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Relative Bargaining Power of Spouses:
Empirical Results Using An Economic Model of
Cooperative Bargaining

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A cooperative Nash bargaining model is used to explore relative bargaining power of spouses with respect to allocation of household expenditure between food and other consumption. The theoretical bargaining model generates an explicit expression for relative bargaining power which is empirically operationalized. Household specific estimates of relative bargaining power are derived and the empirical data are assessed for consistency with bargaining behavior. Association between characteristics of spouses and relative bargaining power is examined.

This research focuses on household decision making behavior, specifically bargaining behavior over the allocation of household expenditure. Decisions made by households regarding allocation of household resources are critically related to the quality of life of individual household members. Though household members share the same physical environment, the quality of life experienced by individuals may vary across members of the same household. The ways in which households allocate resources among members affect household behavior and have implications for policy.

For example, allocation of resources affects the behavior of and interaction among individuals within the household. These resource allocation decisions determine the nature of investments in children including the type, quality and quantity of goods consumed by each child as well as the quality of the environment in which each child is nurtured. Such allocations influence, in very important ways, the human capital of future generations.

Resource allocation decisions influence and in turn are influenced by the roles assumed by men and women within the family. Time of household members must be allocated to market work, to care of dependent household members, to household production activities, as well as to personal care. Individual characteristics of household members influence how their time is allocated, and allocation of time in turn influences human capital formation.

Resource allocation decisions influence cohesiveness of the family unit. Level of

satisfaction with the process and outcome of intrahousehold resource allocation influence an individual's commitment to the family. Interpersonal relationships will be affected by perceived fairness or equity of resource allocations.

Finally, the effectiveness of policies or programs which transfer resources to households rather than directly to individuals will be influenced by intrahousehold resource allocation processes. If resources controlled by mothers are used differently than resources controlled by fathers, programs which transfer resources to mothers will have different effects on family well being than programs which transfer resources to fathers. In these situations it matters who receives the medical care supplement, the financial aid check, or the child care allowance.

Research Framework

The notion that household members bargain to determine household resource allocation is intuitively appealing. Preferences of individual household members need not be identical and the extent to which these preferences count in the household decision making process is likely to be a function of bargaining power relative to other household members. Various theories in family resource management and family sociology suggest that a spouse's influence in household decision making increases with his or her relative resource contribution to the household. A resource which has received considerable attention in the literature is relative earnings or wealth (Bloode & Wolfe, 1980; Blumberg, 1988; Pahl, 1980; Thomas, 1990, 1992).

The increase in female labor force participation in the United States over the past four decades and the resultant increase in dual-earner families as a proportion of all families contribute to the relevance of this topic. Of particular interest is the suggestion that changes in labor force behavior of wives, and therefore their earnings, translate into changes in behavior within households. Specifically, it has been suggested that increases in labor force participation by wives are associated with increases in their decision making power within households (Bloode & Wolfe, 1960).

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While much has been hypothesized about the relationship between characteristics of spouses and their decision making power, empirical research into this topic is hampered by issues of how to measure "power" and how this "power" operates to influence household decisions (Gray-Little & Burks, 1980; McDonald, 1980; Safilios-Rothschild, 1970). Additionally, economic models of household behavior have typically ignored the process by which spouses with conflicting interests reach observed household decisions (Brown & Deaton, 1972; Deaton & Muellbauer, 1980).

In this research, a theoretical bargaining model is used to generate an expression for relative bargaining power within the household which can in turn be estimated with data. The empirical estimates of relative bargaining power are then used to explore association between household relative bargaining power and characteristics of spouses.

The resource allocation decision of interest in this research is the allocation of consumption expenditure between food at home and all other consumption. Food consumption was selected for several reasons. First, food is an important component of the household consumption bundle, accounting for 10-15 percent of disposable personal income (Blaylock & Elitzak, 1990). Second, even though low income households devote a large proportion of income to food expenditure, the available household food supply is often inadequate, and as a result these limited food resources must somehow be allocated across household members. Previous research focusing on households in poverty has shown that allocation of these limited resources is influenced by the roles mothers and fathers have in the decision making process (Blumberg, 1988; Pahl, 1988). Finally, the Nationwide Food Consumption Survey which is used in this research contains detailed information on household food consumption. The data are a sample of observations from USDA's 1977-78 Nationwide Food Consumption Survey. This data set offers detailed information about expenditures on food as well as household and individual demographic and economic data.

The theoretical model of household behavior used in this research is a cooperative Nash bargaining model. The cooperative Nash model has more often been applied to the study of household behavior than other bargaining models due to the properties of the model as well as its ability to generate a unique solution. Manser and Brown (1980) and McElroy and Horney (1981) separately applied the cooperative Nash bargaining model to household behavior. Manser and Brown (1980) focus on marriage behavior: marriage occurs when utility gains to the marriage exceed utility in the best alternative state for each individual. McElroy and Horney (1981) focus on Nash bargained outcomes of the joint allocation of money and time within a married couple household.

The cooperative Nash bargaining model as developed by McElroy and Horney (1981) and employed in this research is a model of bargaining behavior conditional on marriage. In this context a married couple bargains to determine how household expenditure will be allocated across consumption categories. Specifically, spouses cooperate to maximize the weighted product of their individual gains from the bargain, where the objective function is represented by:

$$N = [U'(X) - V_o']^{\theta_w} [U^m(X) - V_o^m]^{\theta_m} \quad (1)$$

U' is the individual utility function of the wife. $U'(X)$ is the utility the wife receives from the bargained contract which yields the solution X . V_o' is the wife's threat point expressed in the form of the indirect utility function. U^m , $U^m(X)$ and V_o^m are similarly defined for the husband. The bargaining power of the wife and the husband are represented by θ_w and θ_m respectively.

The value of the cooperative Nash bargaining model in this research is that it allows individual preferences of spouses to differ and generates an explicit expression for the relative bargaining power of spouses. In this model, the total gain to the bargain within the marriage is distributed between the two spouses in proportion to their relative bargaining power, such that the spouse with relatively more bargaining power receives a larger proportion of the total gain to the bargain. More intuitively, as one's bargaining power increases, the observed household consumption behavior more closely resembles one's individual preferences.

The two-person household maximizes the objective function in equation (1) subject to the relevant constraints. Ideally, one would want to derive explicit expressions for the Nash bargained demand equations, and then estimate all parameters of the demand equations including the bargaining power of each spouse. However, the Nash objective function is a multiplicative function of the individual utility functions. As a result, the first order conditions of the constrained optimization problem are highly nonlinear functions. Solving the first order conditions for explicit expressions of the demand equations is extremely complicated. Therefore, in this research the first order conditions are used to derive an explicit expression for bargaining power which can be operationalized with empirical data.

From the first order conditions, the following expression can be derived:

$$\frac{\theta_f}{\theta_m} = \frac{\frac{U' - V'_o}{P_2 \frac{\partial U'}{\partial X_1} - P_1 \frac{\partial U'}{\partial X_2}}}{\frac{U'' - V''_o}{P_1 \frac{\partial U''}{\partial X_2} - P_2 \frac{\partial U''}{\partial X_1}}} \quad (2)$$

This expression is a weighted ratio of the individual gains to the bargain. The gain to the bargain for an individual spouse is the difference between the utility derived from the bargained contract and the individual's threat point. The weights capture the effect of reallocation of expenditure between food and composite consumption at the observed household consumption bundle for the wife and the husband. The magnitude of this reallocation effect is inversely related to relative bargaining power *ceteris paribus*. In other words, the greater one's relative bargaining power, the lower one's relative gain from further reallocation. Since θ_f is the bargaining power of the wife and θ_m is the bargaining power of the husband, this expression can be used to derive an expression for the relative bargaining power. This expression is a function of individual threat points, individual preferences, and observed consumption in the married household for each spouse. The first step is to obtain empirical estimates for each argument on the right hand side of the expression in equation (2).

Assuming individual utility functions of the Stone-Geary type, each argument can be expressed in explicit form. Utility in the current married state, specified as the direct utility function, is a function of individual preferences and observed consumption in the married household. The individual threat point, specified as the indirect utility function, is defined as withdrawal from the household to the best alternative state, and is a function of prices and income. Individual are assumed to face the same prices in either the married or the alternative state; income in the alternative state is predicted for each wife and husband in the sample. Information on observed consumption in the married household is available in the data.

In order to derive empirical estimates of relative bargaining power, information is needed on individual preferences of spouses. It is assumed that individual preferences are independent of marital status, and that non-married households do not bargain. These assumptions enable use of non-married households to identify individual preferences of women and men.

First, demand equations are estimated separately for households headed by non-married women (N=2,551) and households headed by non-

married men (N=931). The parameters of the individual demand equations uniquely identify the parameters of the individual utility functions for women and for men, or the individual preferences. With estimates of the individual utility function parameters, it is possible to generate empirical estimates of household relative bargaining power in the sample of married couple households (N=5,535). However, before proceeding it is worthwhile to assess what has been learned from the empirical data so far. Specifically, consideration is given to what can be learned about individual preferences and about household bargaining behavior.

Evidence from the Data Regarding Individual Preferences and Household Bargaining Behavior

Household bargaining, or more generally how preferences of individual household members are combined in the household decision making process, is more interesting when individual preferences of household members differ. The most interesting empirical evidence comes from comparison of individual marginal rates of substitution of wives and husbands.

The marginal rate of substitution (MRS) measures the rate at which an individual is just willing to substitute one good for another. To the extent that spouses have similar or different marginal rates of substitution at a defined consumption point, it may be possible to infer similarity or divergence in preferences.

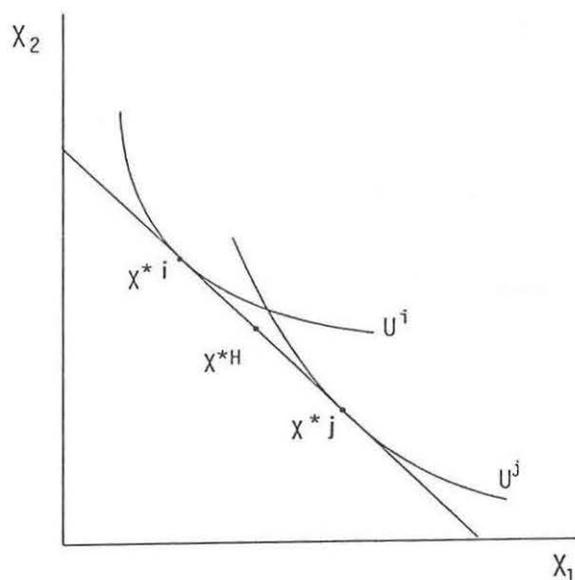
With estimates of the individual utility function parameters, the marginal rate of substitution between food and the composite consumption good can be calculated at the observed household consumption bundle (X^H) separately for the wife and the husband for each household in the sample. When the wife's MRS at the observed household consumption bundle is less than the husband's MRS at that point, the wife is willing to give up less of the composite consumption good to obtain more food relative to the husband. In this instance the wife exhibits a stronger relative preference for the composite consumption good.

The empirical results suggest that preferences differ between wives and husbands, and that in general, husbands exhibit a stronger relative preference for food. (In 88% of the households the wife's MRS is less than the husband's MRS). Additionally, there is evidence in the data of variation in individual marginal rates of substitution between wives and husbands. The individual MRSs are within 20% of each other in 50% of the households, which may suggest some degree of similarity. However, in 50% of the households the individual MRSs differ by more than 20%, suggesting greater divergence. To the extent that household members have different preferences, the household bargaining process becomes more interesting.

In addition to assessing the extent of similarity of preferences between wives and

husband, the estimates of the individual utility function parameters can also be used to determine the extent to which the empirical data is consistent with a general bargaining framework. Given information on individual preferences, household allocation which would result from decisions made independently by each spouse can be derived and compared to the actual allocation in the married couple household. These three consumption points can be plotted in two-good space (Figure 1).

Figure 1.
Household Bargaining Behavior



For behavior consistent with bargaining, the observed household consumption bundle, X^H , should lie somewhere on the household budget constraint between the consumption bundle which would result from decisions made independently by each spouse, designated as X^{*i} and X^{*j} . If the observed household consumption bundle lies on the same side of the two dictator bundles, both spouses prefer reallocation away from the same good toward the other good in the two-good model. However, something precludes the reallocation and the household is observed to consume a non-optimal and inconsistent bundle. A general bargaining model cannot explain this behavior, nor can it provide guidance to interpretation of relative bargaining power within this context.

Accordingly, a statistical test is used to determine the probability of consistent behavior for each married couple. In the sample, approximately 38% of the married couple households reject the null hypothesis of consistent behavior at the 95% confidence level. Thus, the data suggest that many households exhibit behavior

inconsistent with a general cooperative bargaining framework.

It is important to understand why the empirical data could be inconsistent with a bargaining framework. If the estimates of the individual utility function parameters are biased, this bias will introduce measurement error into the empirical measure of the consumption bundle chosen independently by each spouse (i.e. the dictator consumption bundles). This could result in the type of inconsistency observed in the empirical data.

There are two reasons to suspect that the individual utility function parameter estimates might be biased. In order to obtain information about parameters of the individual utility functions of the wife and the husband, it was assumed that bargaining does not take place in non-married households and that individual preferences are independent of marital status. The first assumption rules out negotiation or bargaining behavior among adults or between adults and children in non-married households. The second assumption rules out changes in individual preferences due to changes in marital status as well as systematic differences between non-married individuals and married individuals.

If these behaviors are empirically important, the estimates of individual preferences derived in this research will be biased: the behavior of non-married households will not reflect the individual preferences of the household head, and estimated individual preferences of non-married individuals will not accurately represent the individual preferences of married individuals. With respect to the graph, the empirical estimates of the consumption bundles which would be chosen independently by each spouse will be estimated with error.

Another possible explanation for the inconsistency of the data with a bargaining framework is that the arguments of the individual utility function have been mis-specified. There may exist a third argument in the individual utility function in addition to food and composite consumption, such that observed behavior which is inconsistent in the two-good model, would be consistent in a three-good model.

Association Between Household Relative Bargaining Power and Characteristics of Spouses

Since the measure of relative bargaining power is derived from a bargaining model, it is only appropriate to infer relative bargaining power in households which fail to reject the null hypothesis of consistent behavior. Only these households are retained for the remaining analysis ($N=3,440$). Empirical estimates of relative bargaining power are derived for each married couple household. The estimates indicate that relative bargaining power varies across households. In general, wives have

more bargaining power relative to husbands in the allocation of expenditure between food and other consumption.

One explanation for why the empirical measure of relative bargaining power is so skewed in favor of wives may rest in the decision making area which generates this measure. It could be that decisions regarding household food expenditure are, in fact, made predominately by wives. Wives may determine the food budget quite independently because food decisions are part of the wife's role, or because husbands want their wives to make these decisions.

Another explanation rests in the model which generates this empirical measure. In the model used in this research individual utility is independent of the intrahousehold allocation of goods. As a result, the effect of private good transfers on the bargaining outcome is ignored, and this introduces potential error into the empirical measure of relative bargaining power.

Given empirical estimates of household relative bargaining power, regression analysis was used to explore association between household relative bargaining power and characteristics of spouses. The conceptual model which motivates this research suggests that relative characteristics of spouses should be associated with relative bargaining power. Characteristics explored in this research included age, education, occupation, earned income, non-labor income, total income, labor force participation, and measures of wage rates of the wife and the husband.

In general, the regression equations explained only a small part of the variation in relative bargaining power. While characteristics of spouses (i.e. labor force participation, income and earning power) were associated with variation in household relative bargaining power, household demographic variables had the most explanatory power. This finding is consistent with previous empirical work which has found that characteristics of household members influence household behavior (Lazear and Michael, 1988).

The presence of children in the household was positively associated with the wife's relative bargaining power, with older children having a stronger effect than younger children. Presence of children in the household may reinforce the wife's role as household manager including responsibility for food expenditure. Alternatively, when the household includes children, husbands may feel that food expenditure decisions are better made by the wife who is generally viewed as the primary care giver.

It is interesting that the effect is larger for older children. This effect remains even after controlling for labor force participation of the wife and wife's income. One explanation for this effect could be that as children get older they become more goods-intensive and less time-

intensive. If husbands have the comparative advantage in the labor market, they may increase hours of market work in response to increasing expenditure for children. In turn wives may assume more of the responsibility for household work, thus reflecting an increase in her relative bargaining power with respect to food expenditure decisions.

The regression analysis provided some evidence that variation in income and wage rates of spouses were associated with variation in relative bargaining power. The total income of the wife and the total income of the husband had more explanatory power than separate measures of earned income and non-labor income of the wife and the husband. Variation in relative wage rates of the wife and the husband was also associated with variation in relative bargaining power.

The results suggest that a wife's total income and earning power are positively associated with her bargaining power. An increase in the wife's income relative to her husband's income, controlling for her employment status and for relative wages, increases her relative bargaining power. Similarly, an increase in the wife's relative earning power, controlling for her employment status and for relative income, increases her relative bargaining power.

However, controlling for relative income and relative wage rates, employed wives have less relative bargaining power than non-employed wives. This suggests that earned income and non-labor income affect bargaining power differently: holding relative income and wages of the wife and husband constant, wives with high proportions of their own income from non-labor sources have more relative bargaining power than wives with high proportions of their own income from earnings.

One explanation for this result is that in households in which both spouses participate in the labor market both spouses may be more likely to jointly participate in household decision making including the allocation of expenditure between food and other consumption, while in single earner households, some domains of household decision making may be dominated by one spouse and other areas by the other spouse. The regression results did not suggest that one has to exercise earning power in order for it to translate into bargaining power.

In general, the cooperative bargaining model as implemented in this research is not strongly supported by the empirical evidence. While it is highly likely that households engage in bargaining, the empirical specification used in this research is unable to accurately capture this behavior. As previously discussed, potential bias in the estimates of the individual utility function parameters likely contributed to this result. However, for those households exhibiting consistent behavior, evidence suggests that household composition is more strongly associated with

variation in relative bargaining power than the relative socioeconomic characteristics of the spouses examined in this research.

Future research should investigate alternative models of household decision making behavior in an attempt to find models which capture the complexity of household behavior and are compatible with empirical data. Empirical research which continues to focus on intrahousehold resource allocation will improve understanding of the inner workings of the household. Intrahousehold resource allocation affects the quality of family life, the interrelationships of household members, and cohesiveness of the household unit. Additionally, the impact of policies and programs targeted to improve well being of household members will be affected by how resources are allocated within the household.

References

- Blaylock, J. & Elitzak, H. (1990). Food expenditures. National Food Review, July-September, 17-25.
- Blood, R.O. Jr. & Wolfe, D.M. (1960). Husbands and wives: The dynamics of married living. New York: The Free Press.
- Blumberg, R. (1988). Income under female and male control: Hypothesis from a theory of gender stratification and data from the Third World. Journal of Family Issues, 9(1), 51-84
- Brown, J. & Deaton, A. (1972). Models of consumer behavior: A survey. Economic Journal, 82(823), 1145-1236.
- Deaton, A. & Muellbauer, J. (1980). Economics and Consumer Behavior. Cambridge: Cambridge University Press.
- Gray-Little, B. & Burks, N. (1983). Power and satisfaction in marriage: A review and critique. Psychological Bulletin, 93(3), 513-538.
- Lazear, E.P. & Michael, R.T. (1988). Allocation of income within the household. Chicago: University of Chicago Press.
- Manser, M. & Brown, M. (1980). Marriage and household decision-making: A bargaining analysis. International Economic Review, 21(1), 31-44.
- McDonald, G.W. (1980). Family power: The assessment of a decade of theory and research: 1970-1979. Journal of Marriage and the Family, 42(4), 111-124.
- McElroy, M.B. & Horney, M.J. (1981). Nash-bargained household decisions: Toward a generalization of the theory of demand. International Economic Review, 22(2), 333-349.
- Pahl, J. (1988). Earning, sharing, spending: Married couples and their money. In Walker, R. & Parker, G., eds. Money matters: Income, wealth and financial welfare. London: Sage Publications.
- Pahl, J. (1980). Patterns of money management within marriage. Journal of Social Policy, 9(3), 313-335.
- Safilios-Rothschild, C. (1970). The study of family power structure: A review 1960-1969. Journal of Marriage and the Family, 32(4), 539-552.
- Thomas, D. (1990). Intra-household resource allocation: An inferential approach. Journal of Human Resources, 25(4), 635-664.
- Thomas, D. (1992). The distribution of income and expenditure within the household. Working paper. Yale University.