded as predetermined is also relevant to tests using data across generations. For example, Bernheim, Shleifer, and Summers (1985) and Hoddinott (1992b) assume that the number of children, their education, and earnings are exogenous. Yet child quality and quantity is the outcome of parental decisionmaking, and this feature may affect their results.

A final caveat is appropriate. One can expect a bias in any comparative review of the literature in that it is more likely that studies that report rejections of the unitary model will be submitted for publication and, given that, more likely that they will be accepted for publication. This tendency has been termed "publication bias" and has been shown to apply to a number of—and perhaps all—scientific disciplines (Begg and Berlin 1988).

## **Conclusion**

We recognize that not all the studies discussed in this chapter are ideal. Particularly problematic are the endogeneity of incomes, the neglect of unobserved endowments, and the assumption—also held by many applications of the unitary model—that household formation and sometimes composition can be regarded as predetermined. Other studies are very region-specific or are based on relatively small samples. This said, it remains difficult to imagine that econometric difficulties singly or jointly can account for all the rejections of income pooling and all the evidence supporting various collective models. This conclusion, together with the policy costs of rejecting the collective approach when it holds (discussed in Chapter 17), leads to the argument that the evidence may be taken as shifting the burden of proof. The assumption that the unitary approach is sufficient to account for all aspects of household resource allocation must be defended rather than maintained.

The objective of this chapter has been to review empirical tests of the assumptions underlying the unitary approach and those that have been proposed in support of various collective models. This has been done primarily to provide a context for the chapters presented in this section of the book, and partly to fill what is perceived to be a gap in the literature. It could be inferred from this review that the modeling of intrahousehold allocation is a question of using either a unitary or a collective approach. Such an interpretation is wrong. As stressed in Chapter 1, the unitary approach offers both a valuable set of tools for examining the rationale underlying distribution within the household and the means for linking several aspects of these within a single analytical framework. This argument is more modest: that the evidence suggests that such an approach is not sufficient to account for all aspects of intrahousehold resource allocation. It should be stressed that there is a need for much further work in this area. This issue is pursued further in Chapter 17, but it is worth outlining some directions for future work here. They include more sophisticated tests of the income-pooling hypothesis, modeling labor allocation in the context of agricultural production, examining processes of household formation and dissolution, and work of an interdisciplinary nature. A number of contributions in this volume—such as those of Guyer, Thomas, and Gittelsohn and Mookherji—begin to address these issues.

## **9 Incomes, Expenditures, and Health Outcomes: Evidence on Intrahousehold Resource Allocation**

DUNCAN THOMAS

Although the traditional (unitary) model of the household is simple, it is hard to overstate its contribution to the understanding of economic and social behavior. Whether or not it is an adequate description of household choices is fundamentally an empirical question—the answer to which likely depends on the specific application. There has, however, been little empirical testing of the model.

In this chapter I provide some evidence on this question, drawing on survey data from Brazil. Whether observed consumption and investment patterns are sensitive to differences in the distribution of income between men and women is determined in the context of household demand for commodities, nutrition, and health. Such sensitivity would be *prima facie* evidence against the traditional model of the household, which assumes that household decisions are unaffected by shifting resources from one member to another within a household. Rejection of the traditional model has obvious implications for public policy. It suggests, for example, that policies that result in more resources in the hands of women will have different effects on household choices than policies that generate income for men.

Previous chapters have described the theoretical models underlying the analyses presented here. In this chapter the empirical strategy adopted is outlined first, followed by a description of the data. Empirical results are presented in three sections. We examine shares of the household budget spent on a series of commodities first and then consider household nutrient demands. These outcomes are measured at the household level. The third section focuses on indicators that can be assigned to individuals within the household, namely child anthropometrics, which are measures of health and nutritional status. Special attention is paid to the role of measurement error and unobserved heterogeneity, and robust tests are developed that exploit comparisons of income effects among siblings in the same household. The robustness of the results to variation in the definition of the household unit is also explored.



The evidence suggests that treating the household as a homogeneous unit is not consistent with the data. Placing more resources in the hands of women results in greater spending on human capital goods and nutrients and a bigger positive effect on child nutritional status.

### Model

This section begins with a simple static model of household behavior in which household welfare in any period,  $W$ , depends on the utility of each household member,  $m$  ( $= 1, \dots, M$ ). In turn each individual's utility function,  $U_m$ , depends on the commodity consumption of all household members,  $X_m$  ( $i = 1, \dots, G$ , goods), as well as the consumption of leisure by each individual in the household,  $l_1, \dots, l_M$ . In addition, utility is affected by a vector of home-produced goods,  $\theta_{1M}, \dots, \theta_{MM}$ , which will include, for example, the health, nutrition, and education of each household member. A set of observed individual- and household-specific characteristics,  $\mu$ , may affect tastes and therefore utility,  $U_m(X, l, \theta; \mu, \omega)$ , and  $\omega$  captures unobserved heterogeneity.

The household welfare function is akin to a Bergson-Samuelson social welfare function and aggregates the individual felicity functions:

$$W = W[U_1(X, l, \theta; \mu, \omega), \dots, U_M(X, l, \theta; \mu, \omega)] \tag{9.1}$$

This is maximized subject to a production function for each element of  $\theta$  and a household budget constraint. The production functions are specified in general terms:

$$\theta = \theta(\kappa, \mu; \nu) \tag{9.2}$$

where  $\kappa$  are inputs, some of which are purchased in the market and some of which are not; this vector of inputs thus includes some elements of the consumption vector,  $X$ .<sup>1</sup> Outputs,  $\theta$ , may depend on individual and household characteristics,  $\mu$ , such as the age and gender of the person and the education of the parents. Individual and family unobserved heterogeneity is represented by  $\nu$ . The household budget constraint is

$$pX = \sum_m [w_m (T - l_m) + y_m] \tag{9.3}$$

where the vector  $p$  is the set of prices of all goods in  $X$ ; all household members are assumed to face parametric commodity prices. The price of time for each individual is  $w_m$ , so that individual's total income is given by the value of earned income,  $w_m(T - l_m)$ , together with nonlabor income,  $y_m$ . Household income is simply the sum of all individuals' incomes.

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1. Without loss of generality,  $\kappa$  is allowed to include purchased inputs that are not valued in and of themselves, in which case those elements of  $X$  are given zero weight in the utility function (9.1).

Solving the maximization problem given by equations (9.1)–(9.3), there is a household demand for each element of the commodity vector,  $X$ , and each element of  $\theta$ . Denoting the vector  $\{X, \theta\}$  by  $\Omega$  for notational ease,

$$\Omega_i = g(p, w, y_1, \dots, y_M, \mu, \epsilon) \quad (9.4)$$

Thus, under the assumptions of this collective (or “individualistic”) model of household decisionmaking, the commodity consumption, health, and nutrition of household members (among other demands) depend on all prices ( $p$ ), wages ( $w$ ), household characteristics ( $\mu$ ), *individual* nonlabor incomes ( $y_1, \dots, y_M$ ), and unobserved heterogeneity ( $\epsilon$ ). This specification is quite general and underlies the models discussed in the previous chapters.

In contrast to these collective models, the traditional economic model of the household assumes either that all household members have common preferences (in which case  $U_m$  is identical for  $m = 1, \dots, M$  in equation [9.1]) or that one member dictates all allocation decisions (in which case the aggregator function,  $W(\cdot)$ , assigns a zero weight to all but that member’s utility function). Under these assumptions, the demand functions (equation [9.4]) depend not on individual nonlabor incomes but on their sum:

$$\Omega_i = g(p, w, \Sigma_m y_m, \mu, \epsilon) \quad (9.5)$$

Clearly, if all members are altruistic,<sup>2</sup> household demand will depend on total household nonlabor income; the (perfect) altruism, common preference, and dictatorial models are, therefore, observationally equivalent, at least in terms of their predictions for the impact of individual income on household commodity demand.

This observation suggests a very simple empirical test of the model of common preferences against the more general collective models. Under the assumptions of the “traditional” economic model, household members may be treated as if they pool all their incomes, in which case the distribution of resources within the household should have no impact on the allocation of those resources. That is, observed consumption and investment patterns should be unaffected by shifting the control of income from, say, men to women. This is a key prediction of the common preference model, not shared by any of the more general models that permit heterogeneity in preferences of household members. Maintaining that nonlabor income is exogenous, the prediction of the common preference model will be tested by determining whether nonlabor income attributed to a man in the household has the same impact on demands as nonlabor income attributed to a woman in the household.

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2. If only some members of the household are altruistic, then the preferences of the altruist(s) must dominate: in essence, he or she must behave as a dictator (Manser and Brown 1980)

Typically nonlabor income represents only a small fraction of total resources available to a household for consumption and investment. Furthermore nonlabor income is unlikely to be measured without error. In addition, drawing on the intuition of a bargaining framework, which suggests that bargaining power depends on the resources that one would control if the household were to break up, nonlabor income is an error-ridden proxy for control over those resources. The next step, then, is to examine the impact on demand of the total income of each individual,  $Y_m$ :

$$X_i = g(p, Y_i, \dots, Y_M, \mu, \xi) \quad (9.6)$$

where  $Y_m = w_m(T - l_m) + y_m$  and  $\xi$  represents unobserved heterogeneity. Several studies of household resource allocation examine the impact of male and female income on a variety of outcomes (for a review see Blumberg 1988). Since each household member's utility depends on consumption of his or her own leisure, and possibly that of other members, it may be inappropriate in this model to assume that labor supply ( $T - l_m$ ) is exogenous and thus treat total income as predetermined. Intuitively household members are likely to negotiate over the allocation of resources to goods,  $X$ , home production,  $\theta$ , and leisure,  $l$ , *simultaneously*.

Under the maintained assumption that current nonlabor income is exogenous, it is unaffected by current choices and so is a valid instrument for total income. This is a strong assumption, and so the results of experiments with alternative identification assumptions will also be discussed. Given a set of instruments, it is possible to determine whether the distribution of total income within the household affects household demand and investment patterns. As with nonlabor income, the equality of the impact of (instrumented) total income in the hands of different individuals on outcomes,  $\Omega$ , will be tested.

Rejection of equality of income effects in equation (9.4) or (9.6) says nothing about the appropriate alternative model. This work may be viewed, then, as a precursor to testing these alternative models of household resource allocation. Although the aim of the chapter is modest, testing a simple hypothesis is a useful exercise, because even this task presents several empirical problems.<sup>3</sup>

The trickiest problem probably lies in the measurement of resources under the control of an individual. If, in the survey, the reported assignment of income to one individual or another within the family is random (or if everything is perceived as being de facto jointly owned) then the equality of income effects should not be rejected and the traditional economic model of common preferences is the appropriate empirical model. In a sense, then, rejection of

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3. For recent tests that seek to discriminate between bargaining models and models that only assume that household allocations are Pareto efficient, see Bourguignon et al. (1993), Browning et al. (1994), Thomas and Chen (1994), and Browning and Chiappori (1995).

equality is a strong result. Different income effects may, however, simply reflect differences in the extent of measurement error. Furthermore, the assumption that nonlabor income is predetermined may not be innocuous, since it reflects past labor supply behavior. In a dynamic framework, nonlabor income is appropriately treated as endogenous.

These concerns will be addressed in three ways. The first is an experiment using only asset income, which is less closely tied to recent labor supply choices than all nonlabor income—although even asset income is not exogenous in a dynamic model of household choices.

Second is a test of whether differences in income effects reflect heterogeneity in the composition of nonlabor income. This amounts to testing whether the effect on demands of asset income is equal to the effect of nonasset income. Since it is unlikely that asset and nonasset income will share the same measurement error, it is expected that such error would result in rejection of this equality.

The third set of experiments focuses on child anthropometric outcomes and compares the impact of maternal and paternal income on child height and weight. If a father's income (say) has a greater effect on his son than on his daughter, then it is reasonable to conclude that fathers prefer sons to daughters. However, mothers may also prefer sons to daughters, in which case maternal income effects will be larger on sons. If this observation is true, the results are consistent with both the common preference model and the more general collective models. However, if maternal income affects the health of daughters more than that of sons, then the evidence indicates that preferences of mothers and fathers do differ and that the control over resources within the household does affect allocation decisions. The common preference model would be rejected. By placing the spotlight on the difference between the effect of paternal income on sons relative to daughters, on the one hand, and the effect of maternal income on sons relative to daughters, on the other, a "difference-indifference"-type estimator is constructed that is robust to measurement error and also to fairly general forms of unobserved heterogeneity. To see why, consider measurement error. For a particular parent, measurement error in income is common across all children, and so it will have the same impact on sons and daughters: it is thus possible to calculate unbiased estimates of the *differential* effect of income on sons relative to daughters. It is the difference between mothers and fathers in these differential income effects that is at the center of the test. A similar argument holds for other sources of unobserved heterogeneity, such as tastes for work, as long as they are not correlated with the gender of the child. This assumption rules out, for example, women choosing to work because they have a son rather than a daughter. This is, it seems, about as close as one is likely to get to a "natural experiment" in this context.

## Data

The Estudo Nacional da Despesa Familiar (ENDEF) is a large-scale household budget survey carried out by the Instituto Brasileiro de Geografia e Estatística (IBGE) from August 1974 through August 1975. Some 55,000 households were included in a budget survey that gathered information on income in addition to household expenditures. Each member of the household was asked about his or her own labor supply, earnings, and nonlabor income.

It is not obvious how to attribute income from family enterprises to individuals within the household; in this survey all income was attributed to the "household head." This is a problem particularly in the rural sector, where many families operate farms; in the urban sector, however, unpaid family workers account for less than 5 percent of all workers in the survey. The study sample is therefore restricted to the approximately 38,000 urban households in the survey, and the focus is on the incomes of the head and spouse; they will be referred to as the male and female heads. About 18 percent of all the households in the survey are headed by single females, whereas 6 percent are headed by single males. There are both a male and a female head in the remaining three-quarters of households.

The distribution of income within the household is reported in Table 9.1. On average, household income is about Cr\$27,000 per month<sup>4</sup> and, of that, three-quarters is attributed to the male head. This share is stable across the distribution of household per capita expenditure (PCE). Essentially every male head reports at least some income, and the average male receives about Cr\$28,000 per month. Just under 50 percent of female heads report some income, and among these women average monthly income is Cr\$8,700, which is only one-third of the average male income.

About one-quarter of total household income is derived from nonlabor sources, and positive nonlabor income is reported by somewhat less than one-half (43 percent) of all male heads and nearly one-quarter (23 percent) of all female heads in the survey. On average, male heads report about Cr\$6,500<sup>5</sup> in nonlabor income, which makes up about a quarter of their total income. The share of nonlabor income in the total income of men tends to rise as PCE rises. In contrast, for women the share of income from nonlabor sources is constant across the distribution of PCE, accounting for about 40 percent of total income. The average female head reports about Cr\$1,700 in nonlabor income.

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4. Household income is defined here as the income of the male and female heads. Other income is ignored throughout. Inflation was approximately 35 percent per year during the survey, so all incomes and expenditures were converted to real values using monthly deflators provided by IBGE.

5. This is computed by dividing Cr\$5,302 by 0.81, the proportion of households with a male head.

**TABLE 9.1** Distribution of income within the household by total, labor, and nonlabor incomes: means and standard errors

	Mean for All Households (Cr\$)	Percent of Households Reporting Income	Mean Income Conditional on Reporting Some Income (Cr\$)
Total income	27,006 (390)	98.3	27,467 (396)
Labor income	20,097 (259)	84.7	23,715 (302)
Nonlabor income	6,909 (232)	52.5	6,909 (302)
Asset income	1,883 (76)	14.8	12,722 (500)
Nonasset income	5,026 (189)	40.9	12,289 (457)
Male head			
Percent of households	81.9		
Total income	23,020 (382)	99.0	28,407 (465)
Labor income	17,718 (258)	89.2	24,239 (338)
Nonlabor income	5,302 (225)	43.1	15,029 (629)
Asset income	1,300 (74)	14.5	10,925 (603)
Nonasset income	4,002 (184)	35.0	13,924 (629)
Female head			
Percent of households	93.5		
Total income	3,986 (84)	49.1	8,676 (154)
Labor income	2,379 (40)	35.8	7,111 (110)
Nonlabor income	1,606 (59)	23.1	7,456 (264)
Asset income	531 (20)	7.0	8,045 (638)
Nonasset income	1,075 (49)	13.1	8,819 (389)

NOTE: Figures within parentheses are standard errors.

Income is notoriously difficult to measure well in household surveys, and it is quite likely that income from nonlabor sources is subject to considerable measurement error. ENDEF, however, was a comprehensive and intensive survey, with each household visited on a daily basis for a week by the same enumerator. There is some evidence that enumerators were able to elicit additional information later in the week as households came to view them as less alien (Vasconcellos 1983). The survey took considerable care in the collection of income data, in particular nonlabor income, which was broken down into six categories: income from rents and physical assets, financial assets, pensions, social security and workers compensation, gifts, and other irregular income. Pension benefits and social security are likely to be related to previous labor supply choices, and so the impact of asset income on household commodity demands will be examined separately. Although this asset income may be a cleaner measure of nonlabor income, it too potentially reflects previous earnings and savings behavior. This is a tough problem to crack, at least with a single cross section of data. Indeed even information on bequests or dowries—as suggested by, for example, Schultz (1990)—may not be predetermined in the context of these models of household behavioral choices.

Among the survey respondents, 14 percent of men and 7 percent of women reported some asset income. Such income accounts for a very small fraction (7 percent) of total household income, although among those who report any asset income, the amounts are certainly not trivial. Experiments with the effects of asset income on commodity demand can be seen as checks on the robustness of the results based on the broader measure of nonlabor income.

## **Empirical Results**

In order to assess whether redistributing income within a household affects household consumption and investment patterns, the equality of the impact of male and female incomes on a series of household demands,  $\Omega$ , is tested. The first set of results focuses on shares of the household budget allocated to a series of commodities, whereas the second set examines the demand for nutrients. These outcomes are all measured at the household level and so are not assignable to particular individuals (or groups within the household) without making strong assumptions. In the third set of results, the impact of parental income on child nutritional status, measured at the individual level, is considered. Sample summary statistics are reported in Table 9.2.

Since the empirical specifications, and level of observation, differ across these three sets of outcomes, they are each discussed separately. Throughout

**TABLE 9.2** Sample summary statistics

	Mean	Standard Error	Percent Greater Than Zero
<b>Expenditure shares</b>			
Food	40.88	0.090	98
Meals out	4.24	0.048	41
Housing	18.53	0.061	100
Human capital	6.77	0.035	94
Education	1.89	0.016	62
Health and medical	3.43	0.025	84
Household services	1.45	0.015	60
Leisure	3.93	0.029	81
Ceremonies	1.49	0.017	56
Recreation	2.44	0.022	71
Household goods	7.79	0.037	99
Adult goods	13.10	0.044	99
<b>Nutrient intakes</b>			
ln (calorie intake)	7.61	0.001	...
ln (protein intake)	6.44	0.002	...
<b>Child anthropometrics (Z scores)</b>			
Height-for-age	-0.97	0.010	...
Boys	-1.01	0.014	...
Girls	-0.93	0.014	...
Weight-for-age	-0.01	0.008	...
Boys	-0.04	0.012	...
Girls	0.02	0.012	...
<b>Household characteristics</b>			
Fraction with male head	0.818	0.002	...
Fraction with female head	0.935	0.001	...
<b>Education of male head</b>			
Fraction literate	0.36	0.002	...
Fraction completed elementary education	0.20	0.002	...
Fraction completed secondary education	0.15	0.002	...
<b>Education of female head</b>			
Fraction literate	0.39	0.002	...
Fraction completed elementary education	0.22	0.002	...
Fraction completed secondary education	0.13	0.002	...
<b>Household composition</b>			
ln (household size)	1.38	0.003	...
Males aged 0-4/household size	0.059	0.001	...
Females aged 0-4/household size	0.057	0.001	...
Males aged 5-9/household size	0.051	0.001	...
Females aged 5-9/household size	0.051	0.001	...
Males aged 10-14/household size	0.049	0.001	...
Females aged 10-14/household size	0.050	0.001	...



TABLE 9.2 (continued)

	Mean	Standard Error	Percent Greater Than Zero
Household characteristics (continued)			
Household composition (continued)			
Males aged 15–54/household size	0.262	0.001	...
Females aged 15–54/household size	0.291	0.001	...
Males aged >54/household size	0.052	0.001	...
Females aged >54/household size	0.129	0.001	...
Price aggregate for community characteristics ln (prices)			
Cereals	0.057	0.001	...
Tubers	0.025	0.001	...
Sugar	-0.055	0.001	...
Beans	0.042	0.001	...
Fruits and vegetables	0.024	0.001	...
Meat and fish	0.043	0.001	...
Dairy	-0.001	0.001	...
Fats	-0.015	0.001	...
Oils	-0.017	0.001	...
Housing	0.683	0.003	...
Fuel/transport	-0.050	0.001	...
Clothing	0.173	0.001	...
Personal hygiene	0.020	0.001	...

NOTE: . . . , not applicable.

the chapter, only income effects are reported, although the regressions include additional controls as described in each section.<sup>6</sup>

### *Demand Functions*

This section begins with commodity consumption and estimates a series of expenditure share demand functions. ENDEF reports expenditures for more than 300 different goods over a variable recall period, ranging from a week for commonly consumed foods to a year for infrequently purchased goods such as

6. According to Lagrange multiplier tests (Breusch and Pagan 1980), the assumption of homoskedastic errors is rejected in all the regressions. Variance covariance matrices are thus estimated by the infinitesimal jackknife (Jaekel [1972]; also called the influence function estimator [Hampel 1974] and attributed to White [1980]), which is consistent in the presence of heteroskedasticity. In very large samples, it may make good sense to adopt a size of test that trades off Type I and Type II errors. The Schwarz (1978) proposal, which will asymptotically pick the model that is a posteriori most probable, is followed here. For a  $\chi^2$  test statistic, the critical value is the logarithm of the sample size multiplied by the number of restrictions,  $l$ .

durables and semidurables. Since a large fraction of households do not purchase many of these goods, estimating demand functions at this level of disaggregation would entail addressing the auxiliary problem of the decision to purchase (Wales and Woodland 1983; Lee and Pitt 1986; see Deaton 1986 for a discussion). The focus, therefore, is on a set of aggregates (and sub-aggregates) for which at least most households report nonzero expenditures.

Housing expenditures are either reported by or imputed for all urban households in the survey; they account for almost one-fifth of the budget of the average household. Food, which is also purchased by virtually every household during the survey week, accounts for 40 percent of the budget. According to the anthropological literature, women in Brazil tend to have control over food in the home (Neuhaus 1989); whether this carries over to food purchased outside the home is not clear. Demand for the latter, therefore, is examined separately (although food is purchased outside the home by only 40 percent of households and such purchases account for about 4 percent of the budget).

If adult clothing could be separated for men and women, it could be termed an "assignable good" and used to identify the household income sharing rule (see Bourguignon et al. [1993] and Browning et al. [1994], who examine the demand for these goods among others). In ENDEF, however, it is not possible to separate clothing expenditures unambiguously along gender lines. Alcohol, tobacco, and clothing and footwear have traditionally been treated as "adult goods" in the equivalence-scale literature; they have been examined both separately and as an aggregate here. The results for the aggregate carry through to the three commodities separately. In the interests of brevity, only the aggregate case is reported.

The demand for health services (including medical expenditures) and expenditures on education (including tuition payments, transport to school, school uniforms, and items needed at school such as books) are examined. Household services (many of which are domestic services, but labor around the home and charges for items such as the telephone are also included) are grouped with health and education as a "human capital" aggregate. Almost all households purchase at least some of these human capital goods, which account for just under 7 percent of the budget of the average household. Each of these subaggregates is examined separately as well as together.

Expenditures on books, magazines, clubs, and other recreation items, in addition to expenditures on ceremonies (birthdays, baptisms, weddings, and funerals), are grouped together in the leisure aggregate, which accounts for about 4 percent of the budget of the average household. The final category discussed here is household equipment, which includes expenditures on linens, furniture, electrical equipment, and other semidurables. Almost every household spends something on these goods; they account for nearly 8 percent of the total budget. The remaining 10 percent of the budget is accounted for by other commodities not reported here.

Each household in the survey reports both the value and the quantity of goods consumed, and so it is possible to compute a household-specific price for each commodity purchased. Since variation in these prices may reflect measurement error and heterogeneity in quality choices, it is not appropriate to treat household-level prices as exogenous (Deaton 1988). Instead market average price indexes for 12 commodity groups<sup>7</sup> are included, as are state and month controls to account for other unobserved heterogeneity in the community environment.

The demand functions depend not only on income and prices but also on a set of household characteristics,  $\mu$ . In principle, the price vector includes individual wages that should be treated as endogenous and needs to account for the choice to work in the labor market. To keep the model simple, the determinants of the price of time, in particular the education of the male and female head, are included. In addition controls for the presence of a male and female head are included in  $\mu$ . To pick up scale effects of demand, (the logarithm of) household size is added to the covariates, and to permit variation in the effects of different household compositions,  $\mu$  includes the proportion of household members in each of five gender-specific age groups.<sup>8</sup> To control for community heterogeneity and seasons, the regressions include month dummies and state dummies.

The impact of nonlabor income on household budget shares is reported in Table 9.3. The two-stage least-squares estimates, using total individual income (treated as endogenous), are also reported. In each case, the estimated income effects (evaluated at the mean)—based on a model that includes quadratics in the income of the senior male and female in the household, along with interactions between them—are reported.<sup>9</sup>  $\chi^2$  statistics for joint significance of all three covariates are reported below each income effect. The third column of

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7. It is not obvious how to define market boundaries, at least from an empirical perspective. Using prices on 135 homogeneous commodities (such as black beans, mulatto beans, green corn, and corn flour), median prices were computed for each of 23 states, distinguishing metropolitan from nonmetropolitan areas. These median prices were then aggregated into Tornquist price indexes based on the shares of the budget spent on that good in each market:

$$\ln p_{GM} = \sum_{g \in G} \frac{1}{2}(w_{gm} + w_g) (\ln p_{gm} + \ln p_g)$$

where  $g$  represents goods within the  $G$ th commodity group,  $\cdot$  represents national averages, and  $w_{gm}$  is the share of expenditure on good  $g$  in market  $m$ . Price indexes are included for 12 commodity groups: cereals, tubers, beans, fruits and vegetables, meat and fish, dairy products, fats, oils, housing, fuel and transport, clothing, and personal care items. (See Thomas, Strauss, and Barbosa [1991] for details.)

8. The household age groups are children aged 0–4, 5–9, and 10–14 years and adults aged 15–54 and older than 54. One group (older females) must be dropped, leaving nine composition categories.

9. Linear models are rejected by the data. Experiments with more flexible polynomial models indicate that cubic terms (and additional interactions) do not significantly improve the explanatory power of the regressions.

**TABLE 9.3** Effects of male and female income on budget shares: quadratic model with interactions, effects evaluated at mean

Shares	Nonlabor Income Ordinary Least Squares (OLS)			Total Income Two-Stage Least Squares (2SLS)		
	Female	Male	Ratio	Female	Male	Ratio
Food	-246.08 (305.39)	-60.06 (128.30)	4.10 (143.78)	-261.10 (269.45)	-66.90 (61.31)	3.90 (115.95)
Meals out	-63.44 (105.85)	-7.82 (50.95)	8.12 (74.03)	-66.63 (126.04)	-9.22 (45.30)	7.23 (90.29)
Housing	72.43 (32.50)	12.77 (14.28)	5.67 (21.79)	76.10 (31.89)	13.79 (10.83)	5.52 (21.60)
Human capital	86.79 (146.65)	18.25 (78.20)	4.76 (103.84)	91.69 (64.87)	21.01 (4.14)	4.36 (30.06)
Education	18.45 (36.72)	2.92 (9.06)	6.31 (22.32)	19.44 (36.34)	3.39 (9.55)	5.74 (22.84)
Health	22.29 (29.51)	6.44 (36.53)	3.46 (23.49)	23.89 (30.08)	7.94 (36.59)	3.01 (25.00)
Household services	46.05 (145.47)	8.89 (75.10)	5.18 (85.49)	48.45 (143.16)	9.72 (47.19)	4.98 (93.51)
Leisure	58.58 (58.71)	16.06 (64.61)	3.65 (40.60)	62.20 (61.23)	17.10 (41.99)	3.64 (45.72)
Ceremonies	19.80 (28.44)	0.71 (11.80)	27.90 (26.11)	20.66 (29.48)	1.31 (14.63)	15.76 (26.75)
Recreation	38.79 (37.75)	15.35 (63.64)	2.53 (28.94)	41.55 (37.93)	15.79 (35.53)	2.63 (29.09)
Household goods	12.22 (7.56)	1.86 (7.55)	6.56 (6.08)	13.15 (7.71)	2.74 (7.63)	4.80 (6.31)
Adult goods	-17.57 (29.23)	-11.21 (38.59)	1.57 (1.90)	-18.77 (31.49)	-11.50 (26.81)	1.63 (2.25)

NOTES: There are 38,799 observations in the sample. Income effects are evaluated at mean;  $\chi^2$  tests for joint significance of income covariates are below the estimates. Ratios of female to male income effects are in the third column of each panel;  $\chi^2$  test statistics for equality of male and female effects are in parentheses below the ratios. All tests are based on heteroskedasticity-consistent estimates of standard errors. By the Schwarz criterion, the critical value for  $\chi^2$ 's is 31.7. All incomes are measured in millions of crusados. In addition to quadratics in male and female income, and interactions between them, regressions include controls for existence of male and female head, their education (three dummies each—literate, completed elementary school, completed secondary school or more), in household size, proportions of members in nine age-gender groups, in prices, and month and state dummies. Instruments for (2SLS) estimates are quadratics and interactions in male and female nonlabor income. Human capital goods are education, health, and household services. Education includes tuition, uniforms, and other schooling expenses. Health includes medications, prescriptions, and medical care expenses. Household services include domestic services, labor around the home, and utilities such as telephones. Leisure expenditures include those on ceremonies (baptisms, birthdays, and weddings) and recreation (books, magazines, clubs, and sports fees). Household goods are linens, furniture, and other household semidurables. Adult goods are alcohol, tobacco, and clothing.

each panel reports the ratio of the female to male income effects and the  $\chi^2$  test for equality of these income effects (or, equivalently, for the ratio of effects being equal to unity). According to the Schwarz criterion, the critical value for the  $\chi^2$  tests is 31.7.

IMPACT OF NONLABOR INCOME. Additional nonlabor income in the hands of women increases the budget share spent on housing, education, household services, recreation, and possibly health. More nonlabor income in the hands of men raises the budget share spent on health, household services, and leisure. For all these goods, however, the income effects are larger for women than for men by a factor of between 3 and 5: the differences are significant for the human capital aggregate (education, health, and, in particular, household services) and also for the leisure aggregate (ceremonies and recreation). The household services subaggregate comprises largely payments for domestic services, labor in the home, and utilities such as telephones; these are likely to be substitutes for the time of the female head. Education and recreation expenditures might be viewed as investments in human capital and are directed mostly toward children; health expenditures may also be viewed as investments in human capital. Some shares must also decline, and it turns out that food shares (both at home and out of the home) decline with income (for both men and women), with the decline being larger for a marginal crusado in the hands of a woman.

But not all estimated income effects differ between men and women. There is no evidence, for example, that rearranging the distribution of (non-labor) income within the household will have any (significant) impact on the shares spent on housing and household goods, both of which are presumably like "public" goods to household members. In addition, estimated effects of income in the hands of men and women are essentially the same for those goods that are traditionally treated as adult goods, namely alcohol, tobacco, and clothing (taken separately or together).<sup>10</sup>

ROBUSTNESS OF RESULTS. Since a large fraction of the survey respondents report no nonlabor income, it may be that the estimated income effects largely reflect heterogeneity between those who do have nonlabor income and those who do not. Therefore, the same regressions have been reestimated, but included are a pair of indicator functions for whether the male or female head reports any nonlabor income. Conditional on reporting some nonlabor income, the estimated income effects do *not* change dramatically and are significantly different for men and women in the case of human capital and leisure goods, as well as food (consumed at home).

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10. Testing for male and female clothing (to the extent they can be identified in these data) did not indicate any significant differences in the impact of male or female nonlabor income on their purchase.

As an additional check on the robustness of these results, nonlabor income has been defined more narrowly to include only asset income. Because fewer than 15 percent of households report any asset income, its effect on the demands for commodities that are not purchased by (almost) all households will be difficult to estimate. It turns out that, qualitatively, the results are in line with those based on the broader definition of income: additional asset income in the hands of women, rather than men, is associated with larger budget shares spent on human capital and leisure goods, higher nutrient intakes, and lower food shares. These differences are, however, significant only for food (consumed at home and away), whereas the differences in income effects on human capital border on being significant.

Differences in the impact on demand of asset and all other nonlabor income (nonasset income) have also been tested: their effects are in general not significantly different from each other; this is true for both men and women. This finding implies that the differences in the effects of male and female income cannot be attributed to differences in the composition of nonlabor income, to the extent that heterogeneity in composition is captured by this dichotomy. (See Thomas [1992] for details of these robustness checks.)

**EFFECTS OF TOTAL INDIVIDUAL INCOME.** The focus thus far has been on nonlabor income. Would household consumption patterns change if *total* income were to be redistributed from men to women? The second panel of Table 9.3 reports the results of estimating the demand functions with quadratics in male and female total income along with an interaction. The instruments include male and female nonlabor income, their quadratics, and interactions.

Raising the income of women will tend to increase budget shares spent on housing, education, health, household services, and recreation; if additional income is in the hands of men, then budget shares spent on health, household services, and recreation will increase. As was the case with nonlabor income, the budget shares rise more if additional income is put in the hands of women. Taken together, the estimated male and female income effects are different for both the human capital and leisure aggregates.

Additional income has a negative impact on adult goods—but the effect is the same independent of the gender of the person to whom the income is attributed. The share of the budget spent on food (consumed at home and away) also declines with income; this decline is significantly greater if additional income is in the hands of women rather than men.

The results for total (labor and nonlabor) income are, therefore, remarkably similar to those that examine the impact of only nonlabor income. Furthermore the results for total income are also robust to the inclusion of a dummy for whether or not the individual reported any income (also treated as endogenous, with dummies for the reporting of nonlabor income as the instruments). Once again permitting more flexibility in the income responses (by including cubics in male and female income) does not change the thrust of these conclusions.

All the demand functions have included dummies for the education of the male and female heads in order to control for heterogeneity in tastes as well as the price of time. If household consumption is affected by education *only* through its impact on earnings and thus income, then education may be excluded from the demand functions and can be considered, under these strong assumptions, a valid instrument for total income. This model is, therefore, overidentified. It turns out that, once again, relative to men, income in the hands of women is associated with larger increases in the share of the budget spent on human capital goods and leisure, and these differences are significant in all cases except housing. In this model, more income under the control of women is associated with higher shares spent on adult goods, but lower shares if the income is under the control of men. This difference is significant and is the *only* instance of significantly different income effects on the demand for adult goods. Budget shares for food (consumed at home and away) decline with income, and this decline is significantly faster for women.

In sum, there is evidence that additional income in the hands of women is associated with significantly higher budget shares spent on human capital goods (education, health, and household services) as well as on leisure goods and lower shares spent on food. This is true for both the ordinary least squares estimates that use nonlabor income and the two-stage least squares total income estimates. The results appear to be quite robust.

### *Demand for Nutrients*

It is a straightforward procedure to generalize the demand model given previously to include the consumption of not just foods but also the nutrients they provide. Thus the impact of income on the demand for calories and protein is also examined. In ENDEF, total household consumption of nutrients was measured by weighing the food consumed at each meal (taking care to account for any wastage or leftovers) during the course of a week. These data were then converted to *nutrient intakes* using tables compiled by the Food and Agriculture Organization of the United Nations. The presence of every person at each meal was reported, and so per capita intakes of each nutrient can be calculated for each household, taking account of the presence of both household members and visitors. The survey is very intrusive—the enumerator weighs food prepared at home for seven days—but not so intrusive that every respondent is followed on his or her daily travels. Thus no information is reported about meals eaten away from home. It is assumed that the nutrient content of these meals is, on average, the same as that for meals eaten at home.<sup>11</sup> On average, daily per capita intakes amount to 2,100 calories and 70 grams of protein.

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11. Forty percent of households report eating some food away from home. On average about 4 percent of the budget is spent on these meals, which account for only 10 percent of the total food budget.

**TABLE 9.4** Effects of male and female income on nutrient demand: quadratic model with interactions, effects evaluated at mean

Nutrient Intakes	Nonlabor Income Ordinary Least Squares (OLS)			Total Income Two-Stage Least Squares (2SLS)		
	Female	Male	Ratio	Female	Male	Ratio
ln (calories per capita)	1.60 (69.64)	0.14 (16.13)	11.08 (52.88)	1.68 (69.57)	0.18 (17.68)	9.40 (53.44)
ln (protein per capita)	3.47 (207.85)	0.59 (72.83)	5.91 (119.47)	3.66 (201.22)	0.69 (66.88)	5.32 (130.19)

NOTES: There are 38,799 observations in the sample.  $\chi^2$  tests for joint significance of income covariates are in parentheses below the estimates. Ratios of female to male income effects are in the third column of each panel;  $\chi^2$  test statistics for equality of male and female effects are in parentheses below the ratios. By the Schwarz criterion, the critical value for  $\chi^2$ 's is 31.7.

The empirical model for nutrient demands is identical to that used in the previous section, except that the logarithms of nutrients are used as the dependent variables. Table 9.4 presents the estimated effects of nonlabor income and total income.

In the previous section, it was shown that, consistent with Engel's law, food shares decline with income. Food expenditures, however, increase, and the rate of increase depends on the distribution of income within the household. At the mean, for example, additional income in the hands of a woman is associated with about a 3 percent increase in food expenditures, whereas this effect is about 0.6 percent for men (and these differences are significant). Furthermore, as income (of men or women) is increased, the per capita consumption of both calories and protein increases. As with food expenditures, the marginal effect of additional income in the hands of women is significantly larger than the impact of an increase in male income. This is true for both nonlabor and total income. For calories, the income effects differ by a factor of between 9 and 11; for proteins, the ratio is between 5 and 6.

Higher nutrient intakes are likely to be associated with improved nutrition (at least in Brazil), and so these results suggest that women tend to allocate resources under their control toward foods that are associated with better health of household members. In the next section, this hypothesis is tested directly by estimating the effect of individual parental income on child anthropometric outcomes.

### *Child Anthropometrics*

Among nutritionists, child height-for-age is considered to be a long-run measure of nutritional status and weight-for-height, a shorter-run indicator



(Waterlow et al. 1977). Parental education and, to a lesser extent, household income typically have a significant positive impact on both anthropometric outcomes, even after controlling for genetic endowment (Horton 1986; Behrman and Deolalikar 1988; Thomas, Strauss, and Henriques 1990). Child height is standardized by comparing it with the height of well-nourished children of the same age and gender in a reference population. The United States is used as the reference (National Center for Health Statistics 1976). In the regressions, height is expressed as a Z score (by removing the median and dividing by the standard deviation in the reference population). The height of the average urban child is almost one Z score below the U.S. standard. Weight, conditional on height, is similarly standardized: in contrast with the longer-run nutritional indicator, Brazilian children are on average only slightly lighter, given height, than their U.S. counterparts (see Table 9.2).

Because the analysis of anthropometric data is restricted to children less than 8 years old, relatively younger (and poorer) households are included in this level of data. Average income is about 20 percent lower than that in the sample used in the last two sections. Nonlabor income accounts for a smaller proportion of total income (17 percent), the father controls relatively more (80 percent), and the proportions of mothers and fathers reporting any income from nonwage sources are slightly smaller (14 percent and 34 percent, respectively).

The effects of parental income on anthropometric outcomes are reported in Table 9.5. Because the hypothesis that the income effects are linear is not rejected, only the linear terms are reported. In addition to income, the regressions include controls for the presence of parents, their education and state of residence, and the age and gender of the child.

In the previous two sections, it was found that as income attributed to women rose, expenditure shares on health, education, and nutrient intakes increased faster than when additional income accrued to men. The results here show that the same pattern carries through to child health. As household resources rise, *child weight-for-height and height-for-age* also increase; the rate of increase, however, is faster if the income is in the hands of the mother. The magnitude of the difference is substantial—around a factor of 8 for weight-for-height and half that for height-for-age—and it is significant in the case of weight-for-height. All these results are true for both nonlabor income and total income. Apparently, relative to paternal income, additional maternal income is associated not only with higher budget shares spent on health and education, as well as higher nutrient intakes, but also with improved child nutrition outcomes.

#### *Role of Measurement Error*

Thus far the fact that income may be measured with error (and nonlabor income may be endogenous) has been ignored. It is possible that all the results discussed previously may simply reflect differences in the extent of measurement

**TABLE 9.5** Effects of male and female income on child anthropometric outcomes: linear model

	Nonlabor Income Ordinary Least Squares (OLS)			Total Income Two-Stage Least Squares (2SLS)		
	Female	Male	Difference	Female	Male	Difference
<b>All children</b>						
Z score						
Weight-for-height	0.0357 (3.2)	0.0045 (2.2)	0.0312 (2.7)	0.0329 (3.2)	0.0040 (2.1)	0.0289 (2.8)
Height-for-age	0.0276 (2.3)	0.0065 (2.8)	0.0211 (1.7)	0.0255 (2.3)	0.0058 (2.8)	0.0197 (1.7)
<b>Gender-specific results</b>						
Z score of weight-for-height						
Sons	0.0217 (1.8)	0.0081 (2.8)	0.0136 (1.1)	0.0204 (2.5)	0.0112 (5.0)	0.0092 (1.3)
Daughters	0.1254 (4.2)	0.0007 (0.2)	0.1247 (4.1)	0.1172 (4.2)	0.0039 (0.1)	0.1133 (4.7)
Differences	-0.1036 (3.2)	0.0074 (1.8)	0.1100 (3.4)	-0.0968 (3.2)	0.0073 (1.9)	-0.1041 (3.3)
Z score of height-for-age						
Sons	0.0223 (1.7)	0.0079 (2.4)	0.0144 (1.0)	0.0206 (2.9)	0.0073 (6.0)	0.0133 (1.4)
Daughters	0.0639 (2.0)	0.0051 (1.6)	0.0588 (1.8)	0.0590 (1.9)	0.0043 (1.5)	0.0547 (1.8)
Differences	-0.0416 (1.2)	0.0028 (0.6)	-0.0444 (1.2)	-0.0384 (1.2)	0.0030 (0.7)	-0.0414 (1.2)

NOTES: There are 26,538 observations in weight-for-height regressions and 26,670 in height-for-age regressions. *t*-Statistics are given in parentheses below income effects. F-statistics for equality of income effects appear below the ratios. In addition to parental income, regressions include presence of parents, their education, state of residence, and age and gender of the child.

error in male and female income (see Thomas [1990] for a discussion and some tests). For example, if the variance of male income is larger than that of female income, assuming that the extent of measurement error is proportional to the variance, estimates of male income effects would be expected to be biased downward more than those of female income effects. The evidence is consistent with this view: estimated female income effects are absolutely larger than the estimates for male income. However, the differences in the estimated income effects are very large for several outcomes and suggest measurement error that is 5 to 10 times larger for male income relative to female income. This possibility does not seem especially plausible.

To address concerns about measurement error directly, the estimated income effects on brothers and sisters are compared. As discussed previously, measurement error in parental income should not be related in any systematic manner to the characteristics of the children, including their gender. The lower panel of Table 9.5 presents income effects separately for sons and daughters.

For sons and daughters, maternal income effects are larger than paternal income effects, and the differences, given in the third column of each panel, are greater than zero. As discussed earlier, however, these differences may reflect measurement error in income or some other source of unobserved heterogeneity. Thus the impact of each parent's income on sons and daughters is compared next.

If the parent does not take gender into account when allocating resources to his or her children, income effects should be the same on sons and daughters. They are not. For example, maternal income has a significant impact on the weight-for-height of sons, but the impact on daughters is between five and six times larger. Mother's income also has a bigger effect on the height of daughters relative to sons. The difference in these income effects on sons and daughters is significant in the case of weight-for-height. Paternal income, on the other hand, has no impact on the anthropometric outcomes of daughters, yet it is associated with significantly higher height and weight-for-height of sons. But these differences are only marginally significant.

The fact that maternal income has a greater effect on daughters relative to sons, and paternal income has a greater effect on the health of sons, is *prima facie* evidence against the common preference model. To test explicitly whether the differential effects are significant, Table 9.5 reports the "difference-indifference" estimates in the bottom right corner of each block. For example, in the case of weight-for-height and total income, the 2SLS estimate is  $-0.1041$  with a *t*-statistic of 3.3. The common preference model is unambiguously rejected; it is hard to resurrect the model by appealing to an argument based on measurement error.

These results are robust to the inclusion of household fixed effects, which amounts to comparing brothers with sisters. Similar results hold for the effect of parental education on child anthropometry: maternal education has a larger effect on the daughter relative to the son, whereas paternal education effects are larger on the son. (For more detail and further results, see Thomas [1994].) Finally, Thomas, Schoeni, and Strauss (1995) compare parental income effects on the educational attainment of sons and daughters, using a different survey from Brazil. They also reject the common preference model.

### *Intact Households and Two-Income Households*

Table 9.6 reports estimates of all the demand functions based on subsamples of the data. The first sample is restricted to those households with both a male and a female present. (This reduces the sample by about a quarter in the

**TABLE 9.6** Restricted samples: effects of income on demand, two-stage least squares, nonlabor income as instrument

	Households with Intact Couples as Male and Female Heads			Both Male and Female Heads Report Some Income		
	Female	Male	Ratio	Female	Male	Ratio
<b>Shares</b>						
Food	-188.35 (99.39)	-65.05 (60.11)	2.90 (36.52)	-210.35 (61.68)	-127.15 (198.11)	1.65 (11.20)
Meals out	-20.43 (22.37)	-7.60 (35.77)	2.69 (36.94)	-37.77 (39.09)	-20.85 (35.87)	1.81 (49.16)
Housing	80.76 (12.02)	13.66 (10.95)	5.91 (7.40)	133.14 (22.40)	25.46 (15.87)	5.23 (22.07)
Human capital	86.76 (34.90)	20.41 (30.10)	4.25 (30.09)	88.52 (31.57)	42.15 (49.63)	2.10 (6.54)
Education	4.61 (14.01)	3.48 (6.74)	1.33 (8.79)	2.10 (14.75)	4.71 (7.38)	0.44 (8.93)
Health	22.54 (11.85)	8.02 (23.46)	2.81 (18.90)	22.60 (13.73)	19.35 (20.04)	1.17 (17.01)
Household services	59.61 (57.43)	8.91 (28.95)	6.69 (40.70)	63.83 (39.38)	18.09 (43.71)	3.53 (15.71)
Leisure	48.65 (18.81)	16.05 (24.15)	3.03 (22.35)	46.40 (16.24)	37.83 (34.82)	1.23 (6.09)
Ceremonies	20.24 (6.38)	1.14 (9.16)	17.79 (6.78)	25.03 (3.83)	2.55 (2.84)	9.80 (2.58)
Recreation	28.41 (17.39)	14.92 (26.52)	1.90 (21.35)	21.37 (13.99)	35.28 (41.66)	0.61 (6.51)
Household goods	-10.15 (8.71)	3.30 (3.86)	-3.07 (9.03)	-26.18 (9.38)	2.86 (1.16)	-9.15 (6.11)
Adult goods	-39.14 (15.24)	-10.51 (20.40)	3.72 (5.05)	-61.24 (14.75)	-27.11 (23.80)	2.26 (4.36)
<b>Nutrient intakes</b>						
ln (calories per capita)	0.78 (2.15)	0.19 (1.04)	4.13 (15.56)	1.10 (6.52)	0.42 (8.93)	2.59 (3.49)
ln (protein per capita)	2.48 (2.31)	0.68 (0.90)	3.67 (20.21)	3.65 (37.45)	1.16 (39.73)	3.14 (10.71)
<b>Child anthropometrics</b>						
Weight-for-height	0.0237 (2.13)	0.0041 (2.14)	5.78 (2.78)	0.0269 (1.01)	0.0127 (0.40)	2.11 (0.61)
Height-for-age	0.0255 (2.28)	0.0058 (2.81)	4.44 (2.77)	0.0032 (0.14)	0.0061 (2.91)	0.52 (0.02)

NOTES: For shares and nutrient intakes,  $\chi^2$  test statistics are given in parentheses below estimated effects at mean (quadratic model) and below the ratios. There are 29,273 households in the sample of intact couples; the critical value of  $\chi^2$  for equality of effects is 30.9. There are 11,119 households in the sample of income recipients; the critical value of  $\chi^2$  is 27.9. For child anthropometrics, the *t*-statistic is given below the estimated effect (linear model) and the F-statistic is given below the ratios. There are 24,696 children in the sample of intact couples and 8,696 in the sample of income recipients.

share and nutrient demand functions and by about 10 percent in the sample of younger households, with at least one child less than eight used in the child anthropometric analyses.) The essential results are generally robust to this exclusion, although only those income effects on human capital (especially household services) and food shares (in and out of the home) remain significantly different for men and women (under the Schwarz criterion) in the case of the demand functions. The results for both child weight-for-height and height-for-age are also robust to the restriction.

The results are substantially different, however, if the sample is restricted to those households in which both the male and female heads report some income. Differences in the effects of income in the hands of men and women tend to be smaller and so the ratios of income effects are closer to one. For most shares this reflects (absolutely) larger effects of male income. In fact income effects are not significantly different for any of the commodities except food eaten away from the home (which accounts for less than 5 percent of the total budget). Furthermore the effects of male and female income on child anthropometrics are no longer significantly different, and the only significant income effect is that of the father on child height-for-age.

These results do not, however, have an unambiguous interpretation. It is not at all clear how to model the sample selection where attention is restricted only to those households in which both the male and female head report some income. It seems inappropriate, and certainly not in the spirit of the model described previously, to treat this characteristic as exogenous rather than the outcome of choices. What the evidence does indicate is that if attention is restricted to this subsample of households, then modeling their decisions as if the head and spouse share common preferences is consistent with the data. For all other households, however, the common preference model is apparently not appropriate. This suggests that the key to understanding household resource allocation may lie in a better understanding of household composition patterns along with labor supply decisions.

## **Conclusions**

Most economic models treat the household as a black box. This chapter has attempted to delve into that box by examining household consumption and investment patterns. The impact of income has been analyzed, distinguishing income attributed to women from that attributed to men. Under a model of common preferences of all household members, dictatorial decisionmaking or (perfect) altruism, the distribution of income within the household should have no impact on demand. Using household survey data from Brazil, this model has been tested with both nonlabor income, which is assumed to be exogenous, and total (labor and nonlabor) income.

Under both definitions, this model is rejected. Income in the hands of women is associated with a larger increase in the share of the household budget

devoted to human capital (household services, health, and education) and leisure goods (recreation and ceremonies). The proportion of the budget spent on food (consumed at home and away) declines more if the income is in the hands of women, although food composition also changes, with nutrient intakes rising faster as women's income increases. It appears that, as income under the control of women rises, more is spent on health- and nutrition-related expenses. The evidence on child health outcomes is consistent with this interpretation: maternal income has a significantly larger effect on the weight-for-height and height-for-age of children than paternal income.

All of these results may be explained either by differences in errors of measurement of male and female incomes or by unobserved heterogeneity. However, maternal income effects are significantly larger on daughters relative to sons—and paternal income effects are larger on sons. Thus it is difficult to explain these gender-specific results with an argument based on measurement error or unobserved heterogeneity, because their effects should be the same across sons and daughters.

When analysis is restricted to only those couples in which both members have some income, there is little evidence that income in the hands of men and women has significantly different effects on consumption and investment patterns. This is not, however, generally true. Rather, the evidence suggests that an economic model of the household that treats it as a single unified unit is not consistent with the data used here, at least when all households are examined. This does not mean that the unitary model is not useful: on the contrary, the economics and social science literatures have been substantially enriched by the insights provided by the model.

## **10 The Application of Anthropological Methods to the Study of Intra-household Resource Allocation**

JOEL GITTELSON AND SANGEETA MOOKHERJI

The study of intrahousehold resource allocation is neither easy nor straightforward. Much intrahousehold resource allocation occurs behind closed doors. Although behavior is usually measured through the use of recall methods, resource allocation is made up of many day-to-day activities; these mundane events prove challenging for individuals to recall accurately. Moreover, certain aspects may be considered private or sensitive information and therefore not amenable to investigation using traditional survey methods. Finally, intrahousehold resource allocation may be highly variable, with different patterns being observed within cultures and subcultural groups.

In this chapter we explore methods of examining intrahousehold resource allocation using conceptual frameworks, data collection techniques, and modes of analysis drawn from anthropology. We begin by aligning useful approaches found in the anthropological toolbox, and we then move to specific examples of situations in which these methods can be applied, including improvements in survey design, insight into appropriate community interventions, measurement of activity, and monitoring of change.

### **The Anthropological Toolbox**

Traditionally the anthropologist's tools have been classified into two categories: quantitative and qualitative methods (Table 10.1). Quantitative methods are the primary mode of data collection for many social scientists. They are usually structured forms of data collection through which identical data are collected for a large number of randomly selected respondents. This information can be used to systematically describe communities, households, and individuals and to measure outcomes.

It is useful to describe (briefly) qualitative research, one of the hallmarks of anthropological inquiry, in order to distinguish it from quantitative research. Qualitative methods encompass both a set of techniques and an approach for conducting research. The techniques of qualitative research include key

**TABLE 10.1** The anthropological toolbox

Characteristics of Communities, Households, and Individuals	What Goes on Inside People's Heads	What Goes on Inside People's Households	Outcome Measures
Surveys Direct observation	Key informant interviewing Focus groups Systematic data collection (free lists, pile sorts, triads, ranking, rating)	Participant observation Direct observation (unstructured and structured) Key informant interviewing (narrative accounts of past behavior)	Surveys

informant interviewing, different forms of systematic data collection (free lists, pile sorts, triads, ranking, rating), focus groups (and other group techniques), and the direct observation of behavior. The relatively open-ended nature and textual orientation of these techniques make them ideal for exploring beliefs and behaviors from the point of view of the people being studied.

Key informant interviews involve a series of repeated in-depth interviews with a small number of purposively selected "expert" informants. These are built around open-ended questions and emphasize building rapport and trust. This technique has many applications, but it is especially useful for determining the language of discourse surrounding a particular topic area, including those culturally defined categories (domains) of key importance from the local perspective.

Free listing is a structured data collection technique in which an informant is asked to list all the different items in a particular cultural domain (for example, all possible illnesses of children). These are tabulated to obtain a list of more "cognizant" items. Pile sorting is a structured data collection technique that elicits indigenous categories and groupings of domain items by asking informants to group a set of domain items either "freely" (according to what they think is important) or according to some predetermined criteria. Triad sorting is often used as an alternative to pile sorting, which can prove difficult for illiterate informants. In triad sorting, informants are presented with groups of three domain items at a time and are asked to identify the item that does not belong or is the most different for all possible triad combinations of items. Ranking requires informants to order domain items along a dimension determined by either the investigator or the informants, for example, "order household members according to relative respect and authority." No two items may share the same rank position. Rating requires respondents to order items along



a predetermined and set number of steps, for instance, along a three-step continuum of low, medium, and high respect.

Focus groups are guided discussions within small groups of 6 to 12 people. Topical guides are utilized by a skilled moderator who stimulates discussions around areas of interest.

Direct observation provides records of actual behavior (as opposed to recalled behavior), including actions, conversations, and physical descriptions. Exact procedures and appropriate applications of these and other techniques have been described in a large number of books and articles (Pelto and Pelto 1978; Spradley 1979; Bernard et al. 1986; Scrimshaw and Hurtado 1987; Werner and Schoepfle 1987; Bernard 1988; Whyte 1991; Crabtree and Miller 1992; Gilgun, Daly, and Handell 1992; Morse 1992).

The qualitative research approach embodies four key concepts: flexibility, iteration, triangulation, and creation of context (Gittelsohn 1996). Flexibility requires that data collection methods be continually refined and modified throughout the research process, in order to explore new dimensions as they arise; instruments are not rigidly defined and implemented. Iteration, a concept closely linked to flexibility, refers to a process in which research topics are explored with increasing refinement and focus in successive stages of the data collection. Triangulation involves the use of several different data collection methods to address the same key research questions (Jick 1979). In addition, triangulation can help capture a more holistic, contextual portrayal of the beliefs or behaviors under study (Peshkin 1988).

### **Applications of Anthropological Methods to the Study of Intrahousehold Resource Allocation**

The integration of qualitative and quantitative methods has led to the development of several approaches by anthropologists for examining intra-household resource allocation. These include the following:

1. identifying local concepts and terms related to resource allocation and learning their meaning from the insider's point of view;
2. exploring local perspectives on grouping and organizing household members and/or actual resources that are being allocated;
3. identifying local systems for the differential valuation of individuals and methods for measuring the impact of these systems;
4. directly observing resource allocation within the household;
5. modeling resource decisionmaking within the household; and
6. exploring change and determinants of change in intrahousehold allocation of resources.

The following sections address these approaches in turn, giving some background and offering suggestions for appropriate anthropological research methods.

*Identifying Local Concepts and Terms*

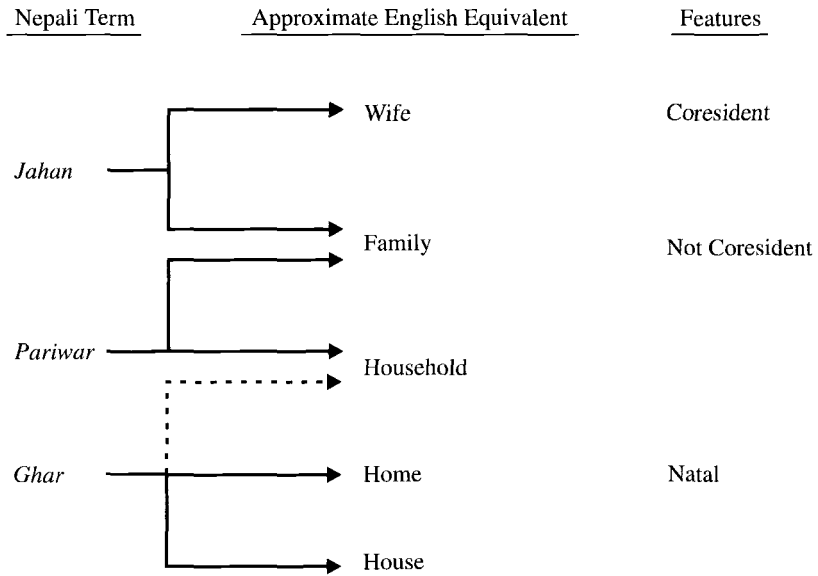
Anthropologists define two different ways of looking at human beliefs and behaviors: etically and emically. The concepts of “etic” and “emic” were first used by the linguist Kenneth Pike (1956) to describe language, and they were applied by Goodenough (1956) to other areas of culture. Although there is some debate about how the two terms should be applied, “etic” is used here to refer to the interpretation of human beliefs and behaviors from the outsider’s (that is, the investigator’s) perspective, whereas “emic” refers to the interpretation of beliefs and behaviors from the insider’s (that is, the native’s) point of view. Both perspectives are critical for the study of intrahousehold resource allocation. As Messer (1990:58–59) observes, “the native’s emic household constructs and his/her cultural values, including gender ideologies, that lead to or limit options in residence, work, and resource distribution patterns, are as important for predicting project outcomes as are the social scientist’s etic definitions.”

As a first step in developing an understanding of what people consider meaningful, anthropologists concern themselves with language. Different languages create and express different realities and categorize experience in different ways.

The concept of the household is a good example of the discrepancy between etic and emic definitions. Local concepts of “household” often differ significantly from those of an outsider. Rogers (1990:9) notes that “any fixed definition of household can create arbitrary and possibly misleading distinctions.” The set of etically derived terms developed by social scientists (for example, education, social status, and economic status) can rarely be directly applied to particular cultural contexts. Even within the discipline of anthropology, definitions of household are by no means standardized (Messer 1983). Bohannan (1963) classifies the household by the most fundamental kinship relationship it contains. Bender (1967:496) also observes that families are defined primarily in terms of kinship and that they are “kinship groups that must be defined strictly in terms of kinship relationships,” but he goes on to define the household simply as a residence group that carries out domestic functions. Netting (1984:xxii) considers households as “a fundamental social unit . . . a primary arena for the expression of age and sex roles, kinship, socialization, and economic cooperation where the very stuff of culture is mediated and transformed into action.”

From work in a variety of cultural settings, it appears that although households contain one or (usually) more features (coresidence, joint production, shared consumption, and kinship links), no particular single feature or combination of these features constitutes a universal definition of the household. The only definite point that can be made is that the concept of the household will vary from culture to culture and probably within cultures as well.

**FIGURE 10.1** Nepali terminology and the concept of “household”



SOURCE: Gittelsohn (1989).

Figure 10.1 illustrates this principle in the case of Nepal. In Nepali, at least three overlapping terms are commonly used to refer to the household, as etically defined: *jahan*, *pariwar*, and *ghar*. (There is undoubtedly a great deal of regional variation in the way these terms are applied within Nepal.) The term *pariwar* is commonly used to refer to a group of people, usually related through kinship ties, who live together and jointly produce and consume resources. However, *pariwar* is also used to refer to family who are not coresident within the same household but who still maintain kinship links to a joint household. The term *ghar* usually refers to the natal home of the individual, though it can also refer to the place where a group of people are currently living together and sharing resources. (It is also used to refer to dwellings in general.) *Jahan* can be used to indicate family (usually coresident), and it also serves as an endearing form of address for one’s wife. Any effort to collect primary data on intrahousehold resource allocation in Nepal would have to take the emic meanings of these terms into account. Responses will vary according to the term used; for example, to a wife and mother *ghar* may indicate “natal home,” a place with which she may not have had contact since her marriage. The particular term used may or may not be perceived to include absent members who either transfer resources into or receive transfers out of the household.

Another important concept that can vary according to the use of either emic or etic perspectives is the term “resource.” In the literature on intrahousehold resource allocation, resources are of several key types: food, health care, labor supply, education, and material goods. In-depth investigation of the intrahousehold allocation of etically derived resource types usually reveals that these broad classifications poorly represent emic categories. For instance, health care may not be a clearly defined resource for allocation. Local people often have “styles” of health-seeking behavior that are differentially allocated to household members (for example, whether one should seek treatment for mild illnesses or wait to get treatment for serious illnesses) (Graham and Larme 1992). Many cultures distinguish at least two main types of food: a staple food (or foods) and side dishes (including condiments) that accompany them. These two types of food are subjected to different allocation patterns, often along gender, class, and age lines.

Some work in Nepal indicates very different patterns of distribution for the main staple foods (*daalbhat* or *roti*) versus side dishes and condiments (*taarkharis*, *achars*, *ghiu*, and so forth) (Gittelsohn 1989). Staple foods in most households were allocated in a fairly egalitarian manner, with individuals consuming as much as they wanted. However, special side dishes were frequently distributed only, or in relatively greater quantities, to favored household members, such as adult males. Local emic perceptions of “resources,” therefore, can greatly affect actual allocation patterns and must be explored.

The term “allocation” also deserves attention. Allocation implies that one or more persons control distribution of food, health care, or other resources. In the case of food consumption, serving can be considered an “allocative” component of the intrahousehold allocation of food. But individuals often acquire food from household stores in a variety of different ways, including begging, stealing, and sharing. Should the concept of allocation incorporate these kinds of behaviors? More importantly, how do local people describe these patterns of acquisition?

The following methods can be used to explore emic perceptions and concepts affecting intrahousehold resource allocation:

1. Preliminary exploration through key informant interviewing can identify and determine the use of local terms and concepts relevant to the study of intrahousehold resource allocation. Some key terms to identify would include “household” or its nearest equivalent(s) and “resource types” (broken down into emically meaningful terms). Some possible key informant question formats would be the following: “What is the word for the place where a person and his or her spouse and children live together?” “What is the word for the group of people who eat together from the same pot/hearth/kitchen?” “What is the difference between a staple food and a side dish?”

2. Free listing may be employed to elicit lists of items within prominent conceptual domains generated through key informant interviewing (Weller and Romney 1988). For instance, a useful early free list question might be one of the following: “What are all the different side dishes that people eat here in the community?” “Within the household, what are all the different ways in which children get food?”

### *Exploring Local Perspectives on Resources Being Allocated*

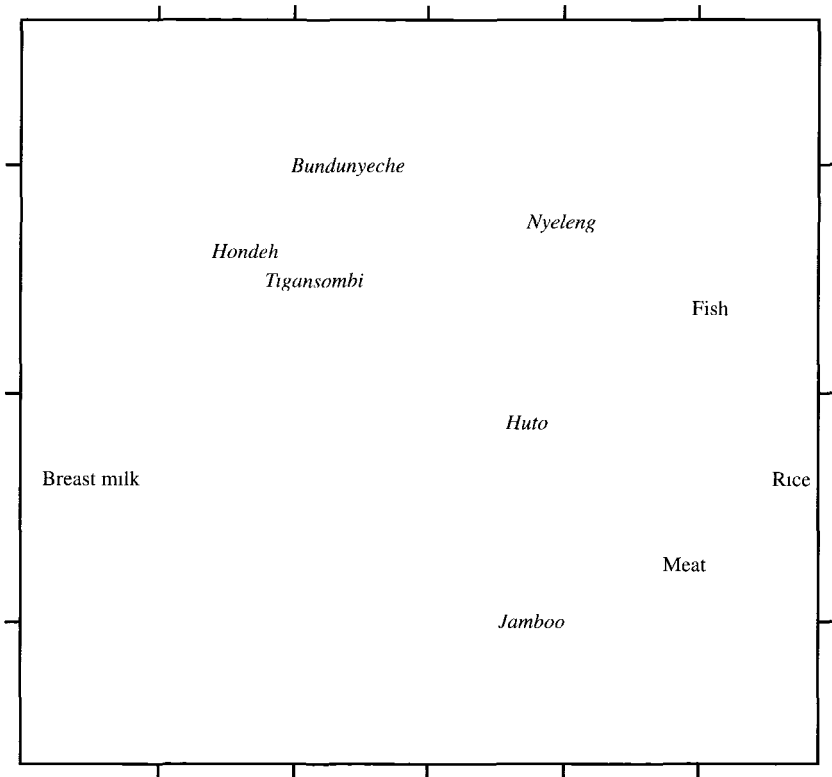
Understanding indigenous systems of classifying terms is important for several reasons. Indigenous models or systems of grouping elements are part of the underlying set of “rules” for intrahousehold resource allocation in a given cultural context.

In The Gambia, qualitative research was conducted on infant feeding in order to develop culturally acceptable weaning foods (Samba and Gittelsohn 1991). After identifying a list of foods commonly given to young children, mothers were asked to group pile sort cards (with small packets of the foods attached) according to their own choice. The results were analyzed using the ANTHROPAC computer program, and a multidimensional scale (MDS) was produced (Figure 10.2). Items that are physically proximate on the MDS were more likely to be sorted together in the same pile and were seen as similar by mothers. In Figure 10.2, foods for children are grouped on the left, with breast milk isolated from the other foods. Pap (*hondeh*), porridge or rice and groundnuts (*tigansombi*), and millet porridge (*bundunyeche*) were first described as “given to children” and then as “they are the same thing” by informants. Fish, meat, and sauce made from green leaves (*jamboo*) are distant from the other foods. Most mothers remarked that these foods “do not go together” with the other foods. This figure gives a useful approximation of how likely, in the local system, mothers are to add one of these distant foods to the weaning pap—information of particular interest to nutrition intervention projects. More generally, understanding how people think about and categorize their resources is a necessary precursor to understanding allocation patterns.

Anthropological methods useful in the examination of local grouping systems of key concepts and terms relating to intrahousehold resource allocation include the following:

1. Using key informant interviews to define cultural or semantic domains for key concepts as described by key informants in their own language (Spradley 1979; Weller and Romney 1988). These include terms for different categories of household members and resources, and subtypes of these categories.
2. Conducting free listing on randomly selected adult respondents ( $N = 15-20$ ) and asking them to name all the different kinds of people who will live together in the same household (terms determined from the previous

**FIGURE 10.2** Multidimensional scale of pile sort data: foods commonly given to weaning-age children in Kulari village, The Gambia ( $N = 11$  mothers)



SOURCE: Samba and Gittelsohn (1991)

NOTE: Local terms are defined as follows: *bundunyeche*, porridge with groundnut sauce; *hondeh*, thick porridge or pap made with cereal flour; *huto*, boiled cereal grains with pounded raw groundnuts, dried fish, onions, or oil; *jamboo*, sauce of green leaves; *nyeleng*, steamed millet or sorghum grains; *tigansombi*, porridge or pounded rice and raw groundnuts.

- step). This process should provide an extensive list of different types of people: husband, wife, grandfather, infant, and so forth.
3. After tabulating the results of the free list, selecting the subset of the most commonly mentioned household members and preparing a set of cards, each representing one household member. Have at least 10 respondents do pile sorts, placing associated cards together in one stack, to see how local people group different types of household members.
  4. Repeating the process using local terms for different resources to determine local perspectives on grouping of these resources.

### *Identifying Local Systems for the Differential Valuation of Individuals*

What is the impact of these cognitive elements on patterns of intra-household resource allocation? One approach is to emphasize the perceived present and future economic contribution of an individual (Gross and Underwood 1971; Chen, Huq, and D'Souza 1981; Katona-Apte 1983; Kumar 1983). However, individuals can be valued socially, religiously, and in many other ways apart from their economic contributions. In most developing countries, for instance, the elderly receive special access to food resources, although they may no longer be significant contributors to the household economy. In Nepal, the economic-benefit hypothesis would lead us to predict favoritism of boys, who remain with the household and become its main supporters during their adult years; however, no differences were observed in terms of favoritism between young girls and boys (Gittelsohn 1989). Thus understanding local systems for valuing individuals can be an important tool for predicting patterns and the outcomes of intrahousehold resource allocation and for predicting how changes in determinants of the valuation system might affect intrahousehold resource allocation.

The following methods can be used to explore the differential valuation of individuals:

1. Use key informant interviewing to identify main patterns and concepts associated with the valuation of individuals.
2. Using the same set of cards developed previously for looking at links between different types of household members, have another group of respondents order the cards by relative "importance" of the individual (or some similar cultural term, identified through key informant interviews). Obtain detailed qualitative explanations of these rankings.
3. Experiment with variations on the ranking technique to explore valuation systems that may affect resources, for example, food serving order or the likelihood of being taken to the clinic (for minor and serious illnesses).

### *Directly Observing Resource Allocation within the Household*

Probably the most powerful method utilized by anthropologists for measuring actual behavior is direct observation. A number of recent reviews of the use of direct observation techniques have been published (Mulder and Caro 1985; Bentley et al. 1994). Observation techniques employed by social scientists range from unstructured data collection formats, such as participant observation and unstructured focused observation, to highly structured formats, such as spot-check observations (Paolisso and Regmi 1992) and ratings of observed features in the environment (for example, level of sanitation). Participant observation and unstructured focused observation provide a more subjective record of human behavior, whereas structured observations rely on the use of

precoded behavioral categories and produce a quantifiable record that is amenable to statistical analysis. Natural variability in behavior and reactivity to the observer's presence are two factors that must be considered when conducting direct observation studies. The former refers to the problem of inferring behavior patterns from a limited number of observations, whereas reactivity refers to the concern that subjects might alter their behavior during an observation owing to the presence of the observer. Neither of these problems is simple to solve (Altman 1973; Mulder and Caro 1985; Martin and Bateson 1986; Bernard 1988). Preliminary observations of a small sample of households can provide information about when subjects cease to react to the observer (the reactivity threshold); more importantly, the nature of the subjects' behavioral variation should be noted during this process (Bentley et al. 1994).

Observational techniques such as continuous monitoring studies are well suited to the acquisition of information on public behavior. They can also be extended to other aspects of intrahousehold resource allocation (Stanton and Clemens 1987; Bentley et al. 1991a, 1991b; Gittelsohn 1991; Kaiser and Dewey 1991). These may focus on people (a target child), on locations (the kitchen), on events (the meal), or on some combination thereof. Observational methods are likely to be most productive for assessing resource allocation processes that occur relatively frequently (typically at least once per day), such as food preparation, consumption, and daily work activities. The allocation of other household resources is more difficult to observe because of its relative infrequency: people eat every day but may receive a new set of clothes only once a year.

Direct observational techniques useful in measuring intrahousehold resource allocation include the following:

1. Determining the relative frequency of occurrence of the type of resource allocation of interest through direct, unstructured focused observations in a small sample of households. This initial step presumes identification of important emic subcategories of resource types through previous key informant interviews.
2. Generating a list of potential key allocative behaviors through literature review, interviews with key informants, and unstructured observation of a sample of households. In the case of food, these might include encouraging an individual to eat, refusing to serve particular foods, or ignoring someone's request for food.
3. Identifying actors, locations, times, and events associated with the key allocative behaviors to permit effective targeting of observations.
4. Selecting an appropriate type of structured observation to conduct continuous monitoring, spot checks, or observation through a ratings checklist (see Bentley et al. [1994] for guidelines).



### *Modeling Resource Decisionmaking within the Household*

A number of different systems have been proposed for describing the decisionmaking process (Acharya and Bennett 1983; Gladwin 1989). Decisionmaking is sometimes modeled on individuals alone, but it is also described as the result of interactions between household members (Piwoz and Viteri 1985). These interactions may take different forms, including negotiation, suggestion, and disagreement. Of course, a simple decision may merely involve an individual mentally reaffirming his perceptions about what constitutes appropriate behavior. In the "simple" day-to-day decisions of everyday life, this mental reaffirmation of the "rules" may be the only determinant of a particular allocative behavior. A woman serving food at dinner may give a larger share to her sons than to her daughters without going through any type of formal decisionmaking process. On the other hand, long-term goals such as saving for an upcoming wedding or preparing for a festival period can also affect apparently "simple" daily allocative decisions.

Anthropological methods can assist in developing decisionmaking models within the household by gathering data on the process of making decisions. Although a great deal of decision modeling is based on measuring outcomes, qualitative methods can be used to gather verbal data on the perceptions and values that help to produce these outcomes, as well as provide in-depth reporting (narratives) of past decisionmaking episodes. A method for developing decisionmaking models (from Gladwin 1989) is briefly outlined below:

1. Beginning with local emic categories for a key resource(s), and on the basis of participant observation and unstructured focused observations, identify those individuals in households most likely to be the primary allocators of a resource. These are those individuals who actually distribute the resource to the end receiver. In the case of food, this would be the food server.
2. Use iterative interviews with key informants (who should be the primary allocators) to develop a preliminary ethnographic decision-tree model. This takes the form of a "tree" with a series of yes-no questions arranged in a hierarchy.
3. Test this decision-tree model by having a different set of informants (also primary allocators) narrate their past decisions regarding allocation of the resource. Record errors (deviations) and revise the model if errors are numerous.

### *Exploring Determinants of Change in Intrahousehold Allocation of Resources*

Neither households nor their internal patterns of distribution are static (Rogers 1990). Changes in household composition can have a profound effect on patterns of intrahousehold resource allocation. Research on intrahousehold

food allocation in rural Nepal shows that meals at which the male head of household was present contained many more side dishes and condiments and were much more likely to contain elements of preferential food allocation (Gittelsohn 1989). Leonard's (1991) work in the Peruvian Andes indicates that the effects of seasonal changes in food availability were mitigated by changes in food allocation that favored young, nutritionally vulnerable children.

Anthropological methods for examining change and determinants of change in intrahousehold resource allocation include the following:

1. Ask small groups of informants to illustrate time and/or seasonal changes using locally available materials. On a single scale of seasons, men are asked to indicate the relative amount of time spent on different activities. This can be compared with a similar record of work patterns diagrammed by a group of women. Other patterns relating to allocative behavior, such as food availability by season, can also be investigated in this manner.
2. Using the local terms for resources and different household members (determined by the processes described earlier), select a unit of time for study. Relevant time units can be identified through key informant interviews. It may turn out, for example, that there are specific festival seasons that determine alternative patterns of resource allocation.
3. Sample several households within the community and conduct direct observations of the allocation of the resource(s) of concern. These observations should be conducted on different days of the week in the same household (if interested in weekly changes) or during different seasons (if interested in seasonal changes).
4. Analyze these data to detect differences in allocative patterns (for example, more food consumed in a more egalitarian manner on weekends). Cross-check observed changes in allocative behavior with key informants.

## **Discussion and Conclusions**

One objective of this chapter has been to describe ways in which qualitative research can lay the foundation for more valid, reliable, and meaningful quantitative research. The use of ethnographic research methods for developing structured quantitative data collection instruments is gaining popularity (Coreil et al. 1989). However, no qualitative researcher likes to think that the sole purpose of his or her work is to lay the trail for the "real" research—the quantitative research. The other great strength of qualitative research lies in its ability to provide independent inputs into intervention design and implementation.

Typically, researchers are interested both in the policy implications of intrahousehold resource allocation and in developing effective interventions.

Interventions must be effective within household contexts. All too frequently, interventions fail because they did not address issues of time management, division of labor by sex, or some other relevant sociocultural feature that could be anticipated through in-depth qualitative research.

At the same time, limitations in using anthropological methods to investigate intrahousehold resource allocation should also be noted. Typically, qualitative information has not been incorporated effectively into predictive models; merging qualitative data into models of intrahousehold behavior for the purpose of predicting specific patterns of food allocation, for example, is an area in which more effort is needed. Qualitative research and, in particular, direct observation tend to be very time- and labor-intensive; efforts to make these data collection methods time- and cost-efficient are essential. In addition, more work is required to determine how qualitative data can be directly incorporated into the design of interventions seeking to modify intrahousehold resource allocation patterns.

It could be argued that health and nutritional status outcomes in individuals are cost-effective indicators of intrahousehold resource allocation patterns, so why look at intrahousehold behavior? However, in the long run, these indicators may not provide sufficient information for the development of effective interventions because the allocation functions inside the "black box" are either overlooked or inadequately described. The community, household, and individual characteristics that influence people's beliefs, attitudes, systems of valuation, and decisionmaking and determine behaviors are all critical proximate determinants of health outcomes.

Anthropological research can assist in the effective design, targeting, and evaluation of interventions in several ways. It aids in the design of interventions by identifying, describing, and working within local cultural models. Targeting of resources can also be improved using anthropological research. Knowledge of intrahousehold processes can permit interventions to target particular beliefs and behaviors as well as particular individuals. In the case of food allocation, at least three levels of behavior affect food intake: food selection at the household level, allocation within the household, and individual food preferences that determine consumption patterns. Anthropological research can indicate which of these levels is most amenable to change and offer insight on how to promote that change. Qualitative methods can also assist in effectively identifying vulnerable household members who should be targeted by the intervention.

Anthropological methods can be used to evaluate the effect of intra-household resource allocation patterns on health interventions. An intensive observational study of intrahousehold food allocation has been conducted to trace the flow of a supplemental food (Nutriatol, a vitamin A-rich gruel) through the household in Guatemala (Solomons and Barrows 1991). Researchers found that serving of Nutriatol was characterized by a distinct age and sex

bias, with smaller children being discriminated against. In most households, Nutriatol was considered a “medicine” and rarely given to small children. This is an example of an intervention evaluation that occurs inside households, and of a result that would not have been obvious in an examination of outcomes only.

Although advances continue to be made in the case of anthropological methods to investigate intrahousehold resource allocation, there are still many gaps. In particular, anthropologists have not been successful in modeling intrahousehold behavior for the purpose of predicting patterns of allocation, or in incorporating qualitative data directly into these models. This is an area in which collaboration between anthropologists and economists may be particularly fruitful.

# 11 Inequality in the Intrafamily Distribution of Food: The Dilemma of Defining an Individual's "Fair Share"

HOWARTH E. BOUIS AND CHRISTINE L. PEÑA

If all individuals required identical amounts of nutrients regardless of age, gender, physiology, and activity pattern, and if all individuals had identical taste preferences and knowledge of their nutritional requirements, it would be relatively simple to measure inequality in the intrahousehold distribution of foods. That is, if all of these conditions were to hold, favoritism in the allocation of a particular food or nutrient reasonably could be determined using the following expression:

$$\frac{X_i / \sum_{i=1}^n X_i}{1/n}$$

where

$n$  = the number of household members,

$X_i$  = consumption by the  $i$ th household member of food or nutrient  $X$ ,

and  $\sum_{i=1}^n X_i$  = total household consumption of food or nutrient  $X$ .

In this example,  $1/n$  may be interpreted as the index of an individual's "fair share" of household consumption.

Precisely because none of the foregoing conditions ever hold, it has proven difficult to define an empirically acceptable index (denominator). Most attempts to do so have used calorie intakes in the numerator, correcting each  $X_i$  by an individual-specific factor, say  $a_i$ , which corrects for differences in calorie requirements due to age, gender, weight, pregnancy or lactation, and activity patterns, depending on data availability (that is, nutrient intakes are expressed as adult equivalents).

As discussed later in this chapter, this generally is considered to be an unsatisfactory solution in that (1) recommended calorie intakes for these

various criteria are still the subject of considerable debate, (2) some critical information (for example, activity patterns) is difficult to measure, and (3) once all relevant criteria are accurately taken into account, calorie adequacy in theory measures whether an individual is in energy balance (possibly at below average weight), which is not necessarily a measure of relative welfare.<sup>1</sup> Nevertheless, use of calorie intakes has the advantage that individuals know, to some extent, when their requirements are not being met (they experience hunger), and avoiding hunger is widely presumed to be of high priority to most individuals.<sup>2</sup>

We argue in this chapter that it is reasonable to assume that necessities are more equitably distributed within households than are luxuries. Therefore, calorie intake (a necessity) is a rather insensitive (and so inadequate) empirical measure of inequality, compared with consumption of foods with higher income elasticities (for example, nonstaple foods). However, this particular property of relative equity makes it a good candidate for use as an index to replace  $1/n$  in the expression given earlier in deriving an alternative expression for measuring inequality in the intrahousehold allocation of food. This expression is then used to identify favoritism or discrimination in the intrahousehold distribution of food for a sample of rural households in Bukidnon, a southern province in the Philippines, and to examine various factors that influence the intrahousehold distribution of food.

In the following section we review the existing literature on intrahousehold distribution of food, focusing on the measure(s) of discrimination used. Next, food consumption patterns for the Bukidnon population at the household level are described, in particular how food consumption patterns change with increases in income. This provides an intuitive basis for presenting the proposed alternative indicator(s) of inequality. The next section applies the methodology to the Philippine data, which are disaggregated by nonstaple food groups and type of nutrient intake. Both a descriptive analysis and regression results are presented. This section is followed by concluding remarks.

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1. In theory, if the calorie adequacy ratio is correctly measured and is chronically below 1.0, an adult is in deficit energy balance and will lose weight, with the opposite result if the calorie adequacy ratio is chronically above 1.0. Thus, other things being equal, an "overweight" adult may be eating more than an "underweight" adult but would have a calorie adequacy ratio lower than that of the underweight adult if the overweight adult were currently losing weight and the underweight adult were currently gaining weight. If both had stable weights, then both adults would have calorie adequacy ratios of 1.0. For children, in theory, calorie adequacy ratios measure energy intakes required to maintain "normal" growth, given the child's observed weight.

2. This similarity of preference for hunger satiation across cultures may be contrasted with the utility associated with any specific food or food group. A food may be highly prized in some societies and disliked in others. The awareness of shortfalls in consumption of calories (hunger) may be contrasted with, say, deficiencies in vitamin A or iron intakes.

## **Identifying Discrimination: Methodological Issues**

Most studies of the intrafamily distribution of food rely either on anthropometric indicators such as weight-for-age and height-for-age, standardized by measurements from a healthy reference population, or measurements of diet adequacy, which assess the degree to which the nutrient intakes of individuals meet established requirements.<sup>3</sup> Both approaches pose problems. First, the use of anthropometry assumes that low weights and heights are primarily the result of poor nutrition. However, substandard growth can be attributed to factors other than undernourishment, such as unsanitary living conditions and inadequate health care (Haaga and Mason 1987; Osmani 1990). Second, the reference population that serves as the basis for the “desired” physical measurements is assumed to be biologically representative of the population being studied (Ross 1992). Third, the anthropometric approach cannot take into account reduction in levels of activity—another result of poor nutrition (Osmani 1990).

When evaluating the adequacy of energy intakes, it is important to control for differences in energy needs between individuals. However, a major problem in comparing intake with requirements by age and gender is the lack of consistency in estimating requirements; such estimation processes are “controversial and undergoing constant revision” (Chen, Huq, and D’Souza 1981:61). Controversy exists in selecting which factors influencing energy needs should be incorporated into the calculation of recommended daily allowances (RDAs) and which factors can be safely ignored (Randolph et al. 1991). For example, failure to account for differences in activity patterns could result in a conclusion that some individuals are overnourished when, in fact, they are consuming the extra calories necessary to sustain themselves while doing heavy manual labor. As a result of variations in concepts of needs and adequacy criteria, as well as kinds of foods consumed in different cultures and countries, recommended RDAs in 41 countries differ substantially (Harriss 1990; Wheeler 1991).

Moreover, as mentioned in the previous section, even if no controversy existed as to how RDAs are to be calculated, in theory these RDAs for adults would measure intakes required to remain in energy balance. Thus it is possible that highly favored, higher-weight individuals would appear to be no better off than highly disfavored, lower-weight individuals, if both groups were in energy balance. In fact, if disfavored individuals were in the process of gaining

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3. See Haddad et al. (1995) for a comprehensive review of approaches and findings. Refer to Farmer and Tiefenthaler (1995) for an analytical approach to interpreting the findings of *intrafamily food distribution studies*. Their work deals with a number of fairness concepts from the perspective of parents that may lead to different food allocation outcomes. They point out that although the focus has been on investment strategies (Rosenzweig and Schultz 1982) such that parents allocate more resources to children who can contribute more to family income, parents may also decide to give more food to the child with the greatest nutritional need, or they may distribute food equally regardless of need.

weight, their higher calorie adequacy ratios might make them appear to be better off than favored individuals.

## **A Measure of an Individual's "Fair Share" of Food**

### *Food Consumption Patterns at the Household Level*

In order to provide an intuitive basis for an alternative measure of discrimination in intrahousehold food distribution, it is instructive to examine how food consumption patterns change at the household level as income increases. Table 11.1 presents per capita food expenditures, price paid per kilogram, and per capita kilogram consumption by expenditure quintile for 11 food groups in the rural Philippines. The data were collected from four rounds of interviews at four-month intervals, using 24-hour dietary recall information.<sup>4</sup> Note that, at the margin, as income and food expenditures increase, consumers buy beverages, dairy products, legumes, and meats in large quantities. Combined expenditures for primary food staples (corn and rice) and vegetables increase with income, but the percentage increases are far smaller than those for the other food groups.

Table 11.2 disaggregates per capita calorie intakes by the same 11 food groups. Calorie consumption from corn and rice combined is nearly constant across expenditure quintiles. As income increases, marginal increases in calorie intakes come from nonstaple sources. At very low levels of income, food consumption choices are driven by the need for inexpensive sources of energy (corn and rice) and variety (vegetables). Even for this low-income population, marginal utilities derived from additional energy and variety apparently have diminished to the point that taste considerations for individual foods influence consumption decisions at the margin as income increases.<sup>5</sup> (In particular, desire exists for more beverages, dairy products, and meats in the diet.)

### *Identifying Discrimination: An Alternative Measure*

The data in Tables 11.1 and 11.2 on food expenditures and calorie intakes can be used to illustrate the derivation of the proposed formula for measuring inequality in intrahousehold food distribution. Suppose that the data in these

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4. These food-recall data are used because they provide a more accurate reflection of actual food intakes than do food expenditures (Bouis and Haddad 1992). These households were surveyed during 1984 and 1985. A wide range of data was collected, including information on landholdings, income sources, expenditure patterns, food intakes, time allocation, and heights and weights. The analysis to follow utilizes data from 448 households, which were present for all survey rounds, in particular the 24-hour recalls of individual food intakes conducted in each round. See Bouis and Haddad (1990) for a more detailed description of the survey site and data collection methodology and Bouis, Haddad, and Kennedy (1992) for a discussion of how the 24-hour recalls of food intakes were conducted.

5. See Bouis (1996) for a more comprehensive discussion of this point.



**TABLE 11.1** Food expenditures, food prices, and kilograms consumed, by expenditure quintile and food group

Food Group	Expenditure Quintile					All	Quintile 5/ Quintile 1	Quintile 4/ Quintile 2
	1	2	3	4	5			
Food expenditures (pesos per capita per week)								
Corn	9.05	9.35	8.86	8.46	4.26	8.00	0.47	0.90
Rice	2.12	3.58	4.52	4.48	9.61	4.86	4.53	1.25
Beverages	0.26	1.76	4.23	6.83	9.83	4.58	37.81	3.88
Dairy products	0.05	0.07	0.14	0.24	1.26	0.35	25.20	3.43
Fruits	0.18	0.16	0.26	0.30	0.33	0.25	1.83	1.88
Meats	6.51	8.18	10.03	14.75	20.40	11.97	3.13	1.80
Green leafy vegetables	1.51	1.58	2.14	1.85	1.66	1.75	1.10	1.17
Legumes	0.18	0.33	0.37	0.49	0.99	0.47	5.50	1.48
Other vegetables	1.04	1.20	1.32	1.87	2.01	1.49	1.93	1.56
Cooking ingredients	1.98	3.12	3.34	4.63	4.62	3.54	2.33	1.48
Other foods	1.60	2.08	2.05	2.97	4.48	2.64	2.80	1.43
All	24.50	31.41	37.29	46.88	59.46	39.90	2.43	1.49
Food prices (pesos per kilogram)								
Corn	4.41	4.52	4.50	4.49	4.50	4.48	1.02	0.99
Rice	5.72	5.97	5.80	5.67	5.64	5.74	0.99	0.95
Beverages	82.42	65.22	105.26	112.78	110.81	102.62	1.34	1.73
Dairy products	37.76	45.70	36.93	41.95	43.77	42.44	1.16	0.92
Fruits	4.69	3.67	3.79	4.44	6.05	4.60	1.29	1.21
Meats	20.33	21.27	22.14	23.13	23.76	22.26	1.17	1.09
Green leafy vegetables	11.54	10.81	11.51	11.27	11.23	11.28	0.97	1.04
Legumes	9.40	12.70	12.03	11.03	12.35	11.77	1.31	0.87
Other vegetables	4.52	4.07	4.57	4.55	4.69	4.49	1.04	1.12
Cooking ingredients	15.25	17.46	17.68	19.31	19.22	17.84	1.26	1.11
Other foods	3.42	4.67	3.68	5.57	7.52	5.15	2.20	1.19
All	6.12	6.73	7.40	8.39	10.15	7.76	1.66	1.25
Kilograms (per capita per week)								
Corn	2.09	2.07	1.97	1.91	0.96	1.80	0.46	0.92
Rice	0.37	0.60	0.79	0.79	1.72	0.85	4.65	1.32
Beverages	0.01	0.04	0.06	0.08	0.22	0.08	22.00	2.00
Dairy products	0.00	0.00	0.00	0.01	0.03	0.01	23.07	5.00
Fruits	0.05	0.06	0.07	0.08	0.05	0.06	1.00	1.33
Meats	0.32	0.43	0.47	0.70	0.86	0.55	2.69	1.63
Green leafy vegetables	0.16	0.16	0.20	0.20	0.17	0.18	1.06	1.25
Legumes	0.02	0.03	0.04	0.05	0.08	0.04	4.00	1.67
Other vegetables	0.24	0.34	0.28	0.43	0.45	0.35	1.88	1.26
Cooking ingredients	0.12	0.14	0.17	0.22	0.22	0.17	1.83	1.57
Other foods	0.73	0.82	0.95	0.98	1.03	0.90	1.41	1.20
All	4.11	4.68	5.00	5.43	5.79	5.00	1.41	1.16

SOURCE: International Food Policy Research Institute/Research Institute for Mindanao Culture Survey, 1984/85.

NOTE: Food prices are taken from the food expenditure survey; food quantities are taken from the 24-hour recall of food intakes; food expenditures are computed from these quantity and price data.

**TABLE 11.2** Calorie intakes per adult equivalent and calories purchased per peso of expenditure, by expenditure quintile and food group

Food Group	Expenditure Quintile					Quintile 5- Quintile 1
	1	2	3	4	5	
<b>Calorie intakes<sup>a</sup></b>						
Corn	1,501	1,469	1,372	1,317	659	-842
Rice	252	388	511	489	1,111	+859
Beverages	2	6	11	15	33	+ 31
Dairy products	1	1	3	4	19	+ 18
Fruits	5	8	9	7	6	+ 1
Meats	77	98	109	149	218	+141
Green leafy vegetables	15	14	17	17	15	0
Legumes	10	19	22	25	46	+ 36
Other vegetables	15	21	18	25	24	+ 9
Cooking ingredients	61	81	97	143	178	+117
Other foods	150	163	191	207	253	+103
Corn and rice	1,753	1,857	1,883	1,806	1,770	+ 17
All others	336	411	478	592	791	+455
All	2,089	2,268	2,361	2,398	2,561	+472
<b>Calories purchased (per peso)<sup>b</sup></b>						
Corn	872	846	858	858	847	...
Rice	570	563	582	570	604	...
Beverages	126	80	102	67	71	...
Dairy products	121	83	115	91	94	...
Fruits	350	265	334	224	164	..
Meats	71	69	63	61	56	...
Green leafy vegetables	61	61	58	60	55	...
Legumes	474	346	358	321	304	...
Other vegetables	117	122	102	99	80	...
Cooking ingredients	145	171	180	214	268	...
Other foods	612	511	553	474	418	..
All	492	441	414	344	286	...

SOURCE: International Food Policy Research Institute/Research Institute for Mindanao Culture Survey, 1984/85.

NOTE: .., not important or easily interpretable.

<sup>a</sup>Calories are computed from the 24-hour recall survey.

<sup>b</sup>Calorie information is taken from the 24-hour recall survey; price information is taken from the food expenditure survey.

two tables, presented by expenditure quintile, represent, instead, individual food consumption information for a five-member household in which food consumption is highly skewed. That is, this hypothetical household spends 40 pesos per capita per week for food, on average, with 60 pesos being spent on the most highly favored member and only 25 pesos being spent on the least favored member.

Assume that, given this distribution of total expenditures (designated, say, by household member 5, who is the recognized decisionmaker), each individual member is allowed the freedom to allocate her own total food expenditure as she wishes among various individual foods. Whatever food allocation decisions are subsequently made by individual members might be termed Pareto optimal, in the sense that whatever allocation each chooses maximizes her own individual utility without affecting the utility of other household members.

Assuming that the preferences of these individuals reflect those of the Philippine sample population (and, by extension, other poor populations as well), household member 5 will choose a diet that is beverage-, dairy-, and meat-intensive relative to household member 1, whose diet will be relatively staple-intensive. Member 1 will not choose to spend her 25 pesos in the same proportion on individual foods as household member 5, simply because satisfying hunger will take precedence over the tastes of more preferred foods. These allocation outcomes can be modeled in terms of a lexicographic utility function (Encarnacion 1990), in which satiation of hunger is given top priority, or in terms of a marginal utility curve that is quite steep (relative to marginal utility curves for other goods or characteristics) up to a certain level of satiation and then abruptly levels off as if "kinked." It is the cruel decisionmaker, indeed, who will not allow individual household members to satisfy hunger first (to the extent possible within a given individual's budget constraint) before satisfying other wants.

The linking of the assumptions of individual Pareto optimality (as just defined) and the primal desire for hunger satiation leads to a conclusion that among the most equitably distributed commodities within households will be those that can least expensively satiate hunger. Consequently, hunger satiation (which will be highly correlated with staple food consumption, calorie intakes, and body weights) will be one of the *least* sensitive empirical indicators of discrimination in the intrahousehold distribution of resources. Foods, nutrients, or even nonfoods with high income elasticities should provide much more sensitive measures of such discrimination.

The measure of inequality in the intrahousehold distribution of food presented here uses a presumption of *relative* equality in hunger satiation across individual household members as the basis for calculating an index for what would be an individual's "fair share" in the consumption of nonstaple foods. This measure is given by

$$R_i = \frac{X_i / \sum_{i=1}^n X_i}{C_i / \sum_{i=1}^n C_i}$$

where

$X_i$  = consumption by individual  $i$  of food or nutrient  $X$ , where  $X_i$  is measured in kilograms, units of a nutrient, or total expenditures;

$C_i$  = calorie intake of individual  $i$ ;

$\sum_{i=1}^n X_i$  = total household consumption of  $X$ ; and

$\sum_{i=1}^n C_i$  = total household calorie intake.

The denominator is the proportion of total household calories that an individual consumes. It takes account of interindividual differences (within a specific household) in metabolic rates, heights, activity patterns, and physiological status (pregnancy, breast-feeding), so that persons who require more calories than other family members to satiate hunger for these reasons receive a higher proportion of household calories.<sup>6</sup>

The numerator is the individual proportion out of total household consumption of any specific food or nutrient. For favored persons in a family, the ratios of food share to energy share (FS/ES) will be greater than 1.0 for “preferred” foods (foods with relatively high income elasticities).

## **Empirical Application and Analysis**

### *Descriptive Analysis*

The Philippine data described earlier are used to calculate FS/ES ratios for nine food groups. Mean individual food intakes, based on 24-hour recalls by mothers across four rounds, were used to minimize intraindividual variations in food consumption (USDA 1986; Behrman 1988a). The results are graphed in Figure 11.1. The ratios shown in Figure 11.1 and the ratios used in the regression analysis use kilogram shares in the numerator.

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6. However, there are some economies of scale in calories needed for maintaining body weights. Other things being equal, an adult weighing 10 percent more requires fewer than 10 percent more calories to maintain that weight; returns to scale for young children are more nearly constant (FAO/WHO/UNU 1985; see Bouis [1994] for a discussion). Thus some downward revision of adult calorie proportions may be advisable relative to child proportions.