



Gary Becker's Contributions to Family and Household Economics*

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Abstract. Gary Becker's influence on the economics of the family has been pervasive. His ideas have dominated research in the economics of the family, shaping the tools we use, the questions we ask, and the answers we give. The foundational assumptions of Becker's economic approach to the family—maximizing behavior and equilibrium—as well as such primary auxiliary assumptions as household production and interdependent preferences, are now widely accepted not only by economists but also by family sociologists, demographers, and others who study the family. Yet the interesting and provocative implications of Becker's economic approach to the family do not follow from the foundational assumptions or from the primary auxiliary assumptions. Instead they depend on contested auxiliary assumptions to which neoclassical economics has no commitment and which lack empirical support. This paper discusses the crucial role of auxiliary assumptions in Becker's analysis of the family, first in the context of preferences, then in the context of household production, and finally in the context of family or household collective choice.

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Like all social scientists who study the family, I must position myself in relation to Gary Becker. To a remarkable extent, his vision has shaped the tools we use, the questions we ask, and the answers we give.

From the standpoint of economists who specialize in the family, I am perceived as a critic of Becker. From the standpoint of everyone else—virtually all non-

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economists and most economists who specialize in distant fields such as industrial organization and international economics—any economist who studies the family is perceived as a follower of Becker. Both perceptions are correct.

I have been one of Becker's most persistent critics—indeed, I've spent much of my professional life criticizing Becker. Examples, in chronological order, include:

- Robert A. Pollak and Michael L. Wachter (1975), "The Relevance of the Household Production Function and its Implications for the Allocation of Time."
- Richard A. Easterlin, Robert A. Pollak, and Michael L. Wachter (1980), "Towards a More General Model of Fertility Determination: Endogenous Preferences and Natural Fertility."
- Robert A. Pollak (1985), "A Transaction Cost Approach to Families and Households."
- Robert A. Pollak (1988), "Tied Transfers and Paternalistic Preferences."
- My work in the 1980s with Jere Behrman and Paul Taubman, collected in Jere R. Behrman, Robert A. Pollak, and Paul Taubman (1995), on parents' investments in their children's human capital and the children's subsequent investments in their own human capital.
- My work in the 1990s with Shelly Lundberg on bargaining in marriage, including Shelly Lundberg and Robert A. Pollak (1993, 1994, 1996).
- My current work with Shelly Lundberg on efficiency in marriage, Shelly Lundberg and Robert A. Pollak (2001).

All of this work, which could be described as criticizing Becker, could equally well be described as reshaping tools Becker has fashioned to address questions Becker has posed—in short, as following Becker.

1. The economic approach

Becker put the family on the economics profession's research agenda. Although genealogists can trace the ancestry of the economics of the family to Malthus, I can testify that it was not part of the curriculum at MIT when I was a graduate student there in the early 1960s. In its contemporary form, the economics of the family is Gary Becker's creation.

In the competition for scarce space on the research agenda, the winners share one essential characteristic. Intrinsic interest helps, sex appeal helps, policy-relevance helps, but "researchability" is essential. By building and analyzing simple, tractable models of family behavior, Becker demonstrated that researchability of the family. His models typically begin with strong assumptions that lead to strong conclusions. The conclusions often have policy implications and these have made Becker a target for critics. A sign of the influence of his ideas is that people who have never read the *Treatise on the Family* can have strong opinions about Becker and what he has termed the "economic approach" to the family.

Gary S. Becker (1976) specifies the three foundational assumptions of the economic approach as “maximizing behavior, market equilibrium, and stable preferences” (p. 5). In 1981, in the preface to the first edition of the *Treatise*, Becker wrote: “The economic approach . . . assumes that individuals maximize their utility from basic preferences that do not change rapidly over time, and that the behavior of different individuals is coordinated by explicit and implicit markets” (1981, p. ix). He continues, “This volume uses the assumptions of maximizing behavior, stable preferences, and equilibrium in implicit or explicit markets to provide a systematic analysis of the family” (1981, p. ix). Becker no longer regards stable preferences as a foundational assumption of the economic approach, so I focus on the two remaining foundational assumptions: maximizing behavior and equilibrium.

The expansion of the economic approach into territories claimed by other academic disciplines—described by Edward Lazear (2000) as “economic imperialism”—is a hallmark of Becker’s work. As Becker has observed, “many economists are hostile” to the application of the economic approach to the family, “whereas increasing numbers of sociologists, anthropologists, lawyers, biologists, psychologists, and historians are using a rational choice approach or related methods to analyze the family” (p. x).

Paul A. Samuelson (1976) illustrates Becker’s point about the hostility of economists to the economic approach to the family, or at least hostility to employing the formal apparatus of micro-economic theory. Praising Easterlin’s relative income hypothesis, Samuelson goes on to criticize Becker and T. W. Schultz: “Thus, the Easterlin hypothesis can explain fertility waves not unlike those actually experienced in the United States during the last 40 years [footnote omitted]. The Easterlin theory is all the more valuable for its scarcity among economic theories, standing out in welcome relief from the rather sterile verbalizations by which economists have tended to describe fertility decisions in terms of the jargon of indifference curves, thereby tending to intimidate non-economists who have not mis-spent their youth in mastering the intricacies of modern utility theory.” To make clear the targets of his criticism, Samuelson followed this sentence with a footnote citing an article by Leibenstein “for a survey of economists’ theories of fertility, including that of the Chicago School theorists, Gary Becker and T. W. Schultz . . .”

In the inaugural issue of the journal *Feminist Economics*, Barbara R. Bergmann, (1995) attacks both Becker’s methodology and his conclusions: “In his analysis of the family . . . Becker brings to bear the theoretical apparatus developed in the last hundred years for the analysis of markets A major characteristics of this mode of analysis is the paucity of factors taken into considerations, which is a necessity if ‘proofs’ using diagrammatic and algebraic models of characterization and persuasion are to go through” (p. 142). In some passages Bergmann suggests that Becker’s conclusions reflect his choice of assumptions: “It comes to plainly ridiculous conclusions because it is too simple: it leaves out considerations of prime importance . . .” In other places, Bergmann suggests that Becker’s “preposterous conclusions”—her title is “Becker’s Theory of the Family: Preposterous Conclusions”—are an inevitable consequence of using the theoretical apparatus of

neoclassical economics: “Becker’s method of thinking about the family leads, as does almost all neoclassical theory, to a conclusion that the institutions depicted are benign, and that government intervention would be useless at best and probably harmful” (p. 149). For me and for like-minded feminist economists, the distinction between criticizing Becker’s assumptions and criticizing his analytical methods is critical. The former leads to building neoclassical models that include considerations that Becker has omitted; the later leads to rejecting neoclassical models, but provides no alternative analytical framework.

Frances Woolley (1996), in a comment on Bergmann, calls on feminists economists to “get some distance on Becker’s work, to try to put it into perspective, rather than just bashing Becker” (p. 118). Woolley argues that feminist economists need to reclaim the economics of the family, and that using the tools of neoclassical economics to build alternatives to Becker’s models is essential to this process. I would go further than Woolley and argue that Becker, perhaps inadvertently, has been an important ally of feminist economics. Although we may reject many of Becker’s answers and refashion many of his tools, his answers and his tools provide the starting point for economists who work on the family.

In this paper, I argue that many of Becker’s “preposterous conclusions” are not inevitable consequences of using the tools of neoclassical economics, and cannot be deduced from its foundational assumptions of maximizing behavior and equilibrium. Instead, I argue, many of Becker’s conclusions depend on auxiliary theoretical assumptions to which neoclassical economics has no commitment and which lack empirical support.

To the extent that Samuelson’s objection is to the use of the formal apparatus of micro-economic theory rather than to the foundational assumption of maximizing behavior, it cuts less deeply than Bergmann’s. Although Easterlin’s relative income hypothesis is a model of fertility determination based on rational choice with endogenous preferences, Easterlin presented his model without the formal apparatus of economic theory. Easterlin, Pollak and Wachter (1980) repackage the Easterlin model in wrapping that makes explicit its reliance on micro-economic theory, using the jargon of utility functions and production functions—a repackaging that would displease Samuelson.

The interpretation of behaviors such as childbearing, marriage and divorce as active choices by maximizing agents rather than as passive responses to social or cultural forces epitomizes the economic approach. James S. Duesenberry (1960), in a comment on Becker’s classic 1960 fertility paper, summarized this threshold issue neatly when he wrote: “I used to tell my students that the difference between economics and sociology is very simple. Economics is all about how people make choices. Sociology is all about why they don’t have any choices to make” (p. 233).

When Becker’s *Treatise* appeared, the *Journal of Economic Literature* commissioned two reviews, one from an economist (Yoram Ben-Porath, 1982) and the other from a sociologist (Michael T. Hannan, 1982). Both were favorable. Hannan’s review, which is quoted on the jacket of the enlarged edition of the *Treatise*, praised

the first edition as: "The most important book on the family to appear in many years. Becker's stark economic conception of action cuts through the romantic mist that so often blinds social scientists to the hard choices faced by families and their members."

Those of us who study the family under the assumptions that individuals maximize and that opportunities are constrained by the requirements of equilibrium are followers of Becker, regardless of whether we were trained as economists, demographers or sociologists. Of course there are dissenters—a few in economics, more in demography and sociology—who reject maximizing behavior or equilibrium. But for most of us, the economic approach is the only game in town.

The foundational assumptions of the economic approach—maximizing behavior and equilibrium—are compatible with such a broad range of behaviors that they have very few refutable implications. Indeed, in the context of consumer demand analysis, Becker himself has argued that many of the standard results that economists usually attribute to maximizing behavior follow directly from the budget constraint, regardless of whether consumers maximize (Gary S. Becker, 1962). Discussing alternative approaches to the analysis of fertility, Robert A. Pollak and Susan Cotts Watkins (1993) argue that the distinguishing feature of maximizing (i.e., rational actor) models is their insistence on a sharp distinction between its two explanatory categories: preferences and opportunities. In contrast to the economic approach, some culture-based explanations reject the preference/opportunities dichotomy. Borrowing a metaphor from chemistry, Pollak and Watkins characterize such cultural explanations as treating preferences and opportunities not simply as "mixtures" of these two elements but as "new compounds whose elements—opportunities and preferences—are bonded together to form a new molecule with distinct characteristics" (p. 485).

Because the foundational assumptions of the economic approach are compatible with such a broad range of behaviors, the real action is not in relaxing the assumptions to achieve greater generality but in strengthening them to achieve greater specificity. That, of course, is what Becker does. The simplicity and tractability of these more specific models depend on imposing just the right combination of auxiliary assumptions.

Becker's strong conclusions and their policy implications depend on auxiliary assumptions. The devil is in the details—in the primary, secondary, and tertiary auxiliary assumptions that determine the theoretical conclusions and policy implications. In this paper, I discuss the crucial role of auxiliary assumptions, first in the context of preferences, then in the context of household production, and then in the context of family or household collective choice, and finally, very briefly, in the context of the marriage market. I contrast Becker's altruist model with recent bargaining models, argue that the presence or absence of resource pooling within married couple households provides a crucial test of alternative models of family or household collective choice, and that the evidence is against Becker's altruist model. I then discuss briefly the opportunities for generalizing models of collective choice from married couples to the types of families. The final section is a brief conclusion.

2. Preferences

I begin this section by describing briefly the disappearance of stable preferences from the trinity of foundational assumptions, and then turn to “altruistic preferences,” the special case of interdependent preferences on which much of Becker’s analysis rests. Interdependent preferences (i.e., non-egoistic preferences) is a primary auxiliary assumption, while Becker’s specification of altruistic or deferential preferences is a secondary auxiliary assumption. A general specification of interdependent preferences allows a concern with the consumption patterns of others, but does not necessarily defer to their preferences regarding their consumption patterns. Thus, Becker’s reliance on altruistic preferences illustrates both his contributions to fashioning analytical tools and the crucial role of auxiliary assumptions.

In “De Gustibus Non Est Disputandum,” George J. Stigler and Gary S. Becker (1977) provide a powerful statement of the position that preferences are not only fixed and exogenous but also identical across individuals. Stigler and Becker avoid many but not all of the difficulties that might seem to follow from assuming identical preferences by working with the household production model and allowing differences in household technology. For positive analysis, whether we attribute differences in behavior to unobserved differences in household technology rather than to unobserved differences in tastes is mere semantics. For welfare analysis, however, whether we attribute differences in behavior to differences in technology rather than to differences in tastes can alter conclusions about whether a policy change increases or decreases welfare (see Robert A. Pollak, 1978). I return to the household production model, although not to this issue, in section 4.

I have long been a critic of the Stigler–Becker view that preferences are fixed and exogenous. In the context of consumer demand analysis, I have proposed, analyzed, and estimated models of habit formation and interdependent preferences; see Robert A. Pollak (1970, 1976, 1978) and Robert A. Pollak and Terence J. Wales (1992, Chapter 4). Becker, in the preface to the first edition of the *Treatise*, in passages already quoted, introduced “stable preferences” as a foundational assumption of the “economic approach.” These passages are repeated almost verbatim in the preface to the enlarged edition—the only change is that in one instance the “economic approach” becomes the “rational choice approach.”

Yet Becker’s more recent work such as Gary S. Becker and Kevin M. Murphy (1988) and Gary S. Becker (1992, 1996) rejects stable preferences, introduces new models of preference formation and change, and argues for their importance. This work, with the exception of Becker (1992), is outside the context of the economics of the family and, interestingly enough, Becker (1992) makes no reference to Easterlin’s “relative income hypothesis.” I expect endogenous preferences to play an increasing role in the economics of the family, but instead of speculating on future developments, I now turn to “altruistic” and interdependent preferences.

I argue that Becker was right to insist on the importance of interdependent preferences, but wrong to insist on altruistic preferences, the unduly restrictive special case on which he relies. In the introduction to the enlarged edition of the

Treatise, Becker now concedes that “The most unsatisfactory aspect of my discussion . . . (in the 1981 edition is) . . . the failure to combine the discussion of ‘merit goods’ and altruism” (p. 10). Becker introduced altruism in the context of the preferences of parents regarding their children’s consumption, and then applied it to the preferences of husbands regarding their wives’ consumption. I reverse Becker’s order, beginning with spouses and then turning briefly to parents and children.

With interdependent preferences, an individual’s utility depends not only on his or her own consumption, but also on the consumption of others. Such dependence would arise, for example, if one spouse wants to spend leisure time with the other (e.g., seeing a play together), or if one spouse takes pleasure in the other’s happiness or satisfaction. I denote the husband’s consumption vector by Y^h , the wife’s consumption vector by Y^w , and the household’s consumption vector by $Y = (Y^h, Y^w)$. In general, we can write the husband’s utility function as $U^h(Y) = U^h(Y^h, Y^w)$ and the wife’s utility function as $U^w(Y) = U^w(Y^h, Y^w)$. Egoistic preferences, the case in which each individual cares only about his or her own consumption, imply

$$U^h(Y) = U^h(Y^h) \quad \text{and} \quad U^w(Y) = U^w(Y^w).$$

Egoistic preferences are the default assumption in most subfields of economics, although not in the economics of the family, where the default assumption is the particular form of interdependent preferences which Becker calls “altruism.”

Altruistic preferences are best introduced, as Becker does, by supposing that one spouse—the wife, for definiteness and for consistency with Becker’s discussion—is egoistic. Suppose that the husband, Becker’s altruist, cares about both his own consumption and his wife’s utility. These two assumptions, one about the wife’s preferences and the other about the husband’s preferences, imply that the husband’s preferences can be represented by a utility function of the form

$$U^h(Y) = W^h[Y^h, U^w(Y^w)].$$

Instead of calling the husband’s preferences “altruistic” I prefer calling them “deferential” because it is more descriptive—the husband defers to his wife’s preferences regarding her consumption pattern. I argue below that we need this new terminology.

To isolate an individual’s preferences for her own consumption—for definiteness, I focus on the wife—requires introducing “conditional preferences.” The wife’s preference ordering over (Y^h, Y^w) implies a conditional preference ordering over Y^w given Y^h . In the absence of separability, the wife’s conditional preference ordering over Y^w depends on Y^h . I assume that the wife’s preferences are separable, so that

$$U^w(Y) = W^w[Y^h, U^w(Y^w)]$$

and say in this case that the wife has “self-regarding preferences.”

Self-regarding preferences allow a generalization of deferential or altruistic preferences from the case in which the wife is egoistic to the case in which she has self-regarding preferences. Assuming that the wife has self-regarding preferences, we

say that the husband has deferential preferences if he cares about this own consumption and his wife's self-regarding utility:

$$U^h(Y) = W^h[Y^h, U^{*w}(Y^w)].$$

This generalization permits us to consider the symmetric case in which both spouses have self-regarding preferences and each spouse is deferential to the other. Formally, this is equivalent to assuming weakly separable preferences for both spouses, and assuming that each cares about his or her own consumption and the spouse's self-regarding utility. Under these assumptions, the utility functions are of the form

$$U^h(Y) = W^h[U^{*h}(Y^h), U^{*w}(Y^w)] \quad \text{and} \quad U^w(Y) = W^w[U^{*h}(Y^h), U^{*w}(Y^w)].$$

The aggregator functions, W^h and W^w , are Bergson–Samuelson social welfare functions, and reflect the “weights” that the spouses place on their own self-regarding utilities relative to the others’. Following Becker, economists studying the family have generally assumed that interdependent preferences take this Bergson–Samuelson form, often assuming that the wife is egoistic, so that the husband's self-regarding preferences do not enter her utility function. Because this specification of interdependent preferences reprises important themes in the economics literature (e.g., weak separability, consumer sovereignty, Bergson–Samuelson social welfare functions), it is especially interesting to economists. A pedagogically useful special case is one in which the W functions are literally weighted arithmetic means of the self-regarding utilities, so that

$$\begin{aligned} U^h(Y) &= \tilde{a}_h U^{*h}(Y^h) + (1 - \tilde{a}_h) U^{*w}(Y^w) \quad \text{and} \\ U^w(Y) &= (1 - \tilde{a}_w) U^{*h}(Y^h) + \tilde{a}_w U^{*w}(Y^w), \end{aligned}$$

where \tilde{a}_w denote the weight that each spouse applies to his or her own self-regarding utility.

Casual observation and introspection suggest that family members often have nondeferential preferences. With non-deferential preferences, spouses care directly about each other's consumption patterns, instead of, or perhaps in addition to, caring about each other's self-regarding utilities. With non-deferential preferences a wife may, for example, want her husband to spend more time jogging because “it's good for him,” even though he would rather spend his time watching television. More generally, non-deferential preferences are compatible with each spouse preferring a different consumption pattern for the other spouse than the other spouse would choose for himself or herself. In public economics, non-deferential preferences correspond to “merit goods”; in social choice theory, they underlie what Amartya Sen (1970, Chapter 6) has termed the “liberal paradox” (i.e., the impossibility of finding a social welfare function satisfying the Pareto principle, unrestricted domain, and some version of “liberalism” that respects individuals' preferences over choices that are “purely personal”).

Becker uses the term “altruistic” to describe what I prefer to call “deferential” preferences. The difficulty with “altruistic” is that Becker’s terminology often conflicts with ordinary usage. For example, Becker forces us to say that the wife who wants her husband to spend more time jogging and less time watching television is non-altruistic. Although I am reluctant to tamper with terminology, I advocate doing so because Becker’s use of “altruistic” creates confusion and hampers communication with non-economists. For example, the philosopher Martha Nussbaum (1995, p. 7), in the introduction to *Women, Culture, and Development*, interprets Becker’s altruist model as requiring that the altruist give no more weight to his own utility, well-being, or interests than he gives to any other family member. This interpretation appears to have strong implications for how the altruist allocates resources between himself and other family members, although its implications may depend on distinguishing among utility, well-being, and interests. Even if we restrict ourselves to a utility interpretation, the specific implications for resource allocation depend on resolving issues of cardinality and interpersonal comparability.

According to Nussbaum, Becker’s approach “holds that the head of the household may be regarded as an altruistic agent of the interests of all the family’s members.” She then proceeds to attack the empirical validity of what she takes to be Becker’s assumption:

Sen’s conclusions and ours, looking at the evidence, is that this assumption is false: males are quite often neglectful of the interests of females, whether wives or children, and make decisions inimical to those interests. Becker deserves much credit for putting these issues on the agenda of the profession in the first place; but models are only as valuable as the truth of their premises. And the truth is that Becker’s picture of male motivation does not fit the evidence . . .

The Nussbaum passage exemplifies the confusion caused by Becker’s use of the word “altruism.” Becker’s definition does not require the altruist to exhibit “equal concern” for all family members, including himself. Anything less than complete egoism counts as altruism. A special case illustrates the point: suppose that utility is cardinal and interpersonally comparable, and suppose that the altruist’s utility function is a weighted sum of the utilities of all family members, including the utility he derives directly from his own consumption. Becker’s definition of altruism requires the weights to be positive and, without loss of generality, we can normalize them to sum to unity. Any weights satisfying these conditions are admissible and Becker’s definition of altruism implies no further restrictions. Some altruists may give equal weight to every family member; others may give virtually all the weight to themselves and virtually none to other family members. If the altruist could choose his most preferred point in the set of feasible allocations, then consumer sovereignty would be the only implication of altruism: whatever resources the altruist allocates to a particular family member would be spent in accordance with the preferences of that family member.

“Deferential” better reflects the meaning of Becker’s assumption about preferences than “altruism,” and, in this case, moving to a terminology closer to ordinary usage is worth the transition cost. In Pollak (1988), where my focus was on parents and children, I used the term “paternalistic” to describe what I now call “non-deferential” preferences. Because of its gender connotation, “paternalistic” is especially inappropriate in the context of husbands and wives. Marjorie B. McElroy and Mary J. Horney (1981) distinguish between “paternalistic” and “maternalistic” preferences on the basis of the gender of the economic agent, a convention that is inconvenient when the gender of the economic agent is unspecified or irrelevant.

Some form of interdependent preferences are crucial for understanding parents’ treatment of their children, especially young children, and it was in the context of parents and children that Becker first introduced what he calls altruistic and I now call deferential preferences. In my 1988 paper “Tied Transfers and Paternalistic Preferences” I proposed a model in which parents were concerned not merely with their children’s utilities, but with their children’s consumption patterns (e.g., parents may be willing to pay for college tuition or the down payment on a house, but not for a Mercedes or a trip around the world.) Non-deferential preferences allow merit goods into parents’ preferences, a suggestion Becker endorses in a passage already quoted (“The most unsatisfactory aspect . . .”) from the introduction to the 1991 enlarged edition of the *Treatise*.

3. Household production

Becker’s household production model, like altruistic preferences, illustrates both Becker’s contributions to fashioning analytical tools and the crucial role of auxiliary assumptions. Although I refer to it as “Becker’s household production model,” of course there were precursors—most immediately Jacob Mincer (1963), but three decades earlier Margaret Reid (1934), a book whose title, *The Economics of Household Production*, suggests its relationship to Becker’s work. But it was Becker’s 1965 article that placed household production and time use firmly on the agenda of economics.

The household production model postulates that households “combine time and market goods to produce more basic commodities that directly enter their utility functions” (Becker, 1965). Recent work on intrafamily allocation has successfully challenged the notion of household utility, relying instead on individual’s utility or preferences. Abandoning household utility complicates the application of the household production model to multi-person households, but does not undermine its usefulness. To deal with complications one at a time, in this section I consider household production in one-person households.

Virtually all systematic analysis of household time allocation rests on some version of the household production model. The question is: which version? As Wachter and I pointed out more than 25 years ago, the simplicity and tractability of Becker’s version of the household production model depends on starting with just the right

combination of auxiliary assumptions. I focus here on two such assumptions—the assumed absence of joint production, and the assumed observability and measurability of commodities. Because household production is a primary auxiliary assumption, the absence of joint production and the observability and measurability of commodities are secondary or tertiary assumptions.

Joint production complicates the interpretation of commodity shadow prices which play a central role in Becker's exposition of the household production model. A commodity's shadow price is the ratio at which a household can transform one commodity into another, or, more precisely, into the standard or numeraire commodity. Relying on the analogy with the theory of consumer behavior, we might expect households facing a high shadow price to consume less of a commodity than households facing a low shadow price.

Joint production seriously compromises the validity of the analogy between the shadow prices of commodities in the household production model and the market prices of goods in the theory of consumer behavior. With joint production, the commodity shadow prices facing a household depend not only on the household's resources and technology but also on the household's preferences. (Recall that I am discussing one-person households.) In the language of consumer theory, with joint production the household becomes a monopsonist with a non-linear budget constraint rather than a competitive consumer with a linear budget constraint. As Pollak and Wachter point out:

Households with different tastes [and the same technology] will select different commodity bundles, and, ... the commodity bundles they select will imply different commodity prices. The unwary economist might attribute some part of the difference in the [commodity] consumption pattern of our two households to these differences in commodity prices, but such an interpretation would be highly misleading; the differences in commodity prices are a reflection of differences in tastes, not differences in opportunities. (p. 265)

How important is joint production? Pollak and Wachter argue that it is pervasive and is present whenever individuals have "direct" preferences for time use as well as "indirect" preferences induced by their desire for the nominal outputs of household production activities. To illustrate the pervasiveness of joint production, Pollak and Wachter develop an example involving two household activities, cooking and cleaning. They argue that if individuals care whether they spend their time cooking or cleaning (e.g., if they like cooking and dislike cleaning), then the household technology exhibits joint production. The argument is straightforward. The household production model in which the household combines "time and market goods to produce more basic commodities that directly enter their utility functions" requires treating all arguments of the household's utility function as commodities; hence, time spent cooking and time spent cleaning must be commodities. That is, time spent cooking is not only one of the inputs into the cooking activity but also, along with home cooked meals, one of its outputs. More generally, if people prefer to

spend their time in some activities rather than others, then the household technology exhibit joint production. The auxiliary assumption “no joint production” rules out direct preferences for time use, while introspection and casual observation suggest that such preferences are pervasive.

Although acknowledging the importance of joint production requires abandoning commodity shadow prices, the household production model remains an indispensable analytical tool. The essential insight of the household production model—that incentives matter, and that changes in incentives cause behavior to change in predictable directions—remains valid. But with joint production, commodity shadow prices cease to be sufficient statistics for the opportunities facing a household. Indeed, despite the prominent role of commodity shadow prices in Becker’s exposition of the household production model, they have played only bit parts in empirical applications. When people care how they spent their time, the household production model is far more difficult to use than the familiar theory of the consumer facing parametric prices.

Becker’s implicit assumption that commodities are observable and measurable is another problematic secondary auxiliary assumption. Becker’s examples of commodities range from “the seeing of a play” and “sleeping” to “children, prestige and esteem, health, altruism, envy, and pleasures of the senses . . .” to “music appreciation.” Time spent seeing a play, sleeping, or listening to music is cardinally measurable, but “pleasures of the senses” and “music appreciation” appear to be ordinal “specific utilities” rather than cardinal outputs of a household production process.

Pollak and Wachter (1975, pp. 273–276) argue that:

... in some potential applications, the variables being investigated are not “commodities” (the outputs of production processes) but rather utilities (numbers representing preference orderings). These misapplications confound tastes with technology by interpreting specific utility functions as production functions.

The disagreements that arise in the study of household production and time use are not about the foundational assumptions of maximizing behavior and equilibrium, nor about the primary auxiliary assumption of household production. They are about secondary or tertiary auxiliary assumptions, such as the presence or absence of joint production and the observability and measurability of commodities. Secondary or tertiary auxiliary assumptions are not sexy, but they do determine the simplicity and tractability of economic models. Despite disagreements about auxiliary assumptions, household production is an indispensable tool for studying the allocation of goods and time within the household.

4. Becker’s models of family collective choice

Gary S. Becker (1974, 1981) proposed the first model of family or household collective choice, his “altruist model.”¹ Prior to Becker, neoclassical economics had

avoided specifying a model of collective choice by treating families and households as if they were individuals and not asking too many questions. The resulting theory of consumer behavior treats the “consumer” as a black box, albeit a black box with well-behaved preferences (i.e., complete, reflexive, transitive, monotonic, continuous, convex), and focuses exclusively on labor supply and the demand for market goods. A centerpiece of the neoclassical theory of consumer behavior was establishing necessary and sufficient conditions for demand functions to be “rationalizable” or “theoretically plausible” in the sense that they are indistinguishable from the demand functions of a utility maximizing individual with well-behaved preferences. For present purposes, it is only a slight exaggeration to say that demand functions are rationalizable if and only if the Slutsky matrix is symmetric and negative semi-definite or, almost equivalently, if and only if they satisfy the strong axiom of revealed preference.

Paul A. Samuelson (1956) was the first to point out that the demand functions of a multiperson household are rationalizable only under highly restrictive assumptions. Samuelson's paper was primarily concerned with international trade and, more specifically, with the conditions under which the demand functions of a country are rationalizable. He showed that a country's demand functions are rationalizable if its citizens have preferences that are identical and homothetic or, alternatively if, the government has a social welfare function and redistributes incomes in response to price changes and other shocks so as to maximize it. In a throw-away section, Samuelson noted the formal analogy between aggregating the demands of citizens to obtain a country's demand functions and aggregating the demands of husband and wife to obtain a family's demand functions.

Becker introduced the altruist model in the context of a family consisting of a brood of egoistic but rational “kids” and one deferential (i.e., altruistic) parent, and applied it immediately to other family interactions. In the case of marriage, the wife is cast as the selfish kid and the husband as the altruistic parent. Becker claimed that the altruistic parent would adjust transfers so that each kid, motivated by his or her self-interest, would act to maximize the altruist's utility function subject to the family's resource and technology constraint; he further asserted that this adjustment is “automatic” (p. 11), an assertion I discuss later but bracket now in order to discuss other issues. Becker summarizes some but not all of these claims in his formal statement of the Rotten Kid Theorem: “Each beneficiary, no matter how selfish, maximizes the family income of his benefactor and thereby internalizes all effects of his actions on other beneficiaries” (p. 288). A reader unfamiliar with the *Treatise* might wonder whether I have quoted only the conclusion of the Rotten Kid Theorem and neglected to quote its hypothesis, but I have quoted the Theorem in its entirety. In the discussion leading up to the Rotten Kid Theorem, Becker fleshed out the interpretation of “internalizes all effects of his actions”: “. . . both an altruist and his selfish beneficiary internalize all ‘externalities’ affecting each other. They not only internalize any effects of their actions on the own income of the other, but also internalize the direct effects on consumption. For example, an altruist (or his selfish beneficiary) would eat with his fingers only when its value to him exceeds the value

of the disgust suffered by the other, or would read in bed late at night only when its value exceeds the value of the loss of sleep suffered by the other . . . ” (p. 284). Theodore C. Bergstrom (1989) elaborates Becker’s example of the altruist reading in bed late at night by adding the possibility that the wife can surreptitiously have the nightlight disconnected. He uses the elaborated example to show that, except with transferrable utility, the conclusion of the Rotten Kid Theorem fails to hold.

Controversy has surrounded the Rotten Kid Theorem and the assumptions under which its conclusion holds. The leading papers include Asser Lindbeck and Jorgen W. Weibull (1988), Bergstrom (1989), and Neil Bruce and Michael Waldman (1990). Becker, in the introduction to the enlarged edition of the *Treatise* cites these papers, concedes that their criticisms have merit, and attempts to clarify the assumptions under which the conclusion holds: “The main assumptions are: all goods can be bought and sold (leisure is an example of a good that cannot); there is a single time period; parents provide gifts to children; and parents choose after children do in a two-stage ‘game’.” (p. 9). Two pages after these “main assumptions” Becker obliquely introduces three supplementary assumptions: “As with the Rotten Kid Theorem, the *automatic* responses of parents to the x_2 chosen by children—no bargaining, commitment, or threats are allowed—induce children to move in a direction desired by parents” (p. 11, italics in original). Two points deserve attention. First, Becker’s laundry list of assumptions are so restrictive as to cast doubt on the relevance of the Theorem. Second, Becker’s effort to clarify the conditions under which the conclusion of the Rotten Kid Theorem holds appears designed to exclude the specific counterexamples developed by his critics rather than to assemble the assumptions required to prove a theorem.

The altruist model and the Rotten Kid Theorem make strong claims about the solution to an unspecified “game”—the scare quotes around “game” are Becker’s—involving parents and children or husbands and wives. Both the claims and the game require clarification. Becker claims that the family acts as though it were maximizing the altruist’s utility function subject to the constraints implied by the family’s resources and technology. When this claim is valid, we can interpret the altruist’s utility function as the family’s Bergson–Samuelson social welfare function. Three implications of this claim deserve attention. First, Becker’s claim implies that family decisions are Pareto efficient. Second, Becker’s claim implies a distribution of the benefits and burdens of family life in which the altruist attains his most preferred point in the feasible set. Third, Becker’s claim implies that a family’s demand functions are rationalizable.

The altruist model is rigged to produce these results, but none of them—efficiency, the lop-sided distribution of benefits and burdens, or rationalizable family demands—is an essential feature of bargaining or game-theoretic models of family collective choice. (I use “bargaining” and “game-theoretic” as synonymous and, for the present, ignore Becker’s assertion that bargaining is not allowed; I return to bargaining when I discuss Becker’s claim that responses are “automatic.”)

To investigate efficiency requires models in which inefficient equilibria are possible. Virtually all cooperative bargaining models assume efficiency. Non-cooperative

bargaining models allow inefficiency and thus provide a framework for investigating the conditions that allow families to achieve and sustain efficient outcomes. The efficiency implications of the altruist model, while of great theoretical interest, do not lend themselves to direct empirical testing.

To investigate distribution requires models, whether based in cooperative or non-cooperative game theory, that allow a wider range of distributional outcomes. Many familiar economic models imply solutions in which one player gets the entire surplus, but such solutions usually depend on strongly asymmetric assumptions about competition (e.g., models with one firm and many workers or, in principal-agent models, one principal and many potential agents). In situations of bilateral monopoly, solutions in which one player gets the entire surplus generally require implausible specifications of the bargaining game. The distributional implications of the altruist model, like its efficiency implications, are of great theoretical interest but do not lend themselves to direct empirical testing.

A substantial literature in consumer demand analysis suggests that the rationalizability of family demand functions lends itself to direct empirical testing. This literature clearly influenced Marjorie B. McElroy and Mary J. Horney (1981), who emphasized the implications of Nash bargaining models for the Slutsky conditions.

Much of Becker's discussion simply assumes that families and households allocate goods and time efficiently. This assumption, combined with the assumption of transferrable utility, justifies the separation of production from distribution and allows Becker to focus on the set of feasible outcomes and the preferences of family members, without formulating an explicit model of collective choice. Indeed, the reader is more than half way through the *Treatise* before encountering Becker's altruist model.

The "collective model" of Pierre-André Chiappori (1988, 1992) postulates an efficient "sharing rule" without attempting to derive it from an underlying model of family or household collective choice. Thus, Chiappori's collective model is midway between Becker's efficiency-based approach and an explicit model of family or household collective choice.

To assess the validity of claims about efficiency, distribution, and the rationalizability of family demand functions requires us to specify not only preferences and the feasible set, but also the rules of the game. The altruist attains his most preferred point in the feasible set not simply because he cares about the utilities of other family members, but because the game is stacked in his favor. The rules empower the altruist.

Although Becker never formalizes the altruist model as a game, two non-cooperative games illuminate different aspects of the altruist model. The ultimatum game, although it violates Becker's insistence that no commitments are allowed and that the parents choose after the children, vindicates Becker's claims about efficiency, distribution, and family demand functions in a broad range of environments. The Stackelberg game, on the other hand, satisfies Becker's insistence that no commitments are allowed and that parents choose after the children, but vindicates Becker's claims only in a very narrow range of environments.

The Stackelberg game is essentially the game Bergstrom (1989, p. 1146) describes as the “Game Rotten Kids Play.”

In Pollak (1985) I suggest interpreting Becker’s altruist model as an ultimatum game. The standard ultimatum game is a sequential two-person game in which the first player, the proposer, offers a division of a fixed sum of money between himself and the second player. The second player, the responder, is informed of the proposed division and chooses between two alternatives:

- She can accept the proposed division, in which case the players receive the proposed payoffs, or
- She can reject the proposed division, in which case both players receive 0.

Thus, the ultimatum game is a one-shot non-cooperative game in which the proposer moves first and confronts the potential recipient with a take-it-or-leave-it offer. Commitment is essential to ultimatum games—if the responder rejects the offer, the game ends: the proposer cannot improve his offer. In the ultimatum game’s unique subgame perfect equilibrium the proposer attains his most preferred point in the feasible set, but the distribution corresponding to this point depends on whether the proposer has egoistic or altruistic preferences. For example, consider the game in which the proposer and the responder divide a fixed sum of money and suppose the proposer has egoistic preferences. In the subgame perfect equilibrium, the proposer offers a division in which he gets the entire sum (or a less than the entire sum), and the responder accepts because she can do no better. Thus, when the proposer has egoistic preferences, the responder is driven down to her reservation level of utility. If, on the other hand, the proposer cares about the responder’s utility, then in the subgame perfect equilibrium the responder receives more than her reservation level of utility.²

The take-it-or-leave-it family ultimatum game provides a model in which all Becker’s claims about efficiency, distribution, and family demand functions hold. The altruist attains his most preferred feasible point, subject to the constraint that others receive enough to remain in the family. Without the ultimatum game’s take-it-or-leave-it commitment structure, the conclusions of the altruist model and the Rotten Kid Theorem hold only in a narrow range of environments.

The Stackelberg game is a two-stage game in which the potential recipient, for definiteness, the child, moves first and the altruist moves second. At the first stage, the child chooses among actions that determine both her income and that of the father. At the second stage, the father observes the child’s income and his own, and may choose to transfer some of his income to the child. The father is assumed to care about both his own consumption and the child’s utility (i.e., to have deferential preferences). If we restrict our attention to income situations in which the father would make positive transfers to the child, and if transfers to the child are a normal good, then the child is better off when family income is higher even though her own income is lower: in effect, family income is pooled and her post-transfer utility depends on total family income, not on how much of it she earns. In the Stackelberg

game, Becker's claims about efficiency, distribution, and the rationalizability of family demand functions hold in the environment just described but, as Becker has acknowledged, they hold only in a narrow range of environments.

When Becker asserted that in the altruist model the adjustment of transfers to family members is "automatic," he may have had in mind the Stackelberg model. His assertion that these adjustments are "automatic" distinguishes his analysis from that of Coase whose bargaining analysis implies efficiency, but does not imply Becker's distributional result or the rationalizability of family demand functions. Becker uses the word "automatically" to distinguish his approach from Coase's: "The Coase Theorem proves that when 'bargaining cost' are negligible, each family member could always be induced to maximize family opportunities through bargaining with and side payments from other members. I have proved that the head (and, as shown later, others members too) has this incentive and, in effect, makes or receives 'side payments' without bargaining with other members. The word 'automatically' is used to distinguish this theorem from the Coase Theorem" (Becker, 1974, p. 1077, fn 26).³ A possible interpretation of Becker's claim that these adjustments are "automatic" and involve "no bargaining" is that they represent a dominant strategy for the altruist, and that the equilibrium of the game follows from "iterated dominance"—the assumption that other family members play their best response to the altruist's dominant strategy. This interpretation saves the notion of "automatic," but its relevance is limited to environments that satisfy a laundry list of assumptions which, taken together, severely limit the applicability of the Rotten Kid Theorem.

Is Becker's altruist a dictator? Becker says no, asserting that: "All beneficiaries voluntarily maximize family income and the utility of the altruist, even when he does not have dictatorial power over their decisions, because their own utility increases and decreases along with his" (p. 296). To characterize Becker's altruist as a dictator, as I did in Pollak (1988) where I described the altruist as the "husband-father-dictator-patriarch," requires qualification, but perhaps not for the reasons Becker asserts. One key distinction is whether a dictator is someone who always gets his way, or someone who gets his way through the exercise of "dictatorial power" or "sovereign power" (p. 297).

In the Stackelberg game, the altruist's power is limited by "corner solutions." From the outset, Becker has explicitly acknowledged that his conclusion about maximization of the altruist's utility function depends on the assumption that the altruist makes positive transfers to all other family members. Becker describes cases in which there are no transfers as "corner solutions" (1991, p. 285), but regards positive transfers from the altruist to the children as the leading case—"parents provide gifts to children" (p. 9). Nevertheless, in the Stackelberg game the altruist's preferences do not prevail unless there are positive transfers.

In the ultimatum game, the altruist's power is limited by the ability of family members to exit. That is, the altruist cannot impose an allocation that would make other family members worse off than they would be outside the family. Hence, the altruist is constrained not only by resources and technology, but also by the reservation utilities of other family members. Whether this constraint implies that

the altruist is not a dictator is a definitional issue. In ordinary language, in the world of nation-states, a dictator's power is constrained by the ability of citizens to exit. In social choice theory, on the other hand, a dictator is defined as someone who always gets his way: implicitly, others lack the ability to exit, so the dictator's power to impose his will is unconstrained. Thus, for the social choice theorist, the altruist who is constrained by the ability of family members to exit is a "quasi-dictator" rather than a dictator.⁴

The altruist model is being displaced by game-theoretic bargaining models in response to developments in economic theory and to accumulating empirical evidence. But the displacement of the altruist model does not lessen its significance as the first attempt to model intrafamily allocation and as a stimulus to subsequent work.

5. Bargaining models of family collective choice

Cooperative bargaining models of marriage were introduced in the early 1980s by Marilyn Manser and Murray Brown (1980) and McElroy and Horney (1981) as an alternative to Becker's altruist model. A typical cooperative bargaining model of marriage begins with a married couple and assumes that each spouse has a utility function that depends on his or her own consumption. If the spouses fail to reach agreement, both husband and wife receive the utilities associated with a default outcome. These default utilities are usually described as the "threat point," but sometimes as the "disagreement point," "breakdown position," or "fallback position." In some models the threat point is interpreted as divorce, in others as a non-cooperative equilibrium within the marriage.

Nash bargaining provides the leading solution concept in cooperative bargaining models of marriage. In the Nash bargaining solution, the utilities received by husband and wife depend upon the threat point; the higher a spouse's utility at the threat point, the higher the utility that spouse will receive in the Nash bargaining solution. This dependence is the critical empirical implication of Nash bargaining models: the couple's expenditure pattern depends not only on prices and the couple's total 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 will maintain ownership of income received separately within marriage, then the expenditure pattern that emerges from marital bargaining will depend not only on the couple's total income but also on the fraction of that income received by each spouse. The threat point also depends on what Marjorie B. McElroy (1990) calls "extrahousehold environmental parameters" and Nancy Folbre (1997) calls "gender-specific environmental parameters." These parameters affect the well-being of divorced men and women but do not directly affect marital utility; they include the public and private resources available to divorced men and women and conditions in the remarriage market. The expenditure pattern that result from divorce-threat marital bargaining will, therefore, depend upon these parameters. As McElroy (1990) points out,

the absence of income pooling and the presence of extrahousehold or gender-specific parameters as determinants of the couple's expenditure pattern yield a specification that can be tested against the common preference alternative. For example, changes that affect the threat point such as changes in the welfare payments available to divorced mothers, the child support obligations of divorced men and women, or in the laws defining marital property and regulating its division upon divorce, should affect distribution between men and women in two-parent families.

In the "separate spheres" bargaining model of Lundberg and Pollak (1993), the threat point corresponds to an inefficient non-cooperative equilibrium within marriage rather than to divorce. Divorce, we argue, should not be treated as the sole determinant of the threat point for cooperative bargaining because, in some situations, divorce is not possible and in many others it is not a plausible threat. In some situations, a "non-cooperative marriage" in which the spouses receive some benefits due to joint consumption may be a more plausible threat in day-to-day marital bargaining. Theodore C. Bergstrom (1996, p. 1926) felicitously characterizes the non-cooperative marriage as "harsh words and burnt toast" but violence or threats of violence may also play a part.

The separate spheres model with its internal threat point implies that, under some circumstances, the couple's expenditure pattern will depend not on who receives income after divorce but on who receives or controls income within marriage: that is, couples do not pool their incomes. Social norms and gender roles play crucial roles in the separate spheres bargaining model as do "household public goods." Household public goods are goods that are enjoyed in common by both spouses and from which neither spouse can be excluded: for example, if both parents care about the well-being of their children, then time and other resources devoted to the nurturing and support of the children are household public goods regardless of which parent provides those resources.

The separate spheres model assumes that socially recognized and sanctioned gender roles assign primary responsibility for certain activities to husbands and others to wives. For example, wives have traditionally been assigned primary responsibility for child care. 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 the absence of cooperation, some household public goods will be provided by the husband out of his own resources and others by the wife out of her own resources. In the separate spheres model when there is strong gender specialization in the provision of household public goods, spouses do not pool their incomes.

As the divorce-threat and separate spheres models show, cooperative bargaining does not imply income pooling. Bargained outcomes depend on the threat point, and if the fraction of the couple's income controlled by husband and wife affects the threat point it will affect the couple's expenditure pattern and the relative well-being of husbands and wives. This dependence implies that public policy, for example, tax and welfare policy, may affect distribution within marriage. The mechanism through which public policy affects individuals and, in some cases, the effects themselves

differ in the divorce threat and separate spheres models. The divorce-threat model predicts that policies that improve the status of divorced women will shift resources within marriage toward wives; it also predicts that policies that affect the control of income within the marriage have no effect on distribution within marriage unless they affect the incomes of divorced men and women. The separate spheres model predicts that policies that affect control over resources within marriage will change distribution within marriage, even if they do not affect the well-being of divorced men and women.

In models of family and household collective choice, the threshold distinction is between cooperative and non-cooperative games. Cooperative games have received more attention, and the Nash bargaining model now plays a leading role in family economics. Virtually all cooperative games, including Nash bargaining, assume or imply solutions that are efficient. Non-cooperative games, on the other hand, often have solutions that are inefficient.

Chiappori's "collective model" finesses the need to specify a particular bargaining game, or even whether bargaining is cooperative or non-cooperative (Chiappori, 1988, 1992). Rather than assuming that observed outcomes are solutions to a particular game, Chiappori assumes only that observed outcomes are efficient. Hence, the collective model contains as special cases all cooperative models and some solutions to some non-cooperative models. Because it assumes efficiency, however, the collective model cannot be used to investigate the conditions under which efficient outcomes are likely. To investigate efficiency requires a model that allows inefficient as well as efficient outcomes.

The most convincing rationale for the usual assumption that bargaining in marriage leads to efficient outcomes is the belief that efficiency is likely to emerge from repeated interactions in stationary environments. But not all marital bargaining involves repeated interactions in stationary environments. Lundberg and Pollak (2001) argue that when a decision affects future bargaining power, inefficient outcomes are plausible. If the spouses could make binding commitments—in effect, commitments to refrain from exploiting the future bargaining advantage—then this source of inefficiency would disappear. But spouses seldom can make binding commitments regarding future allocations within marriage.

To investigate the efficiency of marital bargaining when decisions affect future bargaining power, Lundberg and Pollak consider the location problem of a two-earner couple, where the husband would be advantaged in future bargaining by one location and the wife by the other. Lundberg and Pollak assume that, if the couple agree on a location, they will locate there and bargain to an allocation that is conditionally efficient—that is, efficient conditional on the location chosen. The difficulty arises if the location preferred by the husband implies an allocation that is unacceptable to the wife, and the location preferred by the wife implies an allocation that is unacceptable to the husband. Unless the spouse who is advantaged by the chosen location can commit to refrain from exploiting the bargaining advantage corresponding to that location, the spouses may be unable to agree on a location. Without binding commitments, marital bargaining may result in a divorce that is

inefficient in the sense that in one or both locations there exist feasible allocations that both spouses would prefer to divorce.

Location decisions provide transparent and analytically tractable examples of choices likely to affect future bargaining power, but the logic of the Lundberg and Pollak analysis applies to many other decisions. For example, decisions about education, fertility, and labor force participation are also potential sources of inefficiency.

Bargaining models of marriage have transformed the theoretical landscape. Proponents of bargaining models do not criticize the altruist model on theoretical grounds. Indeed, they concede that there could exist worlds where families behave as the altruist model predicts. They do claim, however, that bargaining models are as consistent with the canons of economic modeling as the altruist model and, hence, that economic theory provides no basis for choice.

How, then, do we choose among competing theoretical models? Aesthetics, mathematical tractability, and parsimony all play a role. But so does empirical evidence. As Einstein famously said (or is famously said to have said), "Science should be made as simple as possible, but not simpler."

In the early 1990s resource pooling emerged as the crucial empirical issue in distinguishing between the altruist model and its competitors. Resource pooling is a restriction on family demand behavior that is simple to explain and apparently simple to test: if family members pool their resources and allocate the total to maximize a single objective function, then only total family resources affect family demands. With resource pooling, the fraction of resources controlled by one family member does not influence those demands, conditional on total family resources. Becker's altruist model implies resource pooling—indeed, at its most literal level, the Rotten Kid Theorem is a theorem about pooling. To quote Becker: "... redistributions of income toward as well as away from w have no effect on the consumption of either w or h , as long as h remains effectively altruistic: his contributions contract or expand sufficiently to offset fully these redistributions" (p. 281). Hence, evidence against pooling is evidence against the altruist model.

With 20/20 hindsight, I am tempted to say that resource pooling is obviously the crucial empirical issue. But it was not obvious to Manser and Brown (1980), to McElroy and Horney (1981), nor to me when I accepted their papers for publication in the *International Economic Review* in the early 1980s. The focus of those articles was not pooling, but Slutsky conditions, an understandable focus given Samuelson's formulation of the problem in his social indifference curves paper and the background of a number of us in consumer demand analysis. Pooling, like intrafamily allocation, had yet to be discovered.

6. Empirical evidence

Empirical work on pooling began with articles by Duncan Thomas and by T. Paul Schultz in a symposium on household bargaining published in the *Journal of Human*

Resources. Using Brazilian data, Duncan Thomas (1990) shows that “kids do better” in terms of mortality and morbidity when their mothers control a larger fraction of family resources or, more precisely, of family nonlabor income. Using Thai data, T. Paul Schultz (1990) shows that men’s and women’s non-labor incomes have different effects on female labor supply. Both Thomas and Schultz use non-labor income because they need an exogenous independent variable; labor income won’t do because it reflects labor supply decisions. Lundberg and Pollak (1996) provide references to a number of studies that ignore this difficulty and proceed as if non-labor income were exogenous. Not surprisingly, supporters of the altruist model find such studies unpersuasive. But even studies using unearned income have difficulties; as Lundberg and Pollak (1996, pp. 144–145) and Jere R. Behrman (1997, pp. 174–175) point out, most unearned income is not entirely exogenous with respect to past or present household behavior.

Taken at face value, the Thomas and the Schultz results challenge all models that assume or imply maximization of a family utility function subject to a family resource constraint. The class of challenged models includes not only Becker’s altruist model but also the neoclassical model. To defend the altruist model or the neoclassical model from the Thomas and Schultz attack, the best move is to claim that the correlations they found reflect unobserved heterogeneity rather than causation. An unobserved heterogeneity explanation of the Thomas and the Schultz results—I am tempted to say a Beckerian alternative explanation—is the “better mothers” story: mothers with more energy and more ability than most are likely to control a larger fraction of family non-labor resources and to have kids who do better. But econometricians do not observe energy or ability. Behrman (1997) summarizes the objections to interpreting the Thomas and the Schultz results as rejections of resource pooling, concluding that “... there are problems with the interpretation that these results reject the pooling assumption ...” (p. 175).

The most convincing empirical work on resource pooling is Shelly Lundberg, Robert A. Pollak and Terence J. Wales (1997). In that paper we analyze the effect of a “natural experiment”—a change in the U.K. “child benefit” in the late 1970s. The child benefit is a government program that pays money to families with children. The payments are not means-tested, but are made to all families with children regardless of their incomes. In the late 1970s Margaret Thatcher’s government restructured the child benefit. The old program worked through the income tax and, in effect, provided resources to the primary wage earner in the family—usually, the husband. The new program paid mothers, typically in cash at the post office. Indeed, some in the Thatcher government were concerned that male voters would resent such a transfer of income “from the wallet to the purse” (Joan C. Brown, 1984, pp. 63–64). During the House of Commons debate, opponents charged that the restructuring “Far from being a child benefit scheme, it looks like being a father disbenefit scheme” (U.K. House of Commons Hansard, May 13, 1975).

The restructuring of the child benefit provides a natural experiment that solves the problem of unobserved heterogeneity: mothers who received additional resources as the result of the restructuring were not the most able or the most energetic—the

restructuring provided additional resources to all mothers. If the pooling hypothesis were correct, the restructuring of the child benefit could not matter—the change from the old to the new benefit scheme would not alter consumption or expenditure patterns.

To test the pooling hypothesis requires dependent variables—data on the intrahousehold allocation that identify consumption by individuals rather than purchases by households. With time use data, leisure is an obvious example of an “assignable” good. Few data sets report the allocation of goods within the household, but some goods are assignable to men, women, or to children on the basis of the descriptions of the goods provided by household expenditure surveys. Men’s clothing, women’s clothing, and children’s clothing are obvious examples. The British Family Expenditure Survey, like its counterpart, the U.S. Consumer Expenditure Survey, reports expenditures on men’s clothing, women’s clothing, and children clothing.

Comparing household expenditure patterns in the years after the change in the child benefit (1980–90) with the years before (1973–76), holding constant family expenditure, Lundberg, Pollak and Wales found a substantial and statistically significant increase in expenditure on children’s clothing relative to men’s clothing. They also found a substantial and significant increase in expenditure on women’s clothing relative to men’s clothing.

Jennifer Ward-Batts (2002) provides further evidence. Lundberg, Pollak and Wales looked for changes in expenditures on tobacco and on alcohol, but found none. Ward-Batts used disaggregated data that distinguished between cigarettes and “other tobacco”—that is, pipe tobacco and cigars—which she characterized as “men’s tobacco.”⁵ Ward-Batts found a substantial and significant decrease in expenditure on men’s tobacco, providing further evidence that control over resources affects household expenditure patterns and allocation within households.

The response to the change in the U.K. child benefit provides the best evidence to date that control over resources affects household expenditure and consumption patterns. Indeed, it is virtually the only evidence that would persuade economists initially skeptical of such claims. Whether evidence persuades individuals depends, of course, on the strength of their prior beliefs. In my experience, non-economists tend to believe that control over resources is likely to matter, while economists, especially those trained at Columbia or Chicago, tend to believe that control over resources is unlikely to matter. For both groups, the priors are based on theory rather than empirical evidence—for the non-economists, usually implicit theory and for the economists usually explicit theory. Although the empirical evidence against resource pooling is scant, the empirical evidence in favor of resource pooling is non-existent. Given the paucity of evidence and the strength with which theoretically based priors are held, discussions often take on a theological flavor. H. Alderman et al. (1995) suggest that the time has come to shift the burden of proof from those who believe that households do not pool their resources to those who believe that they do. The evidence from the U.K. child benefit supports the conclusion that a shift in the burden of proof is overdue.

7. Extending the scope of bargaining models beyond marriage

With the exception of the altruist model, the literature on family and household collective choice has thus far concentrated on marriage and virtually ignored other family relationships. Bargaining between spouses is tractable because it can often be modeled as a two-person game in a stationary environment (i.e., an environment that remains stable or changes slowly over time). Interactions between parents and adolescent or young adult children usually involve more participants (more than one parent; more than one child) and bargaining environments that change as children grow up. Interactions between elderly parents and adult children also may involve more participants (more than one elderly parent, more than one child) and environments that change as elderly parents grow older, become disabled, and die. Blended families, extended families, and families that span three or more generations are still more complex.

Despite their complexity, I expect bargaining models to play an increasing role in the analysis of family and household collective choice. Very little has been done on interactions between parents and adolescent and young adult children; an important exception is Marjorie B. McElroy (1985) which uses the Nash bargaining framework to analyze children leaving or not leaving their parents' households. Interactions between elderly parents and adult children are an area of active research. B. Douglas Bernheim, Andrei Shleifer, and Lawrence H. Summers (1985) proposed a "strategic bequest model" in which elderly parents influence the behavior of their adult children by conditioning bequests on the children's behavior. The strategic bequest model, like Becker's altruist model, implies that the equilibrium is the feasible outcome preferred by one player—the elderly parents in Bernheim, Shleifer, and Summers—subject to the constraint that other family members receive at least their reservation utilities. Like the altruist model, the strategic bequest model can be interpreted as an ultimatum game in which the parent can confront other family members with take-it-or-leave-it choices. In Pollak (1988) I argue that implausible assumptions are required to make credible the elderly parent's threat to disinherit an adult child who fails to provide the attention the parent demands. Donald Cox (1987) analyzes inter vivos transfers in a model that enables parents to maximize their utility subject to the constraint that no child can be made worse off than he or she would be by withdrawing from the family. The contributions of McElroy (1985), Bernheim, Shleifer, and Summers (1985) and of Cox (1987) are not the particular game-theoretic formulations they propose, but the demonstration that interactions between elderly parents and their adult children need not depend exclusively on altruism but can involve elements of exchange.

The theoretical and empirical issues surrounding the family's role in providing long-term care to the disabled elderly have received increasing attention. A central policy concern is the extent to which increased public provision of long-term care would reduce private provision, and private provision is largely family provision. To estimate the effects of policy requires modeling families' responses to the incentives created by public programs, and this in turn requires a model of family collective

choice. Two examples from the recent literature will suffice. Liliana E. Pezzin and Barbara Steinberg Schone (1999) investigate the relationship among coresidence, informal (i.e., unpaid) caregiving provided by the daughter, and the time the daughter devotes to paid work; an underlying Nash bargaining model with a non-cooperative threat point provides the basis for estimation. The authors conclude that government subsidization of formal (i.e., paid) in-home care would substantially reduce both coresidence and the family provision of informal care. Maxim Engers and Steven Stern (2002) focus on another issue—the bargaining among the adult children over the sharing of the burden of caring for an elderly parent.

Models that stack the deck to ensure that one family member attains his most preferred point in the feasible set simplify the analysis. Unfortunately, they simplify too much.

8. Marriage markets and assortative mating

Becker's analysis of the marriage market rests not only on the foundational assumptions of maximizing behavior and equilibrium, but also on auxiliary assumptions. These auxiliary assumptions simplify the analysis, but they lack theoretical or empirical support.

Becker considers two approaches to modeling marriage markets, one based on matching and the other based on search. Matching models are non-stochastic and timeless, implicitly assuming that complete and accurate information is instantaneously and costlessly available to all marriage market participants. Search models, in contrast, are stochastic and dynamic, recognizing explicitly that individuals have less than complete and accurate information about potential spouses, and that acquiring more and better information requires resources and takes time; search models usually emphasize the costs of delay. Becker relies primarily on matching models in his initial analysis of the marriage market (Chapters 3 and 4), but revisits marriage market issues from a search perspective in his subsequent discussion of marriage and divorce (Chapter 10).

I illustrate Becker's reliance on auxiliary assumptions with two examples. The first is his conclusion that marriage markets are efficient. Becker works with a model in which spouses jointly produce a single homogeneous consumption good. He further assumes transferrable utility: in effect each spouse's utility is linear in his or her consumption of this good. Under these assumptions, an efficient matching is a pattern of marriages and non-marriages that maximizes total output. As Becker points out, this equivalence is an implication of the isomorphism between his specification of the marriage problem and the Tjalling C. Koopmans and Martin Beckmann (1957) linear optimal assignment model. Becker's efficiency conclusion rests on his auxiliary assumption that when prospective spouses meet in the marriage market they can make binding costlessly-enforceable agreements regarding allocation within marriage. The assumption that allocation within marriage simply

implements an agreement previously made in the marriage market is, of course, inconsistent both with Becker's altruist model and with bargaining models of marriage. Lundberg and Pollak (1993) and Bergstrom (1996) investigate models in which prospective spouses cannot make binding agreements, but recognize that allocation within marriage is determined by bargaining between spouses after they have married. In such models, marriage market equilibrium need not be efficient.

Becker's conclusion that marriage market equilibrium implies negative assortative mating on wages (e.g., high wage men marry low wage women) provides another illustration of the crucial role of auxiliary assumptions. In this case the crucial auxiliary assumption is that the gains from marriage result solely from specialization: marriage permits one spouse to specialize in the market and the other to specialize in home production. Using a model in which the gains from marriage result solely from spouses' joint consumption of household public goods, David Lam (1988) shows that marriage market equilibrium implies not negative but positive assortative mating on wealth. Generalizing the model to allow gains from marriage to arise from specialization and from joint consumption of household public goods, Lam then shows that a complex pattern of assortative mating can emerge. This work demonstrates that Becker's negative assortative mating conclusion depends on the absence of household public goods.

Thus, both Becker's efficiency conclusion and his negative assortative mating conclusion do not follow solely from the foundational assumptions of maximizing behavior and equilibrium. Each depends crucially on questionable auxiliary assumptions.

9. Conclusion

Lars Hansen and Jim Heckman invited me to discuss the importance of Becker's contributions to policy as well as to social science, but I have little to say about policy. Becker's economic approach to the family is often believed to imply that certain types of targeted government policies cannot affect allocation within families because they will be fully neutralized by individuals' responses: a version of Ricardian equivalence. For example, the altruist model and the Rotten Kid Theorem imply that which parent receives the child benefit must be irrelevant.

I argued earlier that the interesting implications of the economic approach to the family do not follow from maximizing behavior and equilibrium, the foundational assumptions of the economic approach, but depend on contested auxiliary assumptions. For example, the conclusion that parents will neutralize the child benefit depends on the assumption that family collective choice is determined by the altruist model and that preferences exhibit transferrable utility. Whether these auxiliary assumptions are described as primary, secondary, or tertiary, is a matter of taste—*De Gustibus Non Est Disputandum*.

Becker's influence on welfare reform and other specific policies is difficult to assess. In the final paragraph of the *General Theory*, John Maynard Keynes (1936) famously asserted that, in the long run, ideas are more important than vested interests in public policy:

... the ideas of economists and political philosophers, both when they are right and when they are wrong, are more powerful than is commonly understood. Indeed, the world is ruled by little else. Practical men, who believe themselves to be quite exempt from any intellectual influences, are usually the slaves of some defunct economist. Madmen in authority, who hear voices in the air, are distilling their frenzy from some academic scribbler of a few years back.

Treating Keynes's claim as social science rather than as mere rhetoric, we need to ask whether the influence of ideas on policy is researchable. What theory and what data could we marshal to investigate the influence of ideas on policy? Claims about the power of academic scribblers may appeal to academic scribblers, but Social Policy and Social Science may march to different drummers. To identify the influence of ideas on public policy requires a better theory of the policy process than social science can offer.

Becker's influence on the economics of the family has been pervasive. His ideas have dominated research in the economics of the family, shaping the tools we use, the questions we ask, and the answers we give. I can testify to their influence on my own thinking, work, and career.

Becker invented the economics of the family and secured its place on the agenda of economics. On the threshold issue of the importance of modeling interactions within the family Becker has carried the day. On the usefulness of economic theory for modeling interactions within the family, Becker has carried the day. The foundational assumptions of the economic approach—maximizing behavior and equilibrium—as well as such primary auxiliary assumptions as household production and interdependent preferences, are now widely accepted not only by economists but also by family sociologists, demographers, and others who study the family. To a remarkable degree, the economics of the family reflects Becker's vision, although perhaps not to the degree that he would like.

Some of the differences between Becker's original vision and the current state of the economics of the family reflect the evolution of Becker's ideas, sometimes in response to his critics. Other differences reflect ongoing and often vigorous debate. For example, Becker jettisoned stable preferences, which he originally presented as a foundational assumption and dropped his insistence on deferential preferences ("altruism"), acknowledging the importance of merit goods. With household production, the basic concept is now generally accepted but the secondary and tertiary auxiliary assumptions about household technology are contested. More specifically, Becker's formulation of the household production model assumes the absence of joint production, and some of his most striking conclusions depend on this assumption, yet joint production is present whenever individuals care how they spend their time.

Becker's original model of family and household collective choice, the altruist model, is now in retreat, although no particular alternative to it commands general assent. Because of the difficulty of modeling what Martin Shubik (1989, p. 103) calls "complex, loosely structured social interaction," perhaps no single model of family and household collective choice will ever command general assent.

Becker's success in putting the family on the agenda of economics virtually ensured that he would lose control of it. The entry into the economics of the family of economists trained at graduate programs other than Columbia or Chicago was bound to disrupt the early consensus. As an MIT trained economist whose only ties to the Columbia/Chicago tradition are through my interest in the economics of the family, I have the advantages and disadvantages of an outsider.⁶ With my background and interest, I am inevitably both a follower of Becker and a critic of Becker.

No one can predict with confidence the direction the economics of the family will take over the next 25 or 50 years. After all, economists took nearly two centuries to unpack Adam Smith's contributions and establish the conditions under which the conclusions of the invisible hand theorem hold. Perhaps economists unpacking Becker's contributions will move more quickly. Those who complete the task will surely honor Gary Becker for laying the foundations of the economic approach to the family.

Notes

1. A note on terminology: I use the phrase "collective choice model" to mean a mapping from feasible sets and the preferences of family members into family decisions or choices. "Collective choice rule" would be a better term, but has been preempted by social choice theorists. The classic problem in social choice theory is to aggregate individual preferences into social preferences. I have focused instead on mapping preferences into decisions, without regard for whether these decisions can be "rationalized" by a "family preference ranking" with desirable properties (e.g., transitivity or quasi-transitivity). In social choice theory, the default starting point is individual preference orderings but, because of the importance of collective choice models based on bargaining, my default starting point is individual von Neumann–Morgenstern utility functions.
2. Experiments tell a different story about ultimatum games. Responders who receive "ungenerous" offers are likely to reject them and proposers, perhaps aware that responders who receive ungenerous offers are likely to reject them, usually offer responders a substantial fraction of the pie. Thus, experimental evidence overwhelmingly contradicts the prediction of the standard backwards induction argument and these experimental results, despite efforts to exorcise them, have proved extremely robust. Alvin E. Roth (1995) provides a detailed survey of the literature on bargaining experiments, including ultimatum games. Colin Camerer and Richard H. Thaler (1995) provide a brief survey of ultimatum game experiments; their discussion, significantly enough, appears in the "Anomalies" section of the *Journal of Economic Perspectives*. Investigators have proposed a variety of explanations of these anomalous experimental results. The willingness of respondents to reject ungenerous offers suggests that their utility functions contain more arguments than the money payoffs they receive in the game.
3. Becker mentions transaction costs only once in the *Treatise*, citing Posner for the proposition that the common law improves efficiency when transaction costs are large (p. 363). He refers to Coase twice in the *Treatise*, but never to discuss the relationship between the Rotten Kid Theorem and the Coase Theorem. Bergstrom (1989, p. 1138; see also, pp. 1157–1158) characterizes the Rotten Kid Theorem as

- a “younger sibling” of the Coase Theorem, although neither Bergstrom (1997) nor Behrman (1997) mention the Coase theorem in their discussions of the Rotten Kid Theorem.
4. In social choice theory, a dictator is defined as someone whose preferences prevail for all logically possible preference profiles. For example, when the dictator wants the children to eat their broccoli, the social preference is for them to do so, even when the children would rather not. Becker's assumption that the altruist has deferential (i.e., altruistic) preferences rules out preference profiles in which this conflict occurs. Becker's altruist is a Paretian liberal who always defers to his children's dietary and other preferences regarding their own consumption. Hence, even if the altruist's preferences prevailed within this restricted class of admissible (i.e., deferential) preference profiles, social choice theorists would not call him a dictator.
 5. Lundberg, Pollak, and Wales used published data that was cross-classified by household income and demographic composition, and in which the expenditure categories were more highly aggregated than those reported in the micro-data used by Ward-Batts.
 6. Shoshana Grossbard-Shechtman (2001) describes the development of the Columbia–Chicago tradition. Easterlin, Pollak, and Wachter (1980) self-consciously describe the Pennsylvania alternative to the Columbia-Chicago approach; Warren C. Sanderson (1980) provides an insightful commentary on the differences.

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