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## Bargaining and Distribution in Marriage

Shelly Lundberg and Robert A. Pollak

**I**n the 1970s, a proposed change in social welfare policy in the United Kingdom excited considerable debate. The universal child allowance, which had consisted primarily of a reduction in the amount withheld for taxes from the father's paycheck, was to be replaced by a cash payment to the mother. An excerpt from the parliamentary debate in the *House of Commons Hansard* (May 13, 1975) expresses a popular sentiment: "[F]ar from a new deal for families, it will take money out of the husband's pocket on the Friday and put it into the wife's purse on the following Tuesday. Far from being a child benefit scheme, it looks like being a father disbenefit scheme."

Popular discussions of family policies such as the U.K. child benefit often concern their presumed effects on distribution within the family—on the relative well-being of husbands, wives and children. The economist armed only with traditional models of the family must view these discussions as naive. Until very recently, the standard of the profession for both theoretical and empirical analysis was a "common preference" model of the family, which assumes that family members act as though they are maximizing a single utility function. A family's common preference ordering may be the outcome of consensus among family members or the dominance of a single family member, but all such models imply that family expenditures are independent of which individuals in the family receive income or control resources. Common preference models imply that all income is "pooled" and then allocated to maximize a single objective function, so that family demand behavior depends on total family income and not the incomes of individual members. This pooling of resources within the family

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implies that a change from child allowances paid to fathers to child allowances paid to mothers should arouse neither the ire of affected fathers nor the opposition of their parliamentary representatives.

The United Nations World Population Conference, held in Cairo in September 1994, witnessed a continuation of a long-standing debate about how to reduce birth rates in developing countries. Population experts divided into two camps: one favoring continued emphasis on family planning services and the other favoring policies that improve the status of women. The latter group argues that greater access to education, business loans and development projects would give women more control over reproduction and that, as a result, birth rates would fall.

Economists understand a link between fertility rates and the educational and earnings opportunities of women that operates through the value of women's time and the time price of children; but the proponents of women's "empowerment" have emphasized the effect of women's education and income on their decision-making authority within the household. Models that treat the family as a black box—with income flowing in and demands for goods, services, leisure and children flowing out—cannot deal with this argument and so cannot address the intrafamily distribution issues that concern population and development agencies. If economists are to participate in this important debate (or at a minimum comprehend it), we must move beyond common preference models of family behavior.

To this end, the theoretical challenge facing family economics is to develop models in which joint family decisions are derived from the sometimes divergent interests of husbands and wives and in which the formation and dissolution of marriages provide a beginning and an end to the family allocation process. In recent years, a large number of game-theoretic models of marriage and the family have been developed, building on the seminal contributions of Manser and Brown (1980) and McElroy and Horney (1981). In general, these models impose fewer restrictions on observed family behavior than do common preference models, and recent theoretical contributions have been prompted, and supported, by a growing body of empirical evidence inconsistent with common preference models. The most provocative of this empirical work demonstrates a strong positive association between child well-being and the mother's relative control over family resources and has raised new questions about the potential effectiveness of policies "targeted" at specific family members.

A current snapshot of family economics would show the traditional framework under siege on both theoretical and empirical fronts. The political potency of gender issues has given a certain urgency to the development of alternatives to common preference models. However, no new theoretical framework has gained general acceptance as a replacement for common preference models, and empirical studies have concentrated on debunking old models rather than on discriminating among new ones. In this paper, we review a number of simple bargaining models that permit independent agency of men and women in marriage, discuss their

implications for distribution within marriage and for observed family behavior, and present a sampling of the relevant empirical evidence.<sup>1</sup>

## **Models of Family Behavior**

Economic models of consumer demand and labor supply begin with an individual economic agent choosing actions that maximize his or her utility function subject to a budget constraint. How can we reconcile this individualistic theory of the consumer with the reality that people tend to live, eat, work and play in families?<sup>2</sup> Application of a single-agent model to the household or family raises two distinct issues—the identity of the consumer and the identity of the decision maker.

The identity of the consumer is an issue because micro data on “consumption” usually report expenditures at the household level, seldom consumption at the individual level. The household purchases bread and refrigerators, ballet lessons and haircuts, but in general the data do not assign the consumption of these goods and services to individual household members. If the problem were fundamentally data-based, however, we could solve it by collecting better data on individual consumption, time allocation and income. There are two reasons why better data would be only a partial solution and, thus, no solution at all. First, goods whose consumption is inherently joint are an important component of household consumption. With household public goods, better data cannot solve the assignment problem and, hence, cannot restore the integrity of the simple single-agent consumer model.<sup>3</sup> Second, family members who are linked by love and duty have an interest in each other’s consumption. Even if we could assign direct consumption to individual family members, interdependent preferences would invalidate the single-consumer assumption.

Economists have dealt with the multiplicity of decision makers in the family in two ways. The first approach, in ascendancy from the 1950s until the 1980s, was the

<sup>1</sup> Those interested in a more technical review of theories of the family should refer to Bergstrom (1996). Weiss (1994) provides an extensive review of models of marriage and divorce and Behrman (1996) of the empirical literature on intrahousehold distribution.

<sup>2</sup> For our present purposes, we interpret “families” broadly to encompass all types of multiperson households, though some of our discussions of bargaining models of marriage emphasize the legal institutions surrounding marriage and divorce.

<sup>3</sup> The allocation of time provides a set of family demands that are more readily assigned to individuals than is the consumption of goods and services. If leisure is assumed to be the only alternative to market work, we can assume that it is privately consumed, and standard cross-section and panel data sources report the relevant prices and quantities. For many years, the analysis of male labor supply proceeded on the basis of a single-agent model with researchers expressing few qualms about ignoring household interdependencies. When serious study of female labor supply began in the 1960s, however, the limitations of this approach became apparent. In a model of the labor force participation of married women, both leisure and time spent in home production—cooking, cleaning, child care—are alternatives to market work. Since home production yields a variety of goods that are consumed by others in the household, the interest of other family members in the time allocation of married women is difficult to ignore.

common preference approach—treating the family as though it were a single decision-making agent, with a single pooled budget constraint and a single utility function that included the consumption and leisure time of every family member. The second approach, pioneered by Manser-Brown and McElroy-Horney in the early 1980s, was to model family demands as the solution to a bargaining game. Most bargaining models of family behavior allow two decision makers—the husband and the wife. Children are customarily excluded from the set of decision-making agents in the family, though they may be recognized as consumers of goods chosen and provided by loving or dutiful parents. The empirical implications of bargaining models of marriage depend upon their assumptions about the form of the bargaining game, but, in general, these models widen the range of “rational” family behavior.

### Common Preference Models and the Income Pooling Assumption

Two models provide the theoretical underpinning of the common preference approach to family behavior: Samuelson’s (1956) consensus model and Becker’s (1974, 1981) altruist model. The consensus model was introduced by Samuelson to exhibit the conditions under which family behavior can be rationalized as the outcome of maximizing a single utility function. Consider a two-member family consisting of a husband and a wife. Each has an individual utility function that depends on his or her private consumption of goods; but, by consensus, they agree to maximize a consensus social welfare function of their individual utilities, subject to a joint budget constraint that pools the income received by the two family members. Then we can analyze their aggregate expenditure pattern as though the family were a single agent maximizing a utility function. This optimization problem generates family demands that depend only upon prices and total family income and that have standard properties, provided the utility functions are well-behaved.<sup>4</sup> Thus, the comparative statics of traditional consumer demand theory apply directly to family behavior under the consensus model. Samuelson did not, however,

<sup>4</sup> More explicitly, say that the husband,  $h$ , has an individual utility function  $u^h(x_1^h, \dots, x_m^h)$  that depends on his private consumption of  $m$  goods, and the wife,  $w$ , has an individual utility function  $u^w(x_1^w, \dots, x_m^w)$ . If they agree to maximize a consensus social welfare function of the form  $W[U^h, U^w]$ , then we can analyze their aggregate expenditure pattern as though the family were a single agent maximizing a utility function of the form  $U(x_1, \dots, x_m)$  where  $x_j = x_j^h + x_j^w$ , subject to the joint budget constraint

$$\sum_{j=1}^m p_j x_j = I = I^h + I^w$$

that pools the income received by the two family members. This optimization problem generates family demands  $x_j = f^j(p_1, \dots, p_m, I)$ . If the utility functions are well-behaved, these demand functions are homogeneous of degree zero in prices and total family income, and the implied Slutsky matrix of compensated cross-price effects is symmetric and negative semi-definite.

purport to explain how the family achieves a consensus regarding the joint welfare function nor how this consensus is maintained.

Becker's altruist model (1974, 1981) addresses these questions and also provides an account of how resources are distributed within the family. In Becker's model, the family consists of a group of purely selfish but rational "kids" and one altruistic parent whose utility function reflects a concern for the well-being of other family members. Becker argues that the presence of an altruistic parent who makes positive transfers to each member of the family is sufficient to induce the selfish kids to act in an apparently unselfish way. The altruistic parent will adjust transfers so that each "rotten kid" finds it in his or her interest to choose actions that maximize family income. The resulting distribution is one that maximizes the altruist's utility function subject to the family's resource constraint, so the implications of the altruist model for family demands coincide with those of the consensus model.

Whether motivated by Samuelson's family consensus story or Becker's altruist story, the common preference framework is a simple, powerful mechanism for generating demand functions and establishing their comparative statics for use in applied problems. It remains the standard theoretical framework for analyzing consumption behavior and labor supply. Only serious deficiencies could justify replacing this approach with a more complicated alternative. In recent years, however, common preference models have been targets of an intense barrage of theoretical and empirical criticism.

Dissatisfaction with common preference models on theoretical grounds has been the product of serious study by economists of marriage and divorce. Models of marriage and divorce require a theoretical framework in which agents compare their expected utilities inside marriage with their expected utilities outside marriage. Common preference models cannot be used to examine these decisions because the individual utilities of husband and wife cannot be recovered from the social welfare function that generates consumption, labor supply, fertility and other behavior within marriage. If the analysis of marriage and divorce is awkward, the analysis of marital decisions in the shadow of divorce is even more so. If unilateral divorce is possible, individual rationality implies that marital decisions cannot leave either husband or wife worse off than they would be outside the marriage. This individual rationality requirement, however, alters the comparative statics of the model and destroys the correspondence between the behavior of a single rational agent and the behavior of a family.

Recent empirical evidence suggests that the restrictions imposed on demand functions by common preference models are not well-supported. Rejections of the family income pooling assumption have been most influential in weakening economists' attachment to common preference models.<sup>5</sup> Income pooling implies a

<sup>5</sup> Another restriction implied by the common preference model is the symmetry of compensated cross-price effects. McElroy (1981) surveys the evidence provided by demand systems estimation and concludes

restriction on family demand functions that appears simple to test: if family members pool their income and allocate the total to maximize a single objective function, then only total income will affect demands. The fraction of income received or controlled by one family member should not influence demands, conditional on total family income. A large number of recent empirical studies have rejected pooling, finding that earned and unearned income received by the husband or wife significantly affects demand patterns when total income or expenditure is held constant. Many studies find that children appear to do better when their mothers control a larger fraction of family resources.

Empirical tests of pooling, using data from a variety of countries, invariably show that income controlled by the husband and wife have significant and often substantially different effects on family behavior, whether measured by expenditure on categories of goods and services or by outcomes such as child health.<sup>6</sup> For example, increases in the wife's income relative to the husband's income have been shown to be associated with greater expenditures on restaurant meals, child care and women's clothing (Phipps and Burton, 1992)<sup>7</sup> and with reduced expenditures on alcohol and tobacco (Phipps and Burton, 1992; Hoddinott and Haddad, 1995). Increases in child health, nutrition and survival probabilities have also been associated with mother's control over family resources (Thomas, 1990, 1994; Haddad and Hoddinott, 1994; Rose, 1994). Estimated differences in the effects of mothers' and fathers' resources on child outcomes are often large: Thomas (1990) finds that the effects of mothers' unearned income on child survival probabilities in Brazilian data is almost 20 times that of fathers' income.

A test of the pooling hypothesis requires a measure of husband's and wife's relative control over resources. Relative earnings would seem to be an attractive candidate for this measure, since labor income is by far the largest component of family income, and earnings data are readily available and reliably measured. Also, the earnings of wives relative to husbands have increased dramatically in the United States and many other countries, and we would like to assess the distributional consequences, if any, of this change. The difficulty with this approach is that earnings are clearly endogenous with respect to the household's time allocation decisions, so that households with different ratios of wife's earnings to husband's earnings are likely to face different prices and may have different preferences.

If we think of earned income as the product of hours worked and a fixed

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that it provides little support for such symmetry. Although more recent work has not altered this conclusion, statistical rejections of symmetry do not appear to have shaken anyone's faith in common preference models: rejections of symmetry can always be attributed to functional form misspecification or improper aggregation of goods.

<sup>6</sup> Expenditures on a purely private good are not required to test pooling. If husband and wife have different preferences, some bargaining models suggest that the marginal propensity to spend the husband's income on a public good may differ from the marginal propensity to spend the wife's income on the same good.

<sup>7</sup> Increases in expenditure on women's clothing are also found by Browning, Bourguignon, Chiappori and Lechene (1994) and by Lundberg, Pollak and Wales (1995).

market wage rate, then the first factor, hours worked, is a standard choice variable in models of household behavior and is determined simultaneously with the expenditure patterns the pooling test examines. The second factor, the wage rate, measures the price of time for the husband or wife and enters the household's demand functions in common preference models and in bargaining models. Thus the interpretation of the separate effects of wife's earnings and husband's earnings is problematic. Consider the finding of Phipps and Burton (1992) that expenditures on restaurant meals are more elastic with respect to the wife's earnings than the husband's earnings. A bargaining interpretation of this result is that, as the wife's earnings rise relative to the husband's, she gains more influence over the household's spending patterns and that increased expenditures on restaurant meals reflect her preferences. The common preference interpretation is that restaurant expenditures depend upon the cost of substitutes, and the wife's wage is an important component of the cost of home-prepared meals. Thus, the Phipps-Burton result can be interpreted as a price effect rather than as evidence against income pooling.

One might try to avoid these problems by testing the pooling of unearned income rather than earnings. Unearned income is not contaminated by price effects, but most unearned income sources are not entirely exogenous with respect to past or present household behavior. Furthermore, variations in unearned income over a cross-section are likely to be correlated with other (possibly unobservable) determinants of consumption.<sup>8</sup> For example, property income reflects, to a considerable extent, accumulated savings and is therefore correlated with past labor supply and, if those who worked a lot in the past continue to do so, current labor supply. Public and private transfers may be responsive to household distress due to unemployment or bad health and may be related to expenditures through the events that prompted them (Schultz, 1990). *Unexpected* transfers such as lottery winnings, unexpected gifts or unexpected bequests will affect resources controlled by individuals without affecting prices but are likely to be sporadic and unimportant for most families.

The ideal test of the pooling hypothesis would be based on an experiment in which some husbands and some wives were randomly selected to receive an income transfer. A less-than-ideal test could be based on a "natural experiment" in which some husbands or some wives received an exogenous income change. Lundberg, Pollak and Wales (1995) examine the effects of such a natural experiment—the policy change in the United Kingdom that transferred a substantial child allowance from husbands to wives in the late 1970s. They find strong evidence that a shift towards relatively greater expenditures on women's goods and children's goods coincided with this income redistribution<sup>9</sup> and interpret this as a rejection of the pooling hypothesis.

<sup>8</sup> Behrman, Pollak and Taubman (1995) express reservations about interpreting the results of Thomas (1990) or Schultz (1990) as conclusive rejections of pooling on these grounds.

<sup>9</sup> Annual expenditures on children's clothing rose about £50 and expenditures on women's clothing £40 in an average two-child family receiving a child allowance of £500.



Rejecting the pooling hypothesis has important policy implications. Policy-makers sometimes want to target transfers or programs to particular classes of individuals within families, such as women or children. Common preference models imply that such policies are ineffective, beyond their influence on total family resources, because the equilibrium intrahousehold allocation is independent of the distribution of income among family members. Bargaining models suggest, on the other hand, that the government can affect distribution within marriage, either by changing the income of divorced men and women or by transferring control over resources within the marriage from one spouse to the other. Some empirical work supports the potential effectiveness of such policies, but much more will be required to establish the nature of family equilibrium in different cultural and institutional contexts and the extent to which it can be shifted by government policies.

## Cooperative Bargaining Models

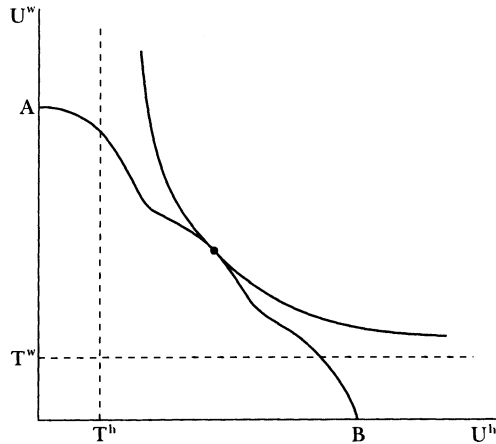
A viable alternative to common preference models of the family must relax the pooling assumption and must recognize, in a nontrivial fashion, the involvement of two or more agents with distinct preferences in determining family consumption. Bargaining models from cooperative game theory satisfy these conditions. A typical cooperative bargaining model of marriage begins with a family that consists of only two members: a husband and a wife. Each has a utility function that depends on his or her consumption of private goods:  $U^h$  for the husband and  $U^w$  for the wife. If agreement is not reached, then the payoff received is represented by a "threat point" ( $T^h, T^w$ )—the utilities associated with a default outcome of divorce or, alternatively, a noncooperative equilibrium within the marriage. The Nash bargaining model provides the leading solution concept in bargaining models of marriage. This solution can be illustrated by a diagram in utility space (Fig. 1), where AB is the utility-possibility frontier.<sup>10</sup> Nash (1950) shows that a set of four axioms, including Pareto optimality—which ensures that the solution lies on the utility-possibility frontier—uniquely characterizes the Nash bargaining solution.

The utility received by husband or wife in the Nash bargaining solution depends upon the threat point; the higher one's utility at the threat point, the higher one's utility in the Nash bargaining solution. This dependence is the critical empirical implication of Nash bargaining models: family demands depend not only on prices and total family income but also on determinants of the threat point.

In divorce-threat bargaining models, the threat point is the maximal level of utility attainable outside the marriage. If divorcing partners maintain ownership of income received separately within marriage, the demands emerging from marital

<sup>10</sup> The Nash bargaining solution is the allocation that maximizes the product of the gains to cooperation, given by the function:  $N = (U^h - T^h)(U^w - T^w)$  subject to the constraint that the family's joint income equal joint expenditure,  $px = I^h + I^w$ .

Figure 1

**The Nash Bargaining Solution**

bargaining will depend not on total family income but on the income received by the husband and the income received by the wife. The divorce threat point is also likely to depend on environmental factors (extrahousehold environmental parameters, or EEP's, in McElroy's (1990) terminology) that do not directly affect marital utility, such as conditions in the remarriage market and the income available to divorced men and women. The family demands that result from divorce-threat marital bargaining will, therefore, depend upon these parameters as well. As McElroy points out, the absence of pooling and the presence of extrahousehold parameters in family demands yield a model that can be tested against the common preference alternative. For example, changes in the welfare payments available to divorced mothers or in laws defining marital property and regulating its division upon divorce should affect distribution between men and women in two-parent families through their effect on the threat point.

In the separate spheres bargaining model of Lundberg and Pollak (1993), the threat point is internal to the marriage, not external as in divorce-threat bargaining models. The husband and wife settle their differences by Nash bargaining, but the alternative to agreement is an inefficient noncooperative equilibrium within marriage. In a noncooperative equilibrium, each spouse voluntarily provides household public goods, choosing actions that are utility-maximizing, given the actions of their partner. This noncooperative marriage may be better for both spouses than divorce. Divorce, the argument goes, may be the ultimate threat available to marital partners in disagreement, but a noncooperative marriage in which the spouses receive some benefits due to joint consumption of public goods may be a more plausible threat in day-to-day marital bargaining.

The introduction of this internal threat point has important implications

because separate spheres bargaining generates family demands that, under some circumstances, depend not on who receives income after divorce but on who receives (or controls) income within the marriage. Control over resources within marriage need not affect the equilibrium: if both the husband and the wife make positive contributions to each public good in the noncooperative equilibrium, then household allocation will not depend upon how income is distributed between the spouses.<sup>11</sup> In the separate spheres model, however, a nonpooling outcome arises when gender specialization in the provision of household public goods ensures that only one spouse makes a positive contribution. The model assumes that socially recognized and sanctioned gender roles assign primary responsibility for certain activities to husbands and others to wives. In the absence of cooperation, one household public good,  $q_1$ , will be provided by the husband out of his own resources and the other public good,  $q_2$ , by the wife out of her own resources. Lundberg and Pollak assume that this allocation of marital responsibilities reflects social norms rather than preference or productivity differences between husband and wife in a particular marriage.

In a noncooperative marriage, the husband treats the level of public good chosen by his wife as fixed and chooses quantities of his private good and the public good that he supplies so as to maximize his own utility, subject to his budget constraint. Similarly, the wife treats the quantity of the public good supplied by her husband as fixed and chooses the level of her private good and the public good that she supplies to maximize her own utility, subject to her budget constraint. These decisions lead to a pair of reaction functions that determine a Cournot-Nash equilibrium in which the public goods contributions are inefficiently low. An important characteristic of this noncooperative equilibrium, which serves as the threat point in the separate spheres model, is that the husband's utility depends upon the resources of his wife through his consumption of "her" public good and vice versa. Since the demand functions generated by cooperative bargaining depend upon the threat point, they will also be independently influenced by husband's income and wife's income. In the cooperative equilibrium, the husband's and wife's utilities will depend not on total family income but on the incomes controlled separately by each spouse.<sup>12</sup>

<sup>11</sup> The control of resources among the potential contributors to a public good in a voluntary provision model affects neither the equilibrium level of the public good nor the equilibrium utility levels of the potential contributors, provided that each makes a strictly positive contribution. This neutrality result is well-known in public finance; see Warr (1983) and Bergstrom, Blume and Varian (1986).

<sup>12</sup> More explicitly, the husband treats  $q_2^*$ , the level of public good chosen by his wife, as fixed and chooses quantities of his private good and his assigned public good so as to maximize his utility  $U^h(x_h, q_1, q_2^*)$  subject to his budget constraint  $x_h + p_1 q_1 = I^h$ . Similarly, the wife treats the quantity of the public good supplied by her husband as fixed and chooses utility-maximizing quantities of her private and public good subject to her budget constraint. The separate spheres threat point is determined by the husband's and wife's utilities in this noncooperative equilibrium, and can be written as:  $[T^h(p_1, p_2, I^h, I^w), T^w(p_1, p_2, I^h, I^w)]$ . Since the demand functions generated by cooperative bargaining will depend upon the threat point, they will be of the form:  $x_i = h^i(p_1, p_2, I^h, I^w)$ .

As the divorce-threat and separate spheres models show, cooperative bargaining does not necessarily imply income pooling. Bargained outcomes depend upon the threat point, and the income controlled by husband and wife will affect family behavior (and the relative well-being of men and women within marriage) if this control influences the threat point. This dependence implies that public policy (like taxes and transfers) need not be neutral in their effects on distribution within the family, although how they affect distribution depends upon how the alternative to agreement is specified. A divorce-threat bargaining model predicts that policies improving the status of divorced women will shift resources within marriage to wives; it also predicts that policies affecting the control of income within the marriage will have no effect on distribution within marriage if they have no effect on the incomes of divorced men and women. A separate spheres bargaining model predicts that policies reallocating income within marriage will change distribution within marriage and family demands, even if they do not affect the well-being of divorced men and women. Consider, for example, a change in child allowance policy from one that pays husbands to one that pays wives; but suppose that, in the event of divorce, the mother is always the custodial parent and receives the child allowance. Divorce-threat models predict that this change will have no effect on distribution in two-parent families, while the separate spheres model predicts redistribution towards the wife.

## **Pareto Optimality and Noncooperative Bargaining Models**

Most models of the family either assume or conclude that family behavior is Pareto optimal. Common preference models ensure Pareto optimality by assuming a family social welfare function that is an increasing function of the utilities of all family members: no member can be made better off without making another worse off. Cooperative bargaining models characterize the equilibrium distribution by means of a set of axioms, one of which is Pareto optimality. Distributional issues remain important: as Lommerud (1995) has stressed, "efficiency" does not imply "harmony." However, the focus on models that restrict us to the utility-possibility frontier is striking. Two recent departures have been the development of empirical models that permit tests of Pareto optimality and applications of noncooperative game theory to the family that allow us to examine what conditions might enable families to sustain Pareto optimal outcomes.

Pareto optimality is the defining property of the "collective model" of Chiappori (1988, 1992). Rather than applying a particular cooperative or noncooperative bargaining model to the household allocation process, Chiappori assumes only that equilibrium allocations are Pareto optimal, and so his collective model contains cooperative bargaining models and common preference models as special cases. He demonstrates that, given a set of assumptions including weak separability of public goods and the private consumption of each family member, Pareto optimality implies, and is implied by, the existence of a "sharing rule." Under a sharing

rule, the family acts as though decisions were made in two stages, with total family income first divided between public goods and the private expenditures of each individual, and then each individual allocating his or her share among private goods. The collective framework thus imposes a set of testable restrictions on the observed demands of the household. In essence, the ratio of the marginal propensities to consume any two goods must be the same for all sources of income, because the independent incomes of husband and wife affect consumption only through the sharing rule. The pattern of consumption expenditures in Canadian and French households has been found to be consistent in this sense with Pareto optimality (Bourguignon, Browning, Chiappori and Lechene, 1993; Browning, Bourguignon, Chiappori and Lechene, 1994).

Nevertheless, the prevalence of destructive or wasteful phenomena such as domestic violence and child abuse, as well as the demand for marriage counseling and family therapy, suggests that we consider the possibility that family behavior is sometimes inefficient. Other researchers have pointed to gender segmentation in the management of businesses or agricultural plots in many countries as evidence of an essentially noncooperative, and possibly inefficient, family environment. A rare fragment of empirical evidence is provided by Udry (1995), who finds that the household allocation of resources to male- and female-controlled agricultural plots in Burkina Faso is inefficient.

Cooperative game theory motivates the assumption of Pareto optimality by assuming that information is relatively good (or at least not asymmetric) and that the players can make binding, costlessly enforceable agreements. Since legal institutions do not provide for external enforcement of contracts regarding consumption, labor supply and allocation within marriage, the binding agreement assumption is unappealing. Noncooperative game theory, in contrast, does not assume that binding agreements enforce intrahousehold allocations, but focuses instead on self-enforcing equilibria. Pareto optimal outcomes are possible in noncooperative games, but not necessary.

Without binding agreements, much of the motivation for assuming Pareto optimality vanishes. It is possible, however, for noncooperative bargaining to yield Pareto optimal outcomes under certain conditions. For example, if the voluntary contribution game played by husbands and wives in the separate spheres model is played only once, it yields an inefficient equilibrium in which public goods are underprovided; but if the voluntary contribution game is played repeatedly, many other equilibria are possible.<sup>13</sup> In general, repeated noncooperative games have multiple equilibria, and Pareto optimal equilibria can often be sustained by the threat of punishment. In essence, each spouse realizes that the one-period gain from deviating from an agreement will be less than the loss associated with being punished by their spouse in the periods that follow.

Browning, Bourguignon, Chiappori and Lechene (1994) motivate their

<sup>13</sup> Lundberg and Pollak (1994) analyze distribution within marriage as a repeated noncooperative game.

assumption of Pareto optimality with the claim that the marital environment possesses characteristics that would promote efficient outcomes in a repeated noncooperative game: a long-term relationship, relatively good information and a stable bargaining environment. We prefer a different research strategy. One of the benefits of modeling distribution within marriage as a noncooperative game is the opportunity to treat efficiency as endogenous, potentially dependent upon the institutions and social context of marriage in a particular society and upon the characteristics of the marital partners. The corresponding costs include the need to specify fully the set of possible actions and the timing of moves.

The existence of multiple equilibria in repeated noncooperative games and the need to choose among them suggest how history and culture might affect distribution within marriage. Kreps (1990) points out that, in many games, there seems to be a “self-evident way to play” that corresponds to a particular equilibrium. He emphasizes that the equilibrium which corresponds to the self-evident way to play cannot, in many cases, be identified solely from the formal description of the game: in realistic social contexts, conventional modes of behavior may suggest to the players a “focal point equilibrium,” thus reducing or eliminating the need for pre-play negotiations. In the case of marriage, social conventions regarding the rights and responsibilities of husbands and wives may indeed suggest to the spouses a particular equilibrium.

For example, consider a model with two household public goods in which the husband and wife make voluntary contributions. Suppose that specialization is desirable in the sense that the household is better off if the wife supplies one good and the husband supplies the other. This game may possess two Nash equilibria analogous to those in the “Battle of the Sexes” game—one in which the wife supplies good 1 and the husband good 2 and another in which the provider roles are reversed.<sup>14</sup> The husband and wife may prefer to provide one good rather than the other, but both will prefer a coordinated provision of public goods to the inefficient alternative in which both supply the same good. The choice between the two equilibria is likely to be sensitive to history and culture, which may generate a “self-evident” way to play. The separate spheres bargaining model provides an obvious example: if some household public goods are regarded as within the wife’s sphere and others as within the husband’s sphere, then the focal point equilibrium may involve complete gender specialization in the provision of household public goods corresponding to this conventional gender assignment of responsibilities. In this noncooperative model, distribution within marriage will depend on the individual resources of husband and wife, due to the corner solution in public goods provision.

<sup>14</sup> The canonical battle of the sexes story relies heavily on gender stereotypes. Both the husband and wife want to spend the evening together, but the husband wants to go to a sporting event (for example, a prize fight) and the wife to a cultural event (perhaps a ballet). The story is used to motivate a noncooperative nonzero sum game in which the Pareto optimal outcomes correspond to successful coordination (that is, both go to the prize fight or both go to the ballet) and are Nash equilibria. The formal structure of the game provides no way to choose between them.

Treating distribution within marriage as the outcome of a repeated noncooperative game, we see the issue of Pareto optimality through a different lens. The existence of multiple equilibria, some of which are Pareto optimal and some of which are not, suggests that we consider factors omitted from the formal model to explain the patterns of marital behavior and gender allocations that develop in any particular society. The behavior of any particular couple may be directed towards a focal point equilibrium that conforms with the behavior of those around them and is consistent with socially sanctioned gender roles. Viewed as the outcome of a repeated game in a social context, the Pareto optimality of distribution within marriage must be investigated and analyzed, not simply assumed.

Like any microanalysis that appeals to focal points or social norms, our analysis inevitably raises macro questions—how do the social norms and gender roles that constrain a particular marriage arise and how are they maintained—and directs our attention to these larger issues. If the achievement of a Pareto optimal outcome depends upon such factors as the stability of the marital environment and the quality of information possessed by husband and wife, then we may be able to analyze the role of marital and other societal institutions in promoting efficient marriage (as well as affecting distribution between husbands and wives), at least in the short run. These institutional factors could include the role of older generations in arranging marriages and regulating marital behavior, restrictions on the economic behavior of married women, the costs of leaving a marriage, and the social and legal treatment of domestic violence.

If one takes seriously the notion that institutions and practices, norms and gender roles are endogenous, then the analysis of individual behavior, individual well-being and Pareto optimality must be recast. England and Kilbourne (1990) and Sen (1990) develop analyses that depend crucially on this endogeneity. England and Kilbourne argue that women are socialized to be less willing than men to drive hard bargains with their spouses and, hence, that wives get less than they otherwise would. Sen carries the internalization argument a step further, arguing that “socialization”—he avoids the word—may prevent a woman from recognizing her true interests. Noneconomists’ critiques of economists’ analyses of distribution between men and women often use words like “power” that are foreign to the vocabulary of economics. Pollak (1994) argues that, although the language is unfamiliar, the substance of these critiques is that economic models of distribution between men and women focus on the subgame of bargaining within a particular marriage and that the real action is elsewhere—in the prior game that determines social norms and gender roles. Although individual men and women take the outcome of this earlier game as given, economists should not, for it determines the institutions and norms that affect the play in a particular marriage.

## **The Marriage Market**

Models that analyze bargaining within existing marriages can give only an incomplete picture of the determinants of the well-being of men and women. The

marriage market, as Becker has emphasized (1991, pp. 13–15), is an important determinant of distribution between men and women. At a minimum, the marriage market determines who marries and who marries whom. The extent to which the marriage market also determines distribution within particular marriages depends crucially on whether prospective spouses can make binding agreements in the marriage market. At one extreme, if binding, fully contingent contracts regarding marital distribution can be made prior to marriage, then there is no scope for bargaining within marriage: distribution within marriage simply implements agreements previously made in the marriage market.<sup>15</sup> At the other extreme, if binding agreements cannot be made in the marriage market, then husbands and wives bargain over the surplus generated by a particular marriage.

The marriage market can also generate substantial differences between the short-run and long-run effects of tax, transfer and other redistributive policies. In Lundberg and Pollak (1993), we consider a model in which prospective spouses can agree on a transfer payment from, for example, husbands to wives that is un-contingent on the realized values of income later in the marriage. If policymakers attempt to redistribute income by transferring the ownership of a child allowance payment from husbands to wives, some redistribution is likely to occur within marriages in existence at the time of the policy change. For the next generation of marriages, however, there will be a new equilibrium with the same pairing of men and women, but with the agreed transfer to wives reduced by the amount of the child allowance. With binding marital agreements, therefore, targeted policies that have redistributive effects in existing marriages may be “undone” by subsequent generations in the marriage market—a pure Ricardian equivalence result.

Even without binding agreements, however, the long-run effects of a redistributive policy are likely to differ from the short-run effects on existing marriages. Prospective spouses understand that marriage commits them to playing a particular bargaining game with a particular partner. A policy that transfers income from husbands to wives will make marriage relatively more attractive to women and less attractive to men. Such a change in transfer policy can alter the equilibrium number of marriages contracted in subsequent marriage markets as well as the equilibrium matching and distribution of marital surpluses (Lundberg and Pollak, 1993).

The scope for bargaining within marriage also depends upon the alternatives available to the marital partners. In the marriage market, if there are close substitutes for each individual, then the next best marriage is nearly as good as the proposed one, and the surplus to be divided by bargaining is small. Over time, however, a sizable surplus may develop in an ongoing marriage, perhaps because of investments in marriage-specific human capital. In this situation, the possibility of divorce (perhaps followed by remarriage) defines the scope for bargaining within an ongoing marriage by placing bounds on the distributions that can emerge as

<sup>15</sup> For example, Grossbard-Shechtman (1993) analyzes marital distribution assuming that the marriage market determines a “wage” for spousal labor that is binding during the marriage.



equilibria. These “divorce bounds” depend upon the costs of divorce, including psychic costs, the resources available to divorced individuals and conditions in the remarriage market. Individual rationality ensures that no individual will accept less than he or she would receive in the next best alternative and implies that the divorce bounds apply to all bargaining models, both cooperative and noncooperative.<sup>16</sup> Just as there is little scope for bargaining in the marriage market when the next best marriage is almost as good as the proposed marriage, there is little scope for bargaining within marriage when the divorce bounds are tight. Bargaining models of marriage are motivated by the assumption that, in at least some marriages, surpluses are large enough that their distribution is worth modeling.

The role of marriage markets in determining distribution within marriage provides another example of the importance of social norms and institutions. When matching models have multiple equilibria, as they often do, which equilibrium is selected or realized may depend upon institutions and practices not specified in the formal model. For example, it is well-known that in a marital matching model, the equilibrium realized when men propose to women is more favorable to men and less favorable to women than the equilibrium realized when women propose to men. Pollak (1994) argues that when the selection of one equilibrium rather than another has important distributional implications, institutions and practices (for example, courting conventions) should be explicitly modeled.

## **Contributions of Bargaining Approaches to Marriage**

Common preference models of the family have proven to be too limited a framework for the analysis of family behavior. Though the models provide a rigorous and powerful tool for analyzing family expenditure patterns and labor supply, its assumption of a single family utility function and its implication of family income pooling are problematic. Furthermore, common preference models rule out analysis of intrafamily distribution or of the connection between marriage markets and marital behavior. Game-theoretic approaches to family behavior provide new models, yield new results and provoke new questions. Novel questions and areas of inquiry are numerous, but three that seem particularly interesting to us are the effect of control of resources by husbands and wives on the well-being of children, the effect of social norms on marital bargaining, and the relationship between marital distribution and marriage markets.

Policies that empower women have been supported not only by claims that they will increase the well-being of women and reduce birth rates, but also by claims that they will increase the well-being of children. The belief that “kids do better” when their mothers control a larger fraction of family resources, which was

<sup>16</sup> The divorce-threat bargaining model goes beyond the notion of divorce bounds to make the cooperative equilibrium depend explicitly on the value of divorce.

presumably part of the rationale for changing the U.K. child benefit program in the late 1970s, has now attained the status of conventional wisdom among development agencies. This belief entails two distinct propositions, both confidently maintained in a recent World Bank (1995) monograph on gender equality. First, we must reject income pooling in favor of some alternative in which control over resources influences distribution within the family. As the World Bank (p. 59) puts it, "policies that specifically target women or girls can address the needs of this group more efficiently and with greater cost-effectiveness than general policy measures." Second, we must accept the additional hypothesis that "[f]emale household members tend to allocate resources more directly to children, while men tend to allocate more resources to adults."

The kids-do-better hypothesis is widely accepted and has received extensive empirical support: Bruce, Lloyd and Leonard (1995) and Blumberg (1991) cite and summarize many of the relevant studies. Economists, many of whom have been skeptical on theoretical grounds that the kids-do-better results were caused by mothers' control over resources, have found the possible endogeneity of income sources discussed earlier to be sufficient econometric grounds for discounting the empirical evidence that supports it. Though the evidence on this point is not conclusive, we think that the burden of proof has shifted to those who doubt that children benefit when their mothers control a larger fraction of family resources.

The notion that control over resources matters focuses attention on the difficult issue of the meaning and measurement of "control." Does the individual family member whose name is on the check maintain control over its disbursement? Are in-kind transfers more controllable by individual recipients than cash? To what extent are one's own earnings "owned" by the worker rather than pooled for household use? Work by sociologists on family budgeting suggests considerable heterogeneity among families in money management practices (Pahl, 1983; Treas, 1993; Zelizer, 1989, 1994; and the literature they cite). Economists, however, are unlikely to find money management practices especially interesting as outcome variables or appropriate as explanatory variables. A more interesting focus for economists is the relationship between control over resources and the extramarital environment, on the one hand, and outcomes such as expenditure patterns, labor supply, and observable indicators of individual well-being such as morbidity and mortality, on the other. In particular, empirical studies that examine the effects of differences in tax and transfer policies that appear to establish different claims on resources within the household are likely to improve our understanding of intrahousehold allocation.

Bargaining models of marriage suggest a number of mechanisms through which social norms and institutions can affect distribution between men and women. Most directly, social norms may affect the preferences of marital partners. In bargaining models, social norms affect outcomes indirectly, often through their effect on the threat point. In the divorce-threat bargaining model, custody and child-support standards and the social position of divorced men and women will be among the extramarital environmental parameters that determine the threat point.

In the context of this model, an increase in welfare “stigma” will be associated with a decline in the relative well-being of women and children in low-income families, as will reductions in the real value of welfare payments. If the threat point reflects the possibility of domestic violence, marital distribution may depend upon the expected reaction of neighbors and the behavior of police on domestic violence calls. Noncooperative outcomes may be influenced by social norms in a different way; in models with multiple equilibria, social conventions may suggest a focal point equilibrium and a way of coordinating behavior without explicit bargaining. Norms regarding appropriate marital or parental behavior for men and women may be powerful in their ability to channel the behavior of marital partners to one equilibrium among many—raising the question of how such norms develop and are maintained.

Bargaining models place distribution within marriage in a theoretical framework that is consistent with existing analyses of marriage and of divorce: two decisionmakers with well-defined preferences choosing an action or strategy from a well-specified set of alternatives. Bargaining models thus provide an opportunity for integrating the analysis of distribution within marriage with a matching or search model of the marriage market. In a unified model, marital bargaining is conditional upon the match (and perhaps contract) agreed to in the marriage market, and agents in the marriage market anticipate the bargaining environment within marriage. We can expect outcomes in these two arenas for male-female contracting to be closely related. A change in the bargaining environment within marriage (for example, a change in tax policy, relative wages or social norms) can not only affect distribution within existing marriages but can also alter subsequent marriage market equilibria; under some circumstances, these marriage market effects can entirely undo the effects of the initial redistribution. We are far from a unified model of marriage, divorce and marital behavior, but a model of distribution within marriage that recognizes the independent agency of men and women within marriage is a prerequisite to a unified model.

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