Abstract

Models of retirement behavior have typically employed a traditional family framework that assumes all decisions are made by one agent—the male household head. As the proportion of married women approaching retirement with substantial work histories rises, bargaining models of marriage can provide an alternative framework, allowing us to consider separately the actions and intentions of the husband and wife and the prospect of dissolution of the marital unit through divorce or death. Game-theoretic models permit a broader range of rational behavior than joint utility family models, and may help to explain some empirical puzzles, such as the failure of consumption profiles to correspond to the individual life-cycle model. Bargaining models also have potentially important implications for retirement policy and in particular social security reform: control over resources and the ability to make independent decisions increase the ability of the husband or wife to negotiate household outcomes that are in their own private interest and affect the distribution of family resources.

* Department of Economics, Box 353330, University of Washington, Seattle, WA 98195. Email: lundberg@u.washington.edu. Henry Aaron and Dick Startz have provided helpful comments, but are not responsible for remaining errors.
Family Bargaining and Retirement Behavior

When the social security system was established in 1935, women made up less than 25% of the work force and only about a third of female workers were married. Economists’ treatment of the retirement decision has been persistently influenced by this demographic fact, though the U.S. labor force is now 46% female and most working women are married. A traditional family model in which a single decision-maker, the (usually male) household head, chooses an optimal life-time path of work and consumption provides the implicit framework for almost all economic analysis of retirement. Other family members, including wives, are ignored in both theoretical modeling and empirical studies of retirement timing. In fact, the enigmatic but key variable “age of the household” employed in many retirement studies can be reliably translated as “age of the male household head.”

A married couple faces a retirement problem very different from that of an individual worker. The work and consumption behavior of the couple will be the outcome of a joint decision-making process that will differ in both constraints and objectives from an individual optimization. Pooling of resources within the family relaxes the time and income constraints facing an individual worker, and reduces the risk associated with changes in individual-specific factors such as health. Husbands and wives are individuals with distinct preferences, and their objectives may not coincide, either in the short- or the long-run. Many of the important empirical issues in retirement behavior involve circumstances in which the needs and goals of married men and women may differ. For example, the extensive poverty among elderly widows is the outcome of the consumption/savings decisions of a married couple with different life expectancies. Recent discussions concerning individual control of social security assets and the fate of the spouse benefit bring into sharp relief the possible conflict of interest between elderly husbands and wives.

Analysis of these and other issues must begin with a model of saving and labor supply decisions that allows for the independent preferences of husbands and wives and for the eventual end of a marriage through death or divorce. Increases in market work among married women and decreases in marital stability during the past forty years have undoubtedly changed the retirement patterns of both men and women, but analysis of these influences will be difficult without a
conceptual framework that incorporates the family context of retirement decisions. In recent years, models of collective family decision-making, including cooperative and noncooperative bargaining models, have been developed and have received considerable empirical support, but have had little influence on the study of retirement.

I summarize alternative models of family behavior, including both standard unitary models and the newer collective models, and speculate on how our understanding of retirement behavior might be improved by recognizing possible conflicts of interest between husbands and wives in family decisions concerning work, savings, and pensions. I show that marital bargaining models have important implications for policy. Distribution of well-being in marriage can be affected by who controls resources, so that policies affecting retirement ages or the allocation of retirement assets can affect both the relative well-being of husbands and wives in elderly couples, and possibly the efficiency with which resources are allocated as well. I explore the implications of bargaining models for some aspects of retirement behavior and suggest that some observed facts may be more consistent with a bargaining than a unitary framework. Finally, I outline elements of a research agenda for analyzing retirement in a game-theoretic context.

I. **Husbands, Wives, and Retirement**

The typical model of retirement behavior examines the optimal behavior of a single individual who faces alternative streams of utility over the remainder of his or her life. Retirement consists of leaving a career job, and thereby significantly reducing or eliminating labor income. Each worker chooses an optimal retirement date by comparing the expected present value of future utilities associated with retirement at different ages, where these depend upon market wages, accumulation of pension assets, the value of leisure, and the rate of time preference.¹ In general, however, retirees are not isolated individuals; most have a spouse whose future consumption (and leisure) will be affected by the retirement choice. We might expect a marital partner, whether she is a worker, retiree, or homemaker, to have some influence on her spouse’s retirement decision, but

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¹ Structural models of retirement behavior are relatively abundant. A few recent examples are Lumsdaine, Stock, and Wise [1992], Berkovec and Stern [1991], Stock and Wise [1990], and Gustman and Steinmeier [1986].
this complication is almost universally suppressed in theoretical modeling of retirement, and receives little attention in empirical studies.

The one-person retirement decision is consistent with the “traditional family” model that is the basis of many empirical labor supply studies. In the traditional family the husband is the primary earner, and his work hours are assumed to depend upon his own wage rate and non-labor income, but not on the work behavior or attributes of his wife. The wife, in turn, treats her husband’s earnings as though they were property income. This specification, in which the husband’s behavior affects his wife’s, but the wife’s behavior does not influence her husband, is convenient for estimation, though it cannot be justified as the outcome of an optimizing model. As the lifetime labor force participation of women has increased in the U.S., studies of retirement by male household heads have been augmented by studies of female retirement behavior that are also consistent with the traditional family model. The results of recent research on the labor supply of older men and women are not in general consistent with this framework, since the work behavior of men does appear to be affected by the employment of their wives. However, only a few studies have treated the retirement decisions of husbands and wives as mutually dependent.

These results suggest that a joint decision-making framework is needed for the analysis of retirement. One possibility is to reject the traditional family model in favor of a joint utility or “unitary” model that assumes the family acts as though it were maximizing a single utility function that incorporates the preferences of all members, subject to a pooled budget constraint. In this model, the sharing of resources between a married couple implies that the earnings opportunities of both husband and wife should affect the retirement behavior of each spouse. For example, the health insurance coverage of an employed wife will affect the marginal value of medicare in decisions concerning the husband’s retirement. A joint model also allows for interdependence of

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2 Lundberg [1988].
3 Honig [1998] finds that, in recent data, older women’s retirement expectations continue to be influenced by their husband’s income and retirement plans, they are much more strongly affected by their own expected wage, employer-provided benefits, and pension income than in the past. Blau [1998] finds strong reciprocal effects of the employment of one spouse on the labor force exits of the other that seem to indicate preferences for sharing leisure.
4 The principal recent exception is Gustman and Steinmeier [1997], who construct a noncooperative model of retirement in two-career families as the basis for an empirical examination of coordinated retirement decisions. The joint retirement of husbands and wives has also been examined empirically by Hurd [1990], and by Clark and Johnson [1980].
husband’s and wife’s consumption through household public goods and complementarity between the husband’s and wife’s leisure time.

An increasingly important alternative to the unitary model of family decisions is a game-theoretic or “collective” model that recognizes explicitly the separate interests of two or more family members. The original contributions to this literature were cooperative bargaining models, but a variety of noncooperative models and others employing a collective framework that does not rely on any explicit bargaining paradigm have appeared in recent years. One advantage of such models over the unitary model is that they permit us to analyze the life-cycle of an individual, allowing for marriage, divorce, and the death of a spouse, rather than the life-cycle of a married couple. For example, the effect of the social security spouse benefit on the lifetime work incentives of women must depend upon the risk of divorce and the treatment of the benefit in the event of divorce. These models also allow for a conflict of interest between the husband and wife within the marriage and provide a mechanism by which family behavior emerges from disparate individual objectives.

Bargaining models widen the range of rational family behavior and can explain departures from the simple life-cycle model without abandoning the economist’s standard assumption of forward-looking, purposeful individuals. In some games, there is an explicit role for social norms in providing a couple with a fall-back position or a focal point that affects the bargained outcome. This approach provides an explanation for the bunching of retirement ages that is related to, but not identical with, the direct effect of peer influence. Finally, a number of empirical puzzles concerning retirement behavior and the well-being of the elderly cannot be usefully addressed with models that assume a married couple acts as one. Most dramatic is the sizable reduction in the proportion of men who chose single life annuitization of employer-provided pensions rather than joint-and-survivor pensions following changes in regulations that should not have altered the choices of a single-utility married couple. A 1974 amendment to ERISA required that a joint life annuity be the default provision, but did not restrict choices in any way; the 1984 Retirement Equity Act required notarized spousal approval before a single annuity pension could be chosen by the employee. The observed responses to these changes cannot be justified by a traditional family

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5 This is discussed in Diamond [1997].
or unitary family model, but suggest that self-interested and strategic behavior by husbands and wives needs to be considered in explaining economic behavior relevant to retirement.

II. **Modeling Family Behavior**

Alternatives to the traditional family model are of two basic types: unitary models in which a single utility function is maximized, and collective models, which include cooperative and noncooperative bargaining models. In a unitary model, outcomes are necessarily efficient and questions of distribution between husbands and wives do not arise in any meaningful way. Decisions depend upon total family income and relative prices, and policies will influence behavior only through the overall family budget constraint or through direct restrictions on behavior. Outcomes are efficient in cooperative bargaining models, but distribution between individual family members will depend upon bargaining power as reflected in the value of the “threat point” or alternative to cooperation. Individual welfare will therefore depend upon individual control of resources and an additional avenue for policy influence is provided. In noncooperative models, the relative well-being of family members also depends upon individual resources, but outcomes may be inefficient.

**Unitary Models**

In the archtypical unitary model, a husband and wife agree to maximize a social welfare function based on their individual utilities, subject to a joint budget constraint that pools their income. This model allows the couple’s expenditures to be analyzed as though they were a single agent maximizing a utility function that depends upon their joint consumption, subject to a joint budget constraint. This optimization problem generates “family” demands for goods and leisure that depend upon prices and total income. Extension to a life-cycle setting is straightforward, and the results are analogous to those in the individual model.

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6 Samuelson [1956].
7 These demands have standard properties if the individual utility functions are well-behaved.
Unitary models have provided a simple and powerful framework for examining the consumption behavior and labor supply of families, but have been subjected to increasing criticism on both theoretical and empirical grounds. A unitary family model cannot be used to analyze the formation and dissolution of marriages, nor can family decisions depend upon conditions external to the marriage. This shortcoming is particularly important in the analysis of retirement, since the long-term decisions of an elderly couple must take into account the probability of widowhood. For example, since wives are typically younger than their husbands and women typically live longer than men, women have more incentive to save for old age than men. At middle age, a wife can expect a retirement period that is, on average, 50% longer than her husband’s.\(^8\) Much of the criticism of unitary models has arisen from difficulties in reconciling a model in which a married couple maximizes a single utility function with the analysis of decisions to marry and to divorce, in which agents must compare their expected utilities inside marriage with their expected utilities outside marriage. The decisions of elderly couples require a different sort of external view—a return to the single state with widowhood.

Recent empirical evidence that is inconsistent with the unitary model has been an even more influential prod to the development of collective models of the family. A unitary model generates family demands that depend upon prices and total family income, not the distribution of income among family members. Several empirical studies have shown that such distribution does matter. The most provocative of these show that the mother’s control over family income is positively related to measures of child well-being.\(^9\) For example, a recent policy change in the U.K. effectively transferred ownership of the universal child allowance from fathers to mothers. Although the size of the allowance did not increase, household spending on women’s and children’s clothing rose relative to spending on men’s clothing.\(^10\)

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\(^8\) This example comes from Browning [1994] and is based on Canadian life-expectancy data.

\(^9\) See Thomas [1990,1994], Haddad and Hoddinott [1994], and Rose [1994]. Lundberg, Pollak, and Wales [1997] examine the effects of a policy change in the U.K. that transferred a substantial child allowance from husbands to wives, and find that a shift towards expenditures on women’s goods and children’s goods coincided with this income redistribution. Three recent surveys of changes in theoretical and empirical modeling of family behavior are Lundberg and Pollak [1996], Behrman [1997], and Bergstrom [1996].

\(^10\) Lundberg, Pollak, and Wales [1997].
Collective Models

Evidence that distribution of income within the family influences consumption has stimulated the development of game-theoretic and other collective models of family behavior. A typical cooperative bargaining model of marriage begins with a family that consists of only 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 the “threat point,” $(T_h, T_w)$ --the utilities associated with a default outcome. 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, $p x = I_h + I_w$. 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. So the interests of husband and wife conflict over issues such as saving for old age, the observed outcome in these models depends upon each spouse’s threat point utility.

The threat point in a cooperative bargaining model is determined by the marital partners’ best alternative to a cooperative marital equilibrium. 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, outcome of marital 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 factors such as the probability of remarriage and the income available to divorced men and women, including eligibility for social security spouse benefits.

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11 Most of these have been cooperative bargaining models, following the tradition established by Manser and Brown [1980] and McElroy and Horney [1981].
12 Solution concepts other than Nash bargaining yield similar results.
13 McElroy [1990] calls these “extrahousehold environmental parameters.”
In the “separate spheres” bargaining model, the threat point is assumed to be internal to the marriage, not external as in divorce-threat bargaining models.\footnote{Lundberg and Pollak [1993].} The alternative to agreement is an inefficient noncooperative equilibrium within marriage in which each spouse voluntarily provides household public goods, choosing actions that are maximize utility, given the actions of their partner. This alternative is a gender-specialized equilibrium, with social roles assigning responsibility for some household public goods to wives, and others to husbands. Individual well-being in the noncooperative solution, and thus in the cooperative equilibrium as well, depends upon individual control of income and other resources by the husband and wife. 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 than divorce, especially for elderly couples whose divorce rates (and remarriage prospects, given divorce) are low. Noncooperation need not involve overt conflict or hostility; the husband and wife simply fulfill socially-accepted spousal responsibilities with minimal negotiation. Since the noncooperative solution depends upon a gender-specific division of household responsibilities established and enforced by social norms, this model provides a route by which such norms can affect family outcomes.

Bargaining models of marriage widen the range of rational family behavior by removing restrictions implied by unitary models, such as the pooling of individual incomes and the irrelevance of extra-marital conditions for marital outcomes. Many variants of these models imply that who controls resources, both within and outside the marriage, can influence the distribution of resources within the marriage, and empirical evidence supporting this result is accumulating. For couples approaching retirement, bargaining power will be influenced by individual control of labor earnings and retirement timing, and by control of pension and other retirement assets and their disbursement. Wives with a history of market work and pension assets in their own name are likely to have a stronger bargaining position within marriage than wives who have stayed home. However, market work by wives is itself an outcome of the bargaining process. The labor supply of a married woman has been found to be an increasing function of her bargaining position within marriage, as measured by state divorce and marital property laws.\footnote{Gray [1995].} Men, it appears, bargain for

\textsuperscript{14} Lundberg and Pollak [1993].
\textsuperscript{15} Gray [1995].
their wives to stay home, and the outcome of this negotiation will affect the long-term distribution of family resources.

The high poverty rate of elderly widows and possible explanations for their relatively low income raise important issues for economic analysis as well as for public policy. Concerns about selfish or myopic decisions by deceased husbands seem to arise from a traditional model of family decision-making, with the husband making unilateral decisions about savings and/or retirement in line with his own preferences and expected life-span. However, the relative poverty of widows could also emerge from cooperative household bargaining in which the wife’s bargaining power is insufficient to ensure a consumption profile that would keep her above the poverty line at the end of a long life. If a cooperative bargaining model with either an exterior or interior threat point correctly characterizes household relations, we can expect the increasing relative market income of women to improve their economic position as surviving spouses.\textsuperscript{16} Bargaining models therefore suggest that policies that improve the labor market opportunities of women, as well as policies that restrict the annuitization of retirement income, will improve the status of elderly widows.\textsuperscript{17}

Although the life-cycle equivalent of the one-period unitary model is well-known, most bargaining models have been restricted to a static, one-period game. To analyze the retirement decision, it is important to recognize that period-by-period family decisions must be embedded in a forward-looking dynamic program in which each individual recognizes the future implications of their current actions. Models of this decision require at least two periods, work and retirement, and for many issues a third period of possible widowhood must be added. Game-theoretic modeling of marriage requires a choice between cooperative and noncooperative frameworks. Cooperative bargaining models assume that binding, costlessly-enforceable agreements between the players (concerning, for example, consumption paths and retirement dates) are possible, but in general agreements concerning distribution within the household are not legally enforceable. Social norms may provide some external reinforcement of spousal obligations, but it will be difficult for a husband or wife to credibly commit to future actions that will not be privately optimal. For this

\textsuperscript{16} The only empirical evidence I am aware of on this point is provided by Browning [1995], who finds that the share of the wife in household income has no significant effect on household savings rates in Canadian data.

\textsuperscript{17} This approach to influencing the intra-family distribution of resources is a commonplace in the development literature and the recent initiatives of development agencies, but has not been prominent in domestic policy discussions.
reason, a noncooperative framework, which focuses on self-enforcing agreements, may be preferred for the study of family bargaining over time. In this case, both distribution within the family and the efficiency of family behavior may depend upon social or private mechanisms that help enforce intertemporal agreements, such as social norms or pressure from friends and extended family.

III. Retirement and Bargaining

Retirement as an event in lifetime decision-making has three important characteristics. First, retirement from career employment has an element of irreversibility. Retirees can return to work, but typically at reduced wages because they lose the value of specific human capital associated with their career job or because they have stepped off a deferred-compensation, rising wage profile. This decrease in the wage will reduce the retiree’s potential control over income, and may decrease bargaining power within the household. Second, retirement reduces market work, increasing the time available for leisure and, especially for women, household work. Finally, retirement influences the retiree’s asset holdings and feasible consumption.

When a husband is the primary earner, he and his wife are unlikely to agree on when he should retire. Retirement substantially increases the husband’s leisure, but not that of his wife, and the wife may have more interest in accumulating wealth for her longer expected period of retirement. Aside from the annoyance of women who suddenly find their retired husbands underfoot all day, we might expect wives to prefer a later retirement than their husbands would choose for themselves. However, the reduction in the retiree’s potential income threatens his future control over family resources, and this will tend to delay the husband’s preferred retirement.

Several studies have documented a pronounced decline in consumption at retirement. This pattern cannot be explained with a standard life-cycle model, and factors such as the end of work-related expenses and the substitution of leisure or home production for market goods cannot reconcile the theory with the facts. A discrete drop in consumption is consistent with a story in which individuals are “surprised” at retirement—“they take stock of their finances only to discover

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18 This has been documented in data from the U.S. (Hamermesh [1984], Mariger [1987]), Canada (Robb and Burbridge [1989]), and Britain (Banks, Blundell, and Tanner [1996]).
that their resources are insufficient to maintain their accustomed standards of living. . . and they revise their expectations downward in the light of this realization.”

A model of intrafamily bargaining can provide an alternative explanation. With retirement comes a shift in the husband’s marital threat point. When his control over market income falls, the consumption profile of the couple should shift towards the preferred profile of the wife, who expects to live longer and, therefore, prefers to maintain savings. This shift will, of course, have been anticipated, but the inability of the couple to make binding commitments with respect to future allocations will prevent the smoothing of consumption that a life-cycle model would predict. If marital bargaining plays any role in the observed consumption decline, we would expect it to occur only among married couples, and to be more pronounced when the husband is much older than the wife.

Husbands and wives tend to retire together. In a unitary model, strong complementarity between the husband’s leisure and the wife’s leisure can explain simultaneous retirement. Other possible explanations include correlations in the retirement preferences of husband and wife, or correlations in their pension accrual profiles. Alan Gustman and Thomas Steinmeier find that the coordination of retirement is due to preferences, not budget sets, and that, although the wife’s retirement decision is not strongly affected by her husband’s, the husband’s retirement decision is strongly (positively) affected by his wife’s. This pattern is inconsistent both with the primary earner/secondary earner paradigm, which implies that the wife’s behavior does not affect her husband’s, and with the unitary model, which implies symmetry in the cross-spouse effects of retirement. Gustman and Steinmeier speculate that this result may arise from strategic behavior by the husband, who is reluctant to face the house and attendant responsibilities alone.

IV. Research Agenda

Only a few of the many potential applications of game theory to retirement and related issues have been explored. Several recent studies have examined the joint labor supply of older husbands and wives. We know that the retirement decisions of men are--perhaps increasingly--

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19 Bernheim, Skinner, and Weinberg [1997], p. 5.
20 Gustman and Steinmeier [1997].
21 Gustman and Steinmeier’s application of noncooperative, rather than cooperative, models to the issue of retirement (see also Hiedemann) is in contrast to most of the marital bargaining literature.
dependent on their wives’ labor supply behavior, and that the retirement decisions of married women are more strongly influenced by their own market opportunities than they were in the past. These facts are inconsistent with the traditional family paradigm that has motivated most retirement analysis. However, a number of empirical gaps concerning the marital context of retirement decisions inhibits the development of bargaining models. We know very little about how marital status and the relative earnings, ages, health status, and other characteristics of husband and wife affect decisions about savings and consumption. Characteristics of the extended family, particularly parents and children, may influence the potential resources and responsibilities of mature men and women, and may also serve as indicators of the enforceability of long-term contracts between husband and wife. A bargaining perspective on the well-being of widows requires longitudinal or extensive retrospective data, with which we can track not just total resources of the former couple, but also the wife’s relative control over resources throughout the marriage.

A model of marital bargaining that will have interesting implications for retirement must be a multi-period model, and the implications of current consumption and labor supply decisions for future household resources are key to all the issues I have discussed. So far, most game-theoretic models of marriage have focused on issues that concern younger couples: the allocation of resources to children and investments in market and household human capital. Bargaining between older couples will be simply one part of a life-time sequence of negotiations with one or a series of partners, but in analyzing retirement behavior we may wish to take as given investments in market and home human capital, and to focus on different issues more focused on the elderly and the retirement period.

Three modeling issues are of particular interest: how control over resources is distributed between working and retired husbands and wives; the role of risks and uncertainty concerning income, health status and death; and how commitments are to be enforced.
Resource Control

The relative control of husband and wife over family resources is not easily measured. The most straightforward indicator is relative income, but this will also affect consumption and time use through its dependence on wage rates, which are the prices of husband’s time and wife’s time. Also, effective control over resources will depend not just upon potential market income and asset ownership, but also on the knowledge and abilities of each partner, and on custom. In a model of bargaining between elderly husbands and wives, it may be reasonable to assume some asymmetry in market wages and returns to household activities. Husbands will typically have higher wages and more years of market work than their wives. As a result, they will be entitled to larger pensions, both public and private. Their wives, on the other hand, will have borne the bulk of household responsibilities. Work histories interrupted by years of raising children will have left them with relatively low earnings and pension accumulations, though perhaps with greater claims on the resources of children when widowed. This discrepancy in the market opportunities and pension accumulation of husbands and wives will decrease as recent cohorts of married women with more labor force experience grow older.

Risk

Life-cycle models often incorporate uncertainty about life span or returns on assets, but marital bargaining models must also deal with the risk of disability in old age. This risk affects husbands and wives asymmetrically, because husbands are usually older than their wives and likely to become disabled earlier. If the husband requires care, therefore, this care is likely to be provided by his younger wife. Substitutes such as care by other relatives (i.e. daughters) or institutional care may be available, but spousal care is likely to be preferred. The anticipation of disability, the need for care, and the alteration in both bargaining power and the ability to bargain often associated with disability will influence the earlier strategic choices of both husband and wife. The inadvertent bequests left by couples who have maintained asset positions as insurance against eventual disability testify to the perceived importance of this risk.
Enforcing Commitments

Cooperative models of marital bargaining assume that a husband and wife can make binding, costlessly-enforceable commitments. Together with the assumption that information is relatively good (or at least not asymmetric), the ability to make binding agreements ensures the efficiency of cooperative agreements. Since legal institutions do not provide for external enforcement of contracts regarding allocation within marriage, the binding-agreement assumption requires some motivation. Repeated noncooperative games have multiple equilibria, and an efficient equilibrium 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. It can be argued that marriage possesses characteristics that are known to promote efficient outcomes in a repeated noncooperative game—a long-term relationship, relatively good information, and a stable bargaining environment.

The assumption of a stable bargaining environment is problematic in models that examine the life-cycle behavior of a married couple. Theodore Bergstrom has noted that “this stationarity is lacking in a model where children grow up and leave the family and where the probability of death increases with age.” If the bargaining environment is not stationary, dynamic inefficiencies can arise if the husband and wife are unable to enter binding lifetime contracts. Few bargaining models have considered dynamic effects, but Robin Wells and Maria Maher present a dynamic model of marital time allocation that focuses on the degree of specialization between husband and wife. In their model, the efficient equilibrium requires that the wife specialize in household production and

22 There is an extensive discussion of this point in Lundberg and Pollak [1996].
23 Most models of the family either assume or conclude that family behavior is Pareto-optimal, in the sense that neither husband nor wife can be made better off without making the other worse off. Unitary 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. Pareto-optimality is also 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.
24 Browning, Bourguignon, Chiappori, and Lechene [1994].
26 Wells and Maher [1996].
the husband specialize in market work. With period-by-period renegotiation of the marital contract, specialization results in a deterioration of the wife’s relative bargaining strength. The threat point is a noncooperative equilibrium in which the partner who specializes in the production of income, a private good, will have an advantage over the partner who produces public goods at home. Since this discrepancy will increase over time due to learning effects, the wife will refuse to engage in an efficient degree of specialization unless her husband is wealthy enough to make an up-front wealth transfer that compensates her for her future loss in bargaining power and marital surplus. Wells and Maher predict, therefore, that household specialization and fertility will be inefficiently low due to strategic considerations in repeated marital bargaining.

Older couples are also likely to face a changing bargaining environment. Retirement is usually a one-time event that permanently reduces the available market wage of the retiree. The timing of this decision is under the control of the worker himself, who must consider two effects on subsequent family bargaining and the allocation of resources within a marriage. First, retirement will permanently change the household’s tradeoff between income and his leisure. Even if period-by-period decisions are made cooperatively, the husband who prefers more leisure and less income than his long-lived wife may be tempted to take a one-time action that alters the prices the family faces in subsequent bargaining in a way that increases his leisure. Second, retirement may reduce the husband’s threat point, so that he receives a smaller proportion of total family resources. The first of these effects is likely to lead to premature retirement, the second to delayed retirement, and both rely on the inability of the husband and wife to enter into binding lifetime contracts concerning consumption and time allocation.

Other changes in the marital bargaining environment may result from aging, rather than retirement per se. As couples age, the probability of death and the end of the game increases, as does the probability of incapacitation from ill health. In repeated games, cooperation between the players becomes more difficult to sustain as the end of the game approaches; elderly couples may be less able to reach efficient cooperative solutions as they age.

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27 The extent to which retirement is associated with a loss of control over income depends, of course, on the allocation of pension assets and associated control over their disbursement. I am assuming here formal joint control over assets, in contrast to individual control over market income.
If a married couple is able to agree on, and enforce, an efficient life-time path of work and consumption, these decisions must be conditioned on the expected needs and lifetime of both husband and wife. If only the husband engages in market work and only the wife produces household public goods, we would expect the husband to work longer and the wife produce more household goods than they would in a noncooperative equilibrium. The folk theorem concerning efficient outcomes in repeated noncooperative games is often invoked to explain the maintenance of such an agreement. Whether an efficient equilibrium can be maintained if retirement is a one-time decision is less clear. If the husband would prefer to retire earlier than his wife would prefer, because she expects to live longer than him, it is difficult to see how an efficient commitment to retire later, say at 65 rather than 62, could be enforced. The decision is made only once and, following a premature retirement, the wife would be better off agreeing to restore a period-by-period cooperative outcome under the new, post-retirement circumstances rather than maintaining a noncooperative stance as punishment. The repeated game folk theorem does not apply in this situation, nor is it likely to apply in the case of other infrequent decisions that are irreversible and can be made unilaterally by one spouse, such as quitting a job, or becoming pregnant. A married couple’s inability to enter into binding life-time agreements concerning these matters may lead to inefficient outcomes. Social norms concerning appropriate retirement ages can help support only those agreements that conform with conventional behavior.  

If the distribution of household resources between a husband and wife depends upon their individual control over market income, then retirement can be a strategic tool in marital bargaining. Workers may retire too late in order to keep control of a larger fraction of total household resources or retire too early to reduce the price of their own leisure. If retirement timing is not part of a binding lifetime agreement between marital partners, then the outcomes of bargaining need not be efficient. Repeated bargaining between husband and wife can maintain efficiency so long as each has less to gain by behaving selfishly in the short run than he or she expects to lose from spousal

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28 For many years, retirement rates at age 65 were higher than would be predicted by standard models. Lumsdaine, Stock, and Wise [1996], though unable to explain the age-65 spike, found that married men were significantly more likely to retire at age 65 than single men, and thus were bound longer to a customary rule-of-thumb concerning the appropriate age to retire than single men or women. One could speculate that, within marriage, social norms about retirement might serve as commitment devices that help maintain efficient work levels by older men and their wives.

29 It should be noted that control over labor income can be effectively replaced by control over assets, and that any decisions regarding the allocation of pension income made at the time of retirement will also be important for subsequent bargaining and distribution.
punishments in the future. This discipline may erode as the end of the game—in this case, death—
approaches. Finite life need not interfere with efficient outcomes if the probability of ending the
game is constant. In fact, the probability of death increases with age, so that the repeated game of
marriage becomes less likely to generate efficient solutions as the spouses age.

As they grow older, men and women will continue to want to have things their own way. Therefore, efficient outcomes can be maintained over time only if commitments can be enforced
and opportunistic behavior limited. A husband who is the primary earner may be willing to work
longer than he would prefer in exchange his wife’s promise of future care, should he become
disabled. However, the wife cannot credibly commit to provide such care in the final period of life
unless it is privately optimal for her to do so, since the husband’s ability to punish her for
abandonment is restricted to the terms of his will. The effect of end-of-life noncooperation on the
retirement date is not clear. The husband’s inability to offer his wife an enforceable income-care
trade suggests an earlier retirement, but if assets can provide the husband with the means to
purchase substitute care in old age, he may prefer later retirement and greater asset accumulation.

Important mechanisms exist for ensuring that marital commitments can be maintained late
in life, despite the erosion of threats of retaliation. Altruism or love for your partner can make
taking care of them when they are old and disabled privately optimal, as can strong social
disapprobation of spousal abandonment or mistreatment. Adult children can monitor parental
behavior and punish a parent who fails to take care of the other. Children will also prefer to avoid
becoming the sole support of a widowed parent, but punishing a dead parent who has failed to
provide for the survivor will be more difficult than punishing a living one. The role of children
provides some potentially testable hypotheses; for example, if the presence of children promotes
cooperation among their parents, we might expect to see more spousal care of disabled partners,
rather than market care or institutionalization, among elderly couples with children.

Legal restrictions on the husband’s ability to disinherit his spouse may therefore affect the range of possible bargains
the couple can enter into, as well as the default allocation. An empirical study of whether these restrictions, which vary
across states and types of assets, are associated with differences in retirement behavior and caretaking arrangements
would be informative.
Other features of family bargaining could lead to inefficiencies in the life-time allocation of time and goods. Cooperative bargaining with internal, noncooperative threat points may be consistent with inefficient outcomes if bargaining itself is costly. The negotiation, monitoring, and enforcement of a cooperative agreement gives rise to transactions costs that are likely to vary over husband-wife pairs. Some couples may therefore prefer to remain at a separate-spheres equilibrium that is maintained by social enforcement and does not involve bargaining costs. Asymmetric information may also be important. Marriage, though a long and intimate relationship in shared accommodation, is unlikely to lead to complete revelation of preferences and all other important information. Misrepresentation of preferences, strategic incompetence, and the maintenance of proprietary information about one’s own sphere (i.e. the functioning of the household or financial status) are features of marital bargaining that could be formally modeled. The consequences of the 1974 ERISA provision that made joint life the default pension option suggest that asymmetric information within married couples may be an important feature of marital decision-making.

V. Conclusion

Analyses of retirement behavior have typically employed a traditional family model in which all decisions are made by one agent—the household head. The joint utility or unitary model of the family allows for interactions between the time allocation and budget constraints of husband and wife, but assumes that the married couple acts as though they are one agent with a single utility function. Bargaining models of marriage, in contrast, allow us to consider separately the actions and intentions of the husband and wife, and the prospect of dissolution of the marital unit through divorce or death.

Game-theoretic models permit a broader range of rational behavior than joint utility family models. They may help solve some empirical puzzles, such as the failure of consumption profiles to correspond to the individual life-cycle model. If marital partners are unable to make enforceable commitments concerning the future allocations of time and money, strategic motives may lead to discrete changes in family behavior. For example, retirement from a career job, if it is irreversible
and its timing is not determined by a binding marital agreement, will lead to a change in the relative control over family resources by husband and wife.

Bargaining models also have a potentially important implications for retirement policy: First, control over resources and the power to make independent decisions increase the ability of the husband or wife to negotiate household outcomes that are in their own private interest. The principal implications of this result are distributional. The existence of large numbers of poor widows may not demonstrate that the allocation of household resources over time was inefficient, but rather that the bargaining power of wives was too weak to guarantee them a large enough share to prevent poverty in old age. Second, marital bargaining may produce inefficient outcomes. Two cases in which inefficiencies may result are strategic responses to anticipated future changes in bargaining power, and an endgame reversion to noncooperative behavior as the end of life approaches. If an efficient life-time contract between husband and wife involves specialization, and the wife expects to live longer than her husband, then without binding commitments the husband may retire “too early,” and the wife provide too few household services in the last years of life.

Models of bargaining by elderly married couples can be expected to generate varied results, depending upon the exact specification of the utility functions, the nature of interdependencies between the spouses, and the ability of the couple to enforce intertemporal agreements. In general, however, some of the results generated by a unitary model of the household will not hold, and factors that did not affect unitary outcomes, such as individual control over income and assets, will play an important role in determining family behavior. More empirical research on the marital context of consumption and retirement could help establish whether bargaining issues are sufficiently important to explain some aspects of the behavior of older American couples.
References


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