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Private Transfers within the Family:
Mothers, Fathers, Sons and Daughters

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Abstract: Despite recent advances in data collection and the growing number of empirical studies that examine private intergenerational transfers, there still exist significant gaps in our knowledge. Who transfers what to whom, and why do they do it? I argue that some of these gaps could be filled by departing from the standard parent-child framework and concentrating instead on fathers, mothers, sons and daughters in a way that accounts for fundamental—and sometimes obvious—male-female differences in concerns and objectives in family life. Elementary sex differences in reproductive biology constitute the basic building blocks of studies of family behavior in many disciplines, but despite recent progress they get far less attention than they deserve in economic studies of the family. I explore, separately, the implications of three basic biological facts for intergenerational transfer behavior. The first is paternity uncertainty: how does it affect the incentives of fathers, mothers and of various grandparents to invest in children? The second is differing reproductive prospects of sons versus daughters: when are sons a better investment than daughters and vice versa? The third is conflict: How much acrimony might we expect to occur in families, and why? In examining these issues I also explore household survey data from the United States. This preliminary evidence is consistent with non-biological as well as biological explanations of behavior. Nonetheless, the biological focus confers two advantages, by generating falsifiable predictions and by illuminating new avenues for empirical work. There is enormous potential for further micro-data-based empirical work in this area.

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Private Transfers within the Family: Mothers, Fathers, Sons, and Daughters

DONALD COX

How does a parent decide how much to support a child? Does it matter whether the parent in question is a father or mother? Or whether the child is a son or daughter? And is it the parent who is really doing the deciding? Might it be that the child has already figured out how much he or she wants, and is now conducting a lengthy campaign to get the parent to hand it over?

Surprisingly, the existing empirical literature on intergenerational transfer behavior contains few answers to these basic questions. Most analyses, for example, are gender-blind, with generic parents and generic children, rather than mothers, fathers, sisters, or brothers. Models that contain husbands and wives usually do not feature anything special about being male or female—they may as well be person 1 and person 2. Not that these limitations have necessarily impeded this fast-growing literature so far. Advances in data collection and ever-expanding empirical interest in the economics of the family have generated significant new knowledge about intergenerational transfer behavior. Recent progress notwithstanding, I argue that the domain of analy-

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sis should be expanded to recognize the separate behavior of mothers and fathers, and sons and daughters.

The rationale for the more detailed focus comes from biological considerations. Elementary evolutionary biology predicts that men and women have fundamental differences in concerns and objectives in family life. Elementary sex differences in reproductive biology constitute the basic building blocks of studies of family behavior in many disciplines, but despite recent progress, they get little attention in economic studies of the family. Expanding economic models of family behavior to accommodate biological basics could generate substantial new insight into how families function.

Such knowledge is of considerable policy interest. The *existence*, *responsiveness*, and *nature* of familial transfers each matter for public policies that redistribute income. For example: if my grandmother qualifies for Medicaid benefits that pay for her stay in a nursing home, is she the true Medicaid beneficiary? Or is it my mother, who in the absence of Medicaid would have had to care for her? Is it better for elderly women to be cared for by their daughters or by nonrelatives? Would it matter whether my mother and her mother got along well or not? What if my grandmother had only sons to rely upon rather than daughters?

The existence of intergenerational transfers complicates labeling public income redistribution programs “programs for the elderly” or “programs for kids.” (What if my grandmother spends part of her Social Security check to help put my cousin through automotive repair school?) The (as yet) unknown nature of intergenerational transfers implies that judgments about crowding out are equally tricky. If the public sector diminishes the role of the family, it matters how well the family was functioning in the first place.

One way to improve our understanding of how families operate is to focus more attention on the separate interests and capabilities of male versus female family members by exploring three themes that are prominent in biology: The first is paternity uncertainty. How does it affect fathers’ versus mothers’ incentives to invest in children? The second is the reproductive and economic prospects of male versus female offspring. Do they create incentives for sex-biased parental investments? The third is parent-child conflict. How could it happen and how prevalent might it be? Along the way, I provide preliminary empirical evidence related to each issue, but keep the investigation deliberately simple, to see if these problems are worthy of further empirical scrutiny.

Nothing in this paper should be construed as a claim that “biology is destiny.” The descriptive evidence, for example, is consistent with both biological and nonbiological explanations. Nonetheless, attention to reproductive biology has two considerable virtues: It generates falsifiable predictions, and

it guides the discovery of new directions for empirical work. Testing a strictly biologically based approach to assess its predictive power is both a feasible and worthwhile direction for future empirical research on the economics of the family. Before proceeding to some considerations of reproductive biology and the family, it is useful to look at some leading stylized facts, puzzles, and gaps in the intergenerational transfers literature.

What Do We Know about How Parents Allocate Transfers to Children? A Brief Overview

In the past twenty years or so, interest in intergenerational transfers has surged, and economists have uncovered a great deal of information about how those transfers are allocated among children. Some of the leading stylized facts that have emerged from this research are:

- The majority of bequests are shared equally among children.
- Unlike bequests, *inter-vivos* transfers appear not to be shared equally.
- The effect of children's incomes on *inter-vivos* transfers is very small.

Studies that find a “compensatory” effect of transfers (that is, more help for poorer children) usually indicates compensation of no more than a few cents on the dollar.

—*Inter-vivos* transfers appear to be targeted toward those who are liquidity constrained.

Demographic characteristics of children, such as age or gender, are often found to be important determinants of transfer receipts, even controlling for income. Despite these general conclusions, empirical work on private transfers has also raised numerous puzzles; many empirical findings pose significant problems for existing theories of transfer behavior. For example, consider the finding of meager income effects. Gary Becker's theory of altruistic transfers predicts not just *compensatory* income effects, but *large* ones.¹ To see why, consider an altruistic parent who gives money to each of her two children. In doing so, she in effect decides how much everyone in the family consumes. Essentially, everyone's paycheck goes into a common cookie jar, and she determines how the total is divvied up. Now, suppose the parent's income falls by a dollar, say, because of an increase in her taxes. Suppose the government uses these proceeds to subsidize the children, so that total family income remains unchanged. Since everyone's preferences stay the same, everyone's optimal consumption stays the same. The only thing that *does* change is the parent's transfer to the children. She gives a whole dollar less to them because of the

1. Becker (1974).

new tax and subsidy scheme. (By taking a dollar out of the parent's pocket and giving it to the children, the government "crowds out" some private transfers by usurping some of the parent's role as provider to the children.)²

The parent's response to these schemes has acquired a name in the empirical literature: the "transfer derivative." Altruistic transfers imply a dollar-for-dollar transfer derivative, that is, a value of one. Transfer derivatives become murkier in a multiperiod model. (Imagine, for example, that the parent who was taxed reduces her transfers to children, but spreads out the reduction over time.) However, if, in addition, children are liquidity-constrained, the original predictions hold once again. Further, the evidence suggests that parental *inter vivos* transfers are indeed disproportionately (though not exclusively) targeted to liquidity-constrained children.³ Empirical work on U.S. private transfer behavior has reached the consensus that transfer derivatives are not even remotely close to those predicted by the altruism model. The highest estimate for U.S. data is 15 cents on the dollar; most are less than half that much.⁴

An even more formidable challenge to the altruism model is the tendency for bequests to be shared equally among inheritors, a finding first emphasized in Paul Menchik's pioneering work.⁵ The altruism model predicts that parents would give more to their poorer children. Equal sharing is difficult for other models of transfer behavior to explain as well. For example, if bequests compensate for services provided by children, it is hard to see how children could all be compensated equally.

To explain equal sharing, economists tend to fall back on the idea that parents care about treating their children fairly. This is quite plausible, but, as most admit, it is not much of a theory. But concentrating on fairness could lead to fruitful theorizing—the trick is to figure out *why* the desire for fairness might come about.⁶

2. This example ignores human capital investment and corner solutions, which can complicate matters. For a far more comprehensive analysis, see Behrman, Pollak, and Taubman (1995). The same goes for a scheme that taxes one child by a dollar and gives the proceeds to the other. The parent would undo this scheme by giving exactly a dollar more to the child who is taxed and giving one dollar less to the child who is subsidized.

3. Cox (1990); McGarry (1999).

4. See Altonji, Hayashi, and Kotlikoff (1997, p. 1153); and Cox and Rank (1992).

5. Menchik (1980).

6. The most recent attempt on this front is the work of Bernheim and Severinov (2000), who postulate that bequests provide to children a signal of their parents' altruism toward them.

It would be premature to use findings such as equal sharing to close the door on such a commonsensical hypothesis as altruism. Part of the reason why transfer derivatives appear so low in the United States might be due to its existing public transfers. Perhaps crowding out is a *fait accompli*, rendering the remaining, infrequent instances of private transfers uninformative about altruism. Further, altruistic motives might only come to the fore when potential recipients are in dire straits, suggesting that nonlinearities in income could have an important role to play.⁷

Income is not the only thing that can affect transfer behavior, but it is easy to see why income effects have received so much priority in the empirical literature. One major line of research in intergenerational transfer behavior is the specter of crowding out. Academics and policymakers want to know if public income redistribution supplants private income redistribution. Further, most theoretical models of private transfer behavior emphasize pre-private-transfer incomes more than any other potential transfer determinant.

Despite their importance, income effects may have captured more than their fair share of attention in the U.S. empirical literature. Other determinants of transfers, particularly demographic characteristics, have been given less emphasis, and existing theory provides little guidance on how to interpret their effects on transfers. Usually, demographic variables are either inserted, with little elaboration, as additional “controls,” or they are treated as supplemental proxies for income.⁸ Sometimes they are included in empirical work but neither reported nor discussed. One exception is the work of Jere Behrman, Robert Pollak, and Paul Taubman, summarized in a recent collection of their articles and papers.⁹ One of these papers investigates the possibility of parental favoritism toward boys; another looks at birth-order effects. But papers like these, which use data from the United States, are rare.

In contrast, the development literature has a long tradition of focusing on demographic variables in studies of family behavior: in particular, differences in the ways boys and girls are treated within the family, and differences in

7. For example, two co-authors and I found extremely large transfer derivatives among poor households in the Philippines, a country with very little public income redistribution. See Cox, Hansen, and Jimenez. 1999. “How Responsive Are Private Transfers to Income? Evidence from a Laissez-Faire Economy.” Boston College. Mimeo.

8. An example of the latter is age, which tells us something about a potential recipient’s access to credit markets.

9. Behrman, Pollak, and Taubman (1995).

how fathers and mothers treat their children are dominant themes.¹⁰ What does this literature tell us about gender and family transfers? Daughters tend to fare worse than sons in the developing world, though pockets of pro-daughter bias do exist and several studies find little or no bias.¹¹ Gender-based favoritism appears to be absent in the United States.¹² As far as mother-father differences go, emerging evidence from the developing world suggests that putting more money in the hands of mothers would benefit children, especially daughters.¹³ Most of the evidence pertains to developing countries, but a recent study of a change in child benefit disbursement policy in the United Kingdom by Shelly Lundberg, Robert Pollak, and Terence Wales indicates that children fare better when the mother has more control over family resources.¹⁴

Economic theory is only somewhat useful for interpreting these results. Theory tells us that the results could *not* have emerged from a household consensus—the so-called common preferences model—between mothers and fathers. But it does not tell us much beyond that. To the extent that parental transfers have to do with human capital investment, economic theory provides considerable insight, since human capital models have existed for many years and are highly refined. But outside of human capital, economic theory has little to say except to refer to parental preferences. Since preferences are exogenous in most economic models, this is not much of an explanation.¹⁵ A recent survey by Lundberg and Pollak sums up the state of the art quite suc-

10. See, for example, the painstaking and comprehensive literature reviews of Behrman (1997) and Strauss and Thomas (1995).

11. Again, refer to the Behrman (1997) and Strauss-Thomas (1995) reviews.

12. Behrman, Pollak, and Taubman (1986).

13. Strauss and Thomas (1995) are cautious about these trends; uncovering parental differences in transfers to children poses formidable estimation problems because a spouse's contribution to, and control over, family resources is endogenous.

14. The Lundberg, Pollak, and Wales study also has the considerable advantage of being far less prone to the endogeneity problem referred to above.

15. Inattention to the complexities of preferences is more a virtue of economics than a drawback, because it highlights the role of prices, which is easier to interpret, and keeps a lid on the arbitrariness that might plague models with more complicated consumer psychology. Further, existing economic concepts about preferences, simple as they are, contain a bit of nuance nonetheless. For example, Ben-Porath and Welch (1976) get considerable mileage out of an idea from economics called "convex preferences," which implies that people prefer moderation to extremes. They use it to explore sex preferences in fertility, and more parents who have two boys or two girls are likely to have a third child than parents who already have one of each. Their finding suggests that parents prefer variety.

cinctly: “. . . no new theoretical framework has gained general acceptance as a replacement for common preference models, and empirical studies have concentrated on debunking old models rather than on discriminating among new ones.”¹⁶

Insights from Reproductive Biology

Over a century ago William James, considered by many to be the father of modern psychology, penned the following tacky rhyme:

Higamous, hogamous, woman's monogamous;
Hogamous, higamous, men are polygamous.¹⁷

James's whimsical assertion is hardly true for everyone, everywhere, but he was nonetheless onto something. Even if a man and woman have the same objective—say, to produce progeny in sufficient numbers and quality to continue the family line—they differ vastly in their capacity to achieve it. In her whole life, a typical woman produces only about 400 viable eggs. In just one day, a typical man produces enough sperm to populate a country the size of Japan. The fecundity of eighteenth century Britain's Duchess of Leinster, who had her twenty-first child at age forty-six, pales in comparison to seventeenth century Morocco's Moulay Ismail the Bloodthirsty, who sired 888 children by his many wives and concubines.¹⁸ These oddities point up the obvious: a motivated, resourceful man can literally “go forth and multiply,” but a woman can only go forth and add.

Of course, this is just one of many basic sex differences in reproductive biology. Here are three more: First, except in the strangest of cases, a woman is always 100 percent certain—and a man never 100 percent certain—that a newborn child is a biological relative. Next, a woman's expected reproductive life span is only half that of a man's; and last, a fertile man who has secured a mate is a mere spasm's worth of effort away from the prospect of getting his genes into the next generation, while a woman who has just conceived still faces a marathon of exhaustion, sickness, discomfort, pain, and risks to physical and emotional health.

These elementary facts figure prominently in biological studies of family

16. Lundberg and Pollak (1996, p. 140).

17. Cited in Hrdy (1999, p. 233).

18. Hrdy (1999, p. 84).

behavior. They also play an important role in analyses of family and kin behavior undertaken by many anthropologists, ethologists, psychologists, ecologists, demographers, and primatologists. But they are, for the most part, glaringly absent from most economic studies of family behavior. Economic models of intergenerational transfers are, for the most part, unisex models.

Not that insights have been lacking. Gary Becker's analysis of altruistic parental transfers spawned a whole new subdiscipline in economics, and the family bargaining models pioneered by Marjorie McElroy and others broadened the scope of that subdiscipline.¹⁹ For many of the questions posed in this early work, the recognition of biological differences would have been little more than a distracting nuisance. Despite these early advances, however, and despite the efforts of a small cadre of economists who have adopted and promoted a biological focus, the empirical state of the art of family economics suffers from its chronic inattention to reproductive fundamentals.

In recent years, the landscape has begun to change, and increasing numbers of economic analyses have centered on these fundamentals. Theodore Bergstrom has written several papers that use and extend ideas from evolutionary biology and combine them with economic reasoning to study family behavior.²⁰ An analysis of a long-standing biological theory of preferences for sons versus daughters—the so-called Trivers-Willard conjecture, which is discussed below—recently appeared in the *Journal of Political Economy*.²¹ Aloysius Siow has explored the implications of male-female differences in reproductive life span for gender roles in the labor market.²² Robert Willis's theory of out-of-wedlock childbearing recognizes the distinct problems and incentives faced by men versus women.²³ But much remains to be done, particularly with respect to taking biologically based models to the data. The following sections concentrate on prominent biological themes, starting with one that is pertinent to fathers and mothers.

Fathers and Mothers

Except for having to worry about rare mishaps like babies getting switched in the maternity ward, a woman is always certain that her newborn is a biological relative. But a man seeking the same certainty would have to do more

19. See, for example, Becker (1974); and McElroy and Horney (1981).

20. See, for example, Bergstrom (1996).

21. Edlund (1999).

22. Siow (1998).

23. Willis (1999).

than watch the maternity ward; he would have to guard his mate round the clock daily.²⁴ In some cultures, past and present, husbands have attempted just that. But barring extreme “mate guarding”—usually draconian practices ranging from intrusive to downright barbaric—a man would have to trust completely his mate’s fidelity or else harbor some flicker of concern, however small, that his putative child is not really a biological relative. What are the implications of such uncertainty for familial transfers?

Certainty of paternity is a major theme in the biological literature on family behavior and in some branches of anthropology and psychology, but only a minor one in the economics of the family. Even Gary Becker’s monumental *Treatise on the Family*, which helped spur the importation of biological concepts into studies of family economics, makes little mention of it.²⁵ Similarly, Jack Hirshleifer’s comprehensive and prescient discussion of the synergies between economics and biology makes no reference to paternity certainty.²⁶

But references are beginning to crop up in more recent economic research. Theodore Bergstrom analyzes uncertain fathers’ investment in children in his wide-ranging, interdisciplinary review of the economics of the family.²⁷ Laura Argys and Elizabeth Peters explore empirically the relationship between the establishment of paternity and fathers’ involvement with, and transfers to, children.²⁸ But no other economic studies deal with the implications of paternity certainty on family behavior. Yet evidence from other disciplines has frequently identified paternity certainty as a prominent force; its connection with family transfer behavior is potentially of great importance for the economics of the family.

24. An alternative would be to get a DNA-based paternity test, something I discuss later.

25. Becker (1991, p. 48) discusses briefly the guarding and seclusion of women in the context of the division of labor within the family, and notes that “Female adultery is a serious offense in traditional societies, mainly because men are reluctant to rear children fathered by others.” But there is not much further reference to the problem of certainty of paternity in his *Treatise*, and no analysis of its implications. Becker’s earlier (1976) article on economics and sociobiology, which has an explicit focus on basic biological concepts such as kin selection, nonetheless makes no mention of paternity certainty.

26. Hirshleifer (1977).

27. See Bergstrom (1996, pp. 1923–24) for an analysis of a male’s decision to support his wife’s versus his sister’s children as a function of paternity certainty for the Nayars of India, a polyandrous matriarchal society.

28. Argys and Peters (2001).

The following discussion explores the basics of female fidelity and its opposite, cuckoldry, that is, misattribution of fatherhood.²⁹ What is the evidence on paternity and cuckoldry? What is the evidence on concerns about cuckoldry? How large would the uncertainty have to be to generate significant behavioral effects? What are the implications for parenting? For grandparenting?

A Case Study with Possible Clues: Grandparenting and Public Pensions in South Africa

A recent paper by Esther Duflo shows that not all grandparents are equally generous to their grandchildren.³⁰ In fact, only one, the maternal grandmother, appears responsive to incentives to support them. Duflo's study was not concerned with paternity certainty per se, but her results nonetheless shed potentially useful light on this issue.

Duflo studied familial transfers that occurred in an unusual natural experiment. Pressure for racial parity in South Africa's public pensions resulted in huge cash transfers to the country's poor elderly, who by early 1993 were receiving from the government more money than they had ever dreamed of—twice the median rural per capita income.³¹ Duflo investigated the impact of the expanded pension on young children, motivated by the fact that Black South African elderly often live with their grandchildren in multi-generation or “skip-generation” households where absent parents work elsewhere.³² She reasoned that these pensioners, many of whom were bringing in more money than anyone else in the household, might be spending some of it on better nourishment for their young grandchildren. Though Duflo's interest was in differences between grandmothers and grandfathers, she also considered whether the grandparent was maternal or paternal.

Only one grandparent's pension eligibility had a statistically significant impact on child well-being—that of the maternal grandmother. Her eligibility for a pension was associated with significantly better outcomes for girls' weight-for-height. The maternal grandmother is unique not only economi-

29. This definition differs from what can be found in most dictionaries. Webster's College Dictionary, published by Random House, defines a cuckold as being “the husband of an unfaithful wife,” a necessary but not sufficient, condition for cuckoldry as defined here. Instead, I adhere to the definition used, for example, by Wilson and Daly (1992), where cuckoldry refers to the misattribution of fatherhood.

30. Duflo (2000).

31. Case and Deaton (1998).

32. Case and Deaton (1998).

cally but also biologically—she is the only grandparent who can be absolutely certain that the grandchild is hers.³³ The question is whether cuckoldry is a reasonable explanation—after all, how prevalent is it likely to be?

Misassigned Paternity: X, the Unknown

How many children are sired by someone other than their putative father? The short answer is that no one knows. Some estimates are rather high but difficult to believe. It could well be that the average probability of cuckoldry in the United States is quite low, though certainly not zero. While concrete evidence is scarce, myth, misinformation, and speculation about paternity uncertainty abound. Further, since beliefs and expectations are presumably what guide behavior, even “urban legends” about paternity could prove relevant. Both fact and fiction merit scrutiny.

Physiologist Jared Diamond created a minor stir by claiming, in his book *The Third Chimpanzee*, that “. . . between about 5 and 30 percent of American and British babies [have been] adulterously conceived.”³⁴ Diamond cites an unpublished study by “Dr. X,” a “distinguished medical scientist” demanding anonymity, who in the 1940s accidentally uncovered evidence of widespread cuckoldry in the course of investigating heritability of human blood groups. Diamond reasoned that this early study probably accessed only a few of the many blood-typing procedures now available, so that blood group discrepancies (such as a type-O wife giving birth to a type-A child, but having a type-O husband) represented the tip of the cuckoldry iceberg.³⁵

33. Another pattern found by Duflo, which is not directly relevant to paternity but nonetheless important from another biological perspective, is the maternal grandmothers’ apparent favoritism toward granddaughters. Only girls benefit from grandmotherly largesse. This is consistent with so-called Trivers-Willard effects, which I discuss further below.

34. Diamond (1992, p. 86).

35. Before the advent of DNA testing, serology was the primary forensic tool for investigating paternity. This method could only reject paternity, and only in cases where offspring characteristics were impossible given characteristics of the potential father. If, as Diamond argues, only a limited number of blood characteristics were investigated by “Dr. X,” such rejections reveal only a subset of the progeny of adulterous unions. Just to illustrate, suppose there is a single trait with two phenotypes, P and p, determined by two equally prevalent genotypes, dominant G and recessive g. With random mating, only about a quarter of all illegitimate children could be identified by phenotypic discrepancies. About half would escape detection because the “cuckolder” and the putative father would share the same genotype. In half of the remaining cases, the mother would carry the dominant gene, making it impossible to

Diamond states that Dr. X's results ". . . were later confirmed by several similar genetic studies whose results did get published" but unfortunately does not provide any references to them. A few years later, biologists Robin Baker and Mark Bellis, in their controversial study of the implications of female infidelity, made similar claims about the incidence of misattributed paternity, this time summarizing published serology studies.³⁶

Another biologist, Tim Birkhead, cautions against reading too much into the limited evidence on paternity uncertainty. Any unpublished study must be taken with a grain of salt since it would not have been subject to routine scientific scrutiny, and published studies are all based upon serology rather than DNA testing, making results difficult to interpret.³⁷

One such blood study, conducted on a sample of parents and children from a small Michigan town and published thirty years ago, illustrates some of the problems Birkhead refers to.³⁸ A team of three geneticists and an epidemiologist used blood samples collected from 9,000 families to identify possible departures from Mendelian inheritance patterns for eleven different blood groupings. After dropping observations with no parental observations, they sought to identify problematic observations, including errors in data entry, unrecorded adoptions, and the like. The researchers went back to the individuals in families with discrepancies and recollected and retyped one or more blood groupings. These screens left 109 out of 2,507 (4.3 percent) with remaining discrepancies, observations that were dropped from subsequent analyses because blood samples were not consistent with parent-child relatedness. Further, though using eleven blood groups generates a higher incidence of exclusion than the more limited studies referred to by Diamond, the probability of exclusion is still less than 100 percent.³⁹

Does this imply a minimum 4.3 percent cuckoldry rate? Not necessarily. The researchers found that first-born children were overrepresented among discrepant children, suggesting that many of them might have been stepchil-

reject anyone's paternity. Only in cases in which the mother carried the recessive gene, and the genotypes of the putative father and the cuckold differed, could paternity be excluded. With equal prevalence of G and g, and random mating, this probability is the product of two independent fifty-fifty events. Of course, the logic of paternity rejection and the evidence are distinct issues, and the numerical assumptions in this example are just used as illustrations.

36. Baker and Bellis (1995).

37. Birkhead (2000, p. 82).

38. Sing and others (1971).

39. "University of Dundee Department of Forensic Medicine" (www.dundee.ac.uk/forensicmedicine/llbtesting.htm [September 2001]).

dren mistakenly reported as biological children. Despite the care with which the authors treated discrepancies, ascertaining the cuckoldry rate proved elusive. Also, it was not a primary aim of the study, and the authors did not pursue it further.

Despite the inferential advantages now available from DNA testing, any direct attempt to study paternity certainty would be fraught with formidable human-subjects concerns and sample-selection bias. It would be obviously unethical, for example, to publish findings about discrepancies in relatedness obtained from DNA studies conducted in relation to, say, organ transplants between supposed kin. And disease inheritance studies based on molecular methods to establish relatedness are based on self-selected samples. In Birkhead's words, "On being told that the information they provide might reveal true paternity, many would-be volunteers melt away. Those remaining are hardly a random sample and hence provide no basis for an estimate."⁴⁰

An alternative source of evidence is animal studies, which are free from human subjects and sample-selection problems. Recent studies point to widespread female infidelity even among species once thought to be almost exclusively monogamous. Even before the advent of DNA testing, biologists were beginning to overturn conventional wisdom concerning parentage in avian species thought to be paragons of monogamy. For example, the indigo bunting, a species of bird once thought to be almost exclusively monogamous, was found to have an estimated cuckoldry rate of at least 35 percent. Findings like these were uncovered repeatedly for one species after another, once DNA fingerprinting techniques were discovered.⁴¹

One might think it strange to refer to animal studies in the context of economic analysis of families. After all, what does the parentage of indigo bunting or baboons have to do with our behavior? Economists should be careful not to dismiss such findings easily or to treat them as fanciful curiosities. In addition to being largely exempt from ethical concerns and selection bias, their culture-free settings create better laboratories for learning about biologically based behavior. Further, evolutionary models imply that all living things face the same basic problems of surviving and reproducing. In other disciplines, such as anthropology and psychology, researchers routinely sift through cross-species evidence when studying family behavior.⁴²

40. Birkhead (2000, p. 82).

41. Birkhead (2000, pp. 37–38).

42. Becker (1991) argues that some of the uncanny similarities in much of the behavior of nonhuman and human families are not necessarily manifestations of "biological determinism," but could instead result from the ubiquity of economic problems faced by nonhumans and humans alike.

Why might cuckoldry occur? If biology is at the root of infidelity, isn't just the male the one who stands to gain, in terms of extra progeny, from stepping out on his mate? This argument fails once it is recognized that people care about child quality in addition to quantity. Quality and quantity trade-offs, first emphasized in economics by Gary Becker, create a conflict of interest between men and women, even if both sexes value these attributes identically. The price of child quantity relative to quality differs dramatically between men and women. A man can pursue extramarital liaisons to raise the quantity of his progeny, whereas a woman obviously cannot (except in cases of male fertility problems). But she can pursue such liaisons to raise the *quality* of her progeny. And, if some of these high-quality progeny happen to be sons, they may afford her an opportunity to "go forth and multiply" vicariously.

A woman's concerns about child quality is a central theme in anthropological, biological, and psychological theories about female infidelity. The theories most interesting from an economic perspective are those concerned with material resources—anthropological models of how women provision their children. Donald Symons argues that a woman might engage in short-term sexual liaisons in order to secure resources for her existing or future progeny.⁴³ Sarah Hrdy reasons that a woman might seek to create confusion about paternity in order to secure resources from more than one man.⁴⁴ Such arguments suggest that female infidelity is, in economic terms, an "inferior good." In Hrdy's framework, for example, two putative fathers may be preferable to one certain father because one man's expected investment is insufficient. Evidence supporting her argument comes from findings about culturally sanctioned multiple husbands, or "polyandry." This rare practice nearly always occurs in environments so rough that a household with only one man might have difficulty making a go of it.⁴⁵

43. Symons (1979).

44. Hrdy (1981). Other explanations for female infidelity are similarly founded upon motives to enhance child quality. For example, there is the "sexy sons" hypothesis, attributed to statistician Ronald A. Fisher (1958). Like Flaubert's Madame Bovary, a woman consorts with handsome, but irresponsible "Fast Freddie" while married to wealthy but unexciting "Steady Eddie." With Freddie's chiseled features and Eddie's money, her son inherits the means to perpetuate the family line by producing several high quality grandchildren.

45. For instance, among poor Tibetan yak herders a man might permit his brother to share his wife if having an extra worker helps ensure the viability of the household. For a recent analysis of the relationship between poverty, sex, and reproduction, see Edlund and Korn (2002).

How Much Could Paternity Uncertainty Possibly Matter?

Applying strictly biological considerations to the problem of paternity uncertainty and familial transfers is bound to be misleading. Economic considerations are essential too. For example, consider the kin selection model of William Hamilton.⁴⁶ Imagine (since no such thing has ever been found), a “helping gene,” that is, a portion of the genome governing altruistic behavior. Hamilton argues that altruistic behavior between kin was determined by the following implicit calculation “I’ll help someone else if expected benefits in terms of ‘inclusive fitness’ exceed expected costs in terms of inclusive fitness.” “Fitness,” in turn, is usually defined as the expected number of progeny, and “inclusive fitness” is my own fitness plus a weighted sum of my relatives’ fitness. The weights, in turn, are the “coefficients of relatedness,” defined as the probability (over and above pure chance) that my beneficiary and I share the same helping gene. For example, because of the genetic shuffling from sexual reproduction, the chance that my daughter inherited my helping gene is fifty-fifty, so my coefficient of relatedness to her would be 0.5.

In brief, Hamilton’s rule says to provide help if $c < rb$, where c denotes fitness costs, b denotes fitness benefits, and r is the coefficient of relatedness. Certainty of paternity figures into this rule in a straightforward way. Suppose a man is only 95 percent sure that he is really the father of his daughter. Then his coefficient of relatedness would be only 0.475, compared to his wife’s 0.5. When his daughter wants to go to the zoo, or to college, his wife will ask, “Is $c < 0.5b$?” while he will ask, “Is $c < 0.475b$?”

But biological considerations alone are woefully insufficient for explaining relative parental investment. It is well known that economic considerations figure prominently. Heading the list is the division of labor between husbands and wives. Decades ago Becker pointed out that specialization can magnify small differences in underlying preferences and technology, resulting in large differences in behavior. Sex differences in the certainty of paternity could figure in, just like other biological differences that Becker lists in his *Treatise*.⁴⁷

In addition to the division of labor, other economic considerations can be appended to Hamilton’s rule. For example, paternity uncertainty creates a public goods problem. The flip side of paternal doubt is the possibility that another father is out there somewhere, and perhaps a devoted one at that. Such prospects create externalities that, at least in principle, further dilute incentives for male investment.

46. Hamilton (1964).

47. Becker (1991).

Lastly, limited time budgets play a role. Departures from strict monogamy create obvious opportunities and trade-offs that divert a philanderer's attention from his children. A husband who arrives home too late to take his kids to the ballgame because a dinner with his attractive new systems analyst went on too long is implicitly sacrificing quality of existing offspring for quantity of future offspring.⁴⁸

Grandparenting and Paternity Certainty

Separating the effects of paternity uncertainty from these distinct though related crosscurrents is a potentially daunting task. One way to help control for (though not completely eliminate) the effects of sex-related division of labor in provisioning to children is to back up a generation and focus on grandparenting. Contrasting maternal versus paternal grandmothers, for example, holds constant the sex of the provider while allowing things like relatedness to vary.

Evidence from three household surveys—the Health and Retirement Study (HRS), the National Survey of Families and Households (NSFH), and the Panel Study of Income Dynamics (PSID)—points to large differences in behavior by maternal or paternal status.

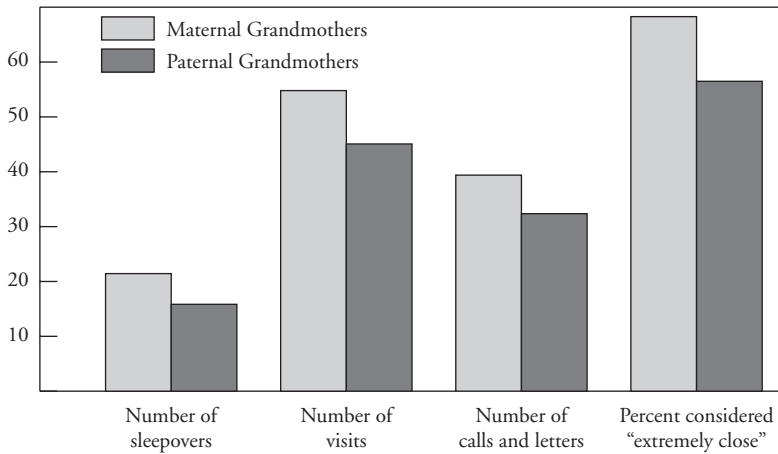
The first finding, from the HRS, is that grandmothers who are exclusively maternal (that is, have grandchildren only by their daughters) provide more hours of childcare than grandmothers who are exclusively paternal (have grandchildren only by their sons). To avoid picking up the effects of grandmothers helping out daughters who are single mothers, the sample was limited to grandmothers with married children. In the first wave of the HRS, respondents were asked if during the preceding twelve months they spent 100 hours or more caring for their grandchildren. Those responding “yes” were then asked to give the amount of time, which was coded as the annual number of hours. Exclusively maternal grandmothers provided 374 hours compared to 290 hours provided by exclusively paternal grandmothers, a difference of 29 percent.

This finding proves little about paternity certainty per se, since far more commonsensical explanations exist. Suppose my wife and I need a babysitter for our daughter, but we divide our labor in such a way that finding one is “her department.” Though both our mothers might be available, she feels more comfortable imposing on hers. Indirectly, then, the maternal or paternal differences in grandmother care come from how my wife and I divide our labor.

48. See Robert Willis (1999) for extensive analyses of these problems and related issues.

Figure 6-1. *Grandmothers' Involvement with Grandchildren*

Number, unless otherwise indicated



Source: Author's calculations using the National Survey of Families and Households (NSFH).

Maternal or paternal differences extend to other forms of grandmother and grandchild relationships besides hours of care. The second wave of the NSFH includes a special module on contact and affection between grandparents and grandchildren. As with the HRS, I analyze the sample of grandmothers who were either exclusively maternal or exclusively paternal and whose own children are not single parents. The NSFH grandparenting module measures grandparent-grandchild contact (visits separate from letters-plus-phone calls) and the number of times in the past year a grandchild spent the night at the grandmother's house ("sleepovers"). Each measure indicates more contact with maternal grandmothers than paternal ones, as shown in the first three pairs of bars in figure 6-1. Maternal grandmothers had 35 percent more sleepovers and 22 percent more visits and calls-plus-letters.

The NSFH also asked grandparents to report their feelings of affection for grandchildren. On a scale from zero to ten, where zero is "not at all close," and ten is "extremely close," how would you describe your relationship with your grandchild(ren)? The results are displayed in the last pair of bars in figure 6-1. As with the other indicators, this self-reported closeness measure shows the same maternal and paternal differential: 68 percent of the exclusively maternal grandparents chose the extreme portion of the closeness scale compared to 56 percent of their paternal counterparts.

But these additional results still do not rule out more straightforward expla-

nations. Closeness, for example, is likely to be nurtured by repeated contact and care; feelings and actions are not separate.⁴⁹ So the results from figure 6-1, while consistent with the idea that paternity uncertainty matters, are hardly conclusive. Instead, they only indicate that further scrutiny is warranted.

I provide a bit more scrutiny with a final piece of evidence, which explores the relationship between incomes of adult children and grandparenting behavior. Recall that there might be reason to believe that paternity uncertainty could be the outcome of a rational strategy of a woman who seeks to provision her children in the face of poverty.⁵⁰ Elijah Anderson's ethnography of sexual mores among inner city youth, for example, describes a situation of mutual suspicion between the sexes regarding infidelity.⁵¹

Accordingly, I explore differences in the familial support provided by paternal versus maternal grandparents, while considering the incomes of the parent (middle) generation. PSID respondents were asked to report in-kind transfers in the form of child care and money transfers received from parents. For the sample of married households with children (age eighteen or younger) and all four grandparents, average hours of care received from maternal versus paternal grandparents are similar to using the HRS data above as seen in the first two bars of figure 6-2. But for transfers of money, the results are reversed—paternal grandparents are more generous with transfers of money.

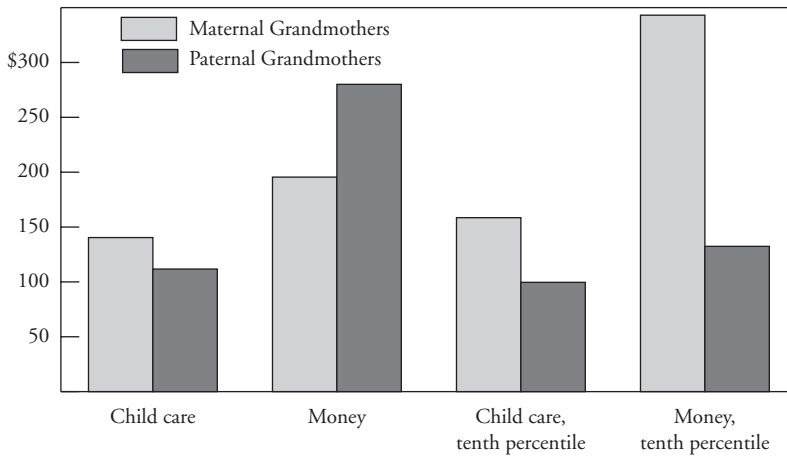
One likely explanation for this result is related to earlier, commonsensical arguments: A wife calls upon her own mother more often than her mother-in-law to baby-sit. Her mother-in-law makes up for the inequity by giving more money. But focusing just on the households in the lowest decile reverses this paternal advantage in money transfers as seen in the rightmost last two pairs of bars in figure 6-2. Further, the maternal advantage in hours of childcare increases. Unlike the earlier differences, however, it is significant only at the 10 percent level. Further, the difference for childcare is not significant except at the 25 percent level. The sample sizes are small and select—recall that only married households are included.⁵² Moreover, part of the

49. Though altruism is mostly treated as an unwavering, exogenous parameter of the utility function, economists have begun to recognize that such preferences are themselves forged by parental choices. For example, see the recent work of Casey Mulligan (1997) on the formation of altruistic preferences.

50. Hrdy (1999).

51. Anderson (1993).

52. Relaxing the requirement that all four grandparents be living, and replacing it with requiring both living grandmothers, doubles the sample size. Using this sample, the difference in differences for the maternal advantage in child care is significant at the .02 level, but that of money transfers, while still positive, is not statistically significant.

Figure 6-2. *Parental Transfers*

Source: Author's calculations using the Panel Study of Income Dynamics (PSID).

maternal and paternal differences in behavior could come from the effects of different ages, income, location and so on. The simple tabulations only suggest that there might be something to be explained.

Sons and Daughters

While the first implication of biology focused on paternal uncertainty, the second explores the advantages or disadvantages of investing in sons and daughters.

The Trivers-Willard Hypothesis

Consider again Esther Duflo's South African evidence, but this time concentrate on the *recipients* of grandparental largesse—who happen to be the granddaughters.⁵³ Is it a coincidence that the benefits of pension expansion accrue to them rather than to their brothers? Perhaps, but consider: A daughter from a poor family might stand a better chance of escaping poverty—by marrying “up” the status scale—than a son who lacks the resources to marry at all. Conversely, a son from a rich family might well be in a position to “go forth and multiply.”

Such is the logic of the so-called Trivers-Willard effect, an idea formulated in 1973 by renowned evolutionary biologist Robert Trivers and his fellow

53. Duflo (2000).

student at the time, mathematician Dan Willard. Trivers and Willard were not concerned with human behavior per se, but instead were interested mainly in whether animals of various species might somehow control the production of female versus male offspring to take advantage of propitious circumstances for one or the other sex. Trivers-Willard effects have been uncovered in both field and laboratory tests for several species. But so far researchers have found little evidence of biased sex ratios for humans.⁵⁴

Parents have considerable latitude for making differential investments in sons versus daughters, even if they choose not to control the sex ratios of their progeny.⁵⁵ Edlund cites evidence that points to Trivers-Willard effects in infant and toddler care among North American and German mothers, for example.⁵⁶ What about parental investments in older and grown children? In addition to schooling investments, parents can make *inter-vivos* transfers to children and bequests at death.

I investigated the Trivers-Willard hypothesis in a somewhat narrow setting by comparing education levels of male versus female children at varying levels of wealth for the sample of HRS households with just two biological children (one male, one female) from an intact marriage. The results, which are shown in figure 6-3, are surprisingly consistent with the Trivers-Willard hypothesis. Having a daughter who is better educated than a son prevails in the lower ranks, while favoritism toward sons does not emerge until well into the top quartile for parental net worth.⁵⁷

54. One fact that occasionally arises in discussions of sex ratios is the effect of being a U.S. president, a natural proxy for high status and wealth, and the propensity to sire sons versus daughters. Starting with Barbara and Jenna Bush, the daughters of President George W. Bush, and going back in time, presidential families have produced just sixty-three daughters compared to ninety sons, a 59 percent proportion of sons, which teeters on the brink of conventional levels of statistical significance. Does this evidence demonstrate the value of the Trivers-Willard theory for predicting sex ratios in human births? (Or does it reinforce the value of statistical reasoning for preventing type 1 errors?) See Edlund (1999) for more discussion of sex-ratio evidence.

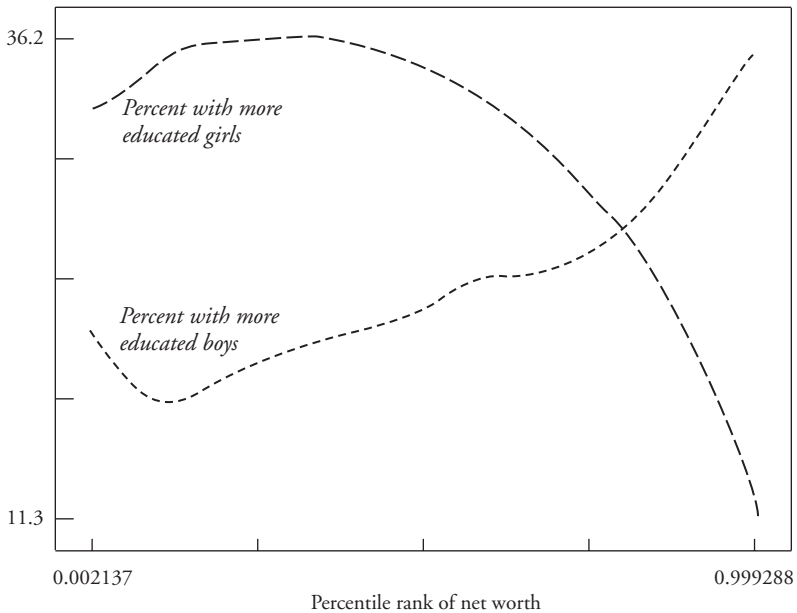
55. But people have other ways of controlling the sex ratios of their progeny, and many of them exact an enormous toll in human suffering: sex-specific pregnancy termination, infanticide, and neglect all play a role. Amartya Sen's (2001) recent estimates point to a catastrophe of unimaginable proportions—as many as 100 million females in the developing world lost from efforts to control the sex of offspring.

56. Edlund (1999).

57. Figure 6-3 plots locally weighted smoothing of the binary variable indicating that the female is better educated (1 if yes, 0 if no) on rank of parental net worth. It also plots, for comparison purposes, the binary variable indicating that the male is

Figure 6-3. *Child Education and Parental Wealth*

Percent



Source: Author's calculations using the Health and Retirement Survey (HRS).

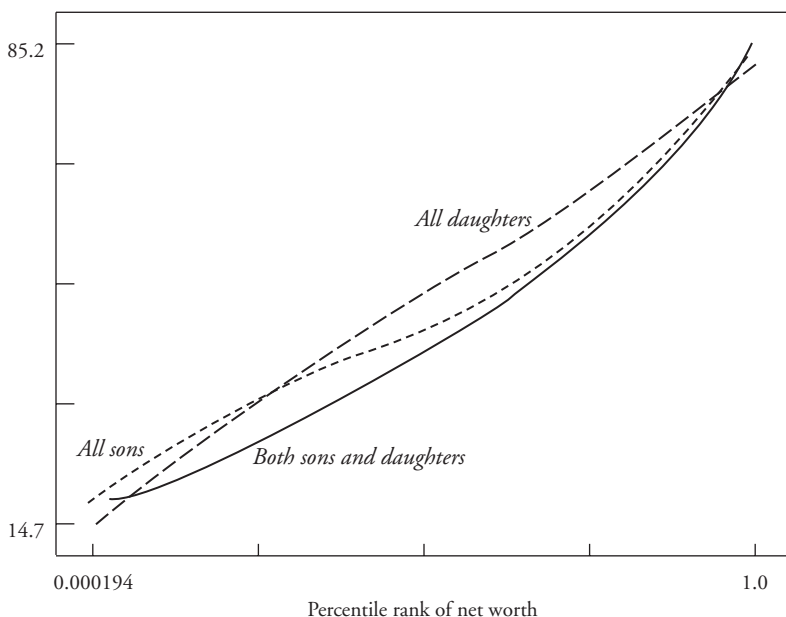
As before, many other explanations are possible. The predominant, and compelling, view in the human capital literature is that schooling is an investment, chosen to maximize expected lifetime earnings. An obvious corollary is that, with well-functioning capital markets, schooling choices are optimal, which implies that no person contributing his or her information to figure 6-3 needed any more or less schooling than he or she got. Perhaps daughters appear “favored” because labor market prospects for male high school dropouts are relatively better than for female dropouts, and both tend to be concentrated among poorer families.

Another measure of transfers to children available in the HRS—intentions to bequeath—indicate no Trivers-Willard effects at all. HRS respondents with only biological children are grouped according to whether they have only male children, only female children, or both, and the desire to leave a

better educated. An ordered probit on the ordinal variable (2=male better educated, 1=male-female education equal, 0=female better educated) on rank of parental net worth produced an estimated coefficient of 0.48 with an asymptotic t value of 3.30.

Figure 6-4. *Parents Who Intend to Bequeath and Parental Wealth*

Percent



Source: Author's calculations using the Health and Retirement Survey (HRS).

substantial bequest is regressed on the rank of parental net worth as before.⁵⁸ The results, which are shown in figure 6-4, reveal no discernible differences in wealth effects by sex composition of the family.⁵⁹

However, bequests might be given too late to have much influence on the reproductive potential of offspring. Further, Kathleen McGarry's recent work comparing *inter-vivos* transfers and bequests indicates that the former are much more responsive to economic and demographic circumstances.⁶⁰ It may therefore be worthwhile in future research to use information on *inter-vivos* transfers to test for Trivers-Willard effects.

58. Many HRS respondents have stepchildren, and the problem of giving to stepchildren versus biological children merits separate, detailed attention. Recall, for example, the earlier discussion of Hamilton's rule. I defer the important issue of transfers to stepchildren to another time.

59. These findings are consistent with Menchik's (1980) finding that the majority of bequests to male-female sibling pairs are shared equally.

60. McGarry (1999).

Old-Age Support

Most of the world's elderly in need of financial support receive it in the form of assistance from kin rather than public pensions. Jeffrey Nugent's survey cites individual studies of twenty-four developing countries on four continents (and even a study for Greenland) that provide evidence of the value of children for old-age security.⁶¹ Nugent provides a systematic listing of background conditions that make old-age security an important motive for having children, and prominent institutional factors include the lack of developed capital markets and the lack of old-age pension and disability programs.

But would parents desiring support favor sons or daughters? A case can be made for favoring sons in many instances. For example, Mead Cain estimates that Bangladeshi sons can start pulling their weight as net producers as early as age ten, but that daughters, despite also starting work very young, leave home before having a chance to repay parental investments.⁶² But even female exogamy with dowry payments can confer benefits to parents in the form of risk sharing by forging ties with in-laws living far away.⁶³

A more straightforward approach to the question might be to rely on the method of "revealed preference." China's 1990 census counts ninety girls for every 100 boys.⁶⁴ In Egypt and Iran, the ratio is ninety-seven females for every 100 males; in Bangladesh and Turkey, ninety-five; in India and Pakistan, ninety-three.⁶⁵

Country averages can mask substantial within-country variance. Sen finds, for example, significant variation in sex ratios and sex-specific child mortality across Indian regions and states. He expresses puzzlement at the heterogeneity: "The pattern of contrast does not have any obvious economic explanation. The states with antifemale bias include the rich states . . . as well as poor states. . . ."⁶⁶ However, such a pattern could be caused by the conflicting forces of Trivers-Willard effects in rich states and the need for old-age support in poor ones. Sen argues that the worldwide problem of "missing

61. Nugent (1985).

62. Cain (1977).

63. Rosenzweig and Stark (1989).

64. Hrdy (1999, p. 319).

65. Sen (2001); Do proverbs constitute admissible evidence? Consider these: "More sons, more happiness and prosperity" (China); "Eighteen goddess-like daughters are not equal to one son with a hump" (India); "Daughters are no better than crows. Their parents feed them and when they get their wings, they fly away." All quoted in Hrdy (1999, pp. 320–24).

66. Sen (2001, p. 40).

women” is too complicated to be addressed by economic reasoning alone, but economic factors are clearly important. For example, consider the common theme of crowding out referred to earlier: Full crowding out implies that public pensions just cause an equal reduction in private support. Sometimes economists assert that crowding out renders public income redistribution useless, or even counterproductive, if, for example, it raises transactions costs. But a completely different perspective is that the crowding out from public pensions might hold the key to dramatic improvements in the well-being of women. If male-biased sex preferences are in large part determined by the desire for private old-age support, then shifting that support to the public sector could mitigate these biased preferences.

Consider the retired elderly in the United States, for example. Their income sources include Social Security, private pensions, dividends, and the like, but usually little financial support from children. Instead, adult children provide support-in-kind: a drive to the optometrist, for example, or advice with investments. Companionship, emotional support, assistance with problems in daily living—these, not money, constitute familial old-age security in the United States. And the overwhelming evidence indicates that daughters provide much more help than sons.⁶⁷ The logic of crowding out suggests that instituting public pensions could tilt parental preferences toward daughters. This conjecture is testable. For example, it might be interesting to compare measures of the desire for, and treatment of, daughters versus sons in the United States before and after Social Security.

Conflict

Exploring some biological roots of family economics has involved some of the nastier aspects of family life: the oppression of wives and neglect of daughters. This section explores further dimensions of family distress. Some of these emanate from a different fundamental theme from biology—Trivers’s theory of parent-child conflict. Still others come from extensions of this theory of conflict.

To see why understanding familial conflict can have potential use within the economics of the family, consider the “case of the yelling parent.” In a recent study, Frank Sloan, Gabriel Picone, and Thomas Hoerger used data

67. Eleanor Stoller’s (1983) study of hours of elder care provided by adult children, for example, shows that daughters provide twice as many hours of help as do sons. See related evidence from Kotlikoff and Morris (1989). More recent findings from the HRS and Asset and Health Dynamics among the Oldest Old (AHEAD) data accord with this evidence. See, for example, Soldo and Hill (1995).

from the United States National Long-Term Care Survey (NLTCS) to study the provision of care by adult children to their disabled elderly parents.⁶⁸ Part of their aim was to explain variation in hours of help provided by adult children. They regressed hours of informal care provided by children to their parents on a variety of mostly economic and demographic variables, including parent and child wealth, the child's wage rate, sex, marital status, and the like. In addition, they entered the dummy variable: "parent yells when upset." About a third of the parents in their sample were so classified, and yelling turned out to be an important explanatory variable in the regression for informal care. It was associated with an extra thirteen weekly hours of care, a lot by any standard, and large in relation to the average of twenty-nine hours received from the primary caregiving child. Yelling falls outside the typical "altruism-exchange" dichotomy so common in empirical studies of intergenerational transfer behavior.⁶⁹ The altruism versus exchange framework has caught on in empirical literature because it seems to cover the bases: I give you something either because I care about you or because I want something in return, or both. This ignores a third possibility: Maybe I just want you to stop bugging me.

At first, this alternative looks like exchange, but it is not. My disabled father yells; I change his blankets. We both would have been better off if he had asked nicely. Yelling is not Pareto optimal; neither is wheedling, nagging, cajoling, or any of the other seven deadly sins of family conflict. Such episodes are wasteful, like strikes or wars. It is preferable to skip them and proceed straight to an agreement.

Such waste makes conflict difficult to analyze in economic terms. John Kennan's thoughtful analysis of strike behavior illuminates the problem, which he calls the "Hicks paradox."⁷⁰ To paraphrase Kennan's explanation, consider the following situation: You and I argue constantly, though when the dust settles, we always come to an agreement of some sort. We go to therapy, in search of a theory that predicts when an argument will occur, how long it will last, and what the outcome will be. The therapist supplies us with one. We then use it to circumvent the *Sturm und Drang* and go straight to the outcome. But this makes our therapist's theory cease to hold!

So strong is the economist's affinity for Pareto optimal solutions that

68. Sloan, Picone, and Hoerger (1997).

69. In fact, however, Sloan and others were primarily interested in testing the implications of the "strategic bequests" model of Bernheim, Shleifer, and Summers (1985).

70. Kennan (1986).

when he first encountered Robert Trivers's conjecture about parent-child conflict, Gary Becker was inclined to discount it. The theory, which first occurred to Trivers while he was watching pigeons, and which applies more to yelling toddlers than to yelling parents, is summarized in his own words below:

The parent has been selected to invest in its offspring in such a way as to maximize the number eventually surviving. From the parent's standpoint we can dissolve parental investment into associated benefit and cost. The benefit is the degree to which the investment increases the survival of the offspring at hand, while the cost is the degree to which the investment decreases the parent's ability to invest in other offspring (including those still unborn). Put this way, the parent is naturally selected to avoid any investment in the offspring for which the cost is greater than the benefit, since such investment would decrease the total number of its offspring surviving.

By contrast, the offspring is selected to devalue the cost it inflicts compared to the benefit it receives. This is because the offspring is identically related to itself but only partly related to its siblings. . . .

Because the offspring is selected to devalue the cost of parental investment, it will always tend to favor a longer period of parental investment than the parent is selected to give.⁷¹

Trivers reasons that such differences in perspective, where mother likes "ego" and "sis" equally, but ego likes himself more, would lead him to temper tantrums and other behaviors aimed at steering extra maternal resources his way. Becker discounts the importance of tantrums, appealing to the logic of his "rotten-kid" theorem.⁷² For example: my sister, altruist mother, and I live under the same roof. Conflict, from wherever it may arise, saps shared family resources, and all are made to suffer, even the perpetrator, who therefore should think twice about causing trouble. This is the same logic that might prevent a pet from biting the hand that feeds it or a virus from killing its host. Bergstrom shows that Becker's reasoning has more limited applicability than he supposed.⁷³ While Becker's theorem arguably qualifies as a behav-

71. Trivers (1985, p. 148).

72. Becker (1976, p. 825) writes: "My analysis denies that such a conflict exists when parents are altruistic because children have an incentive to act as altruistically toward each other as their parents want them to, even if children are really egotistical."

73. Bergstrom (1989).

ioral benchmark, it need not *necessarily* be true. Bergstrom shows that it is logically possible for a child—equipped, for example, with powerful lungs and first-strike capability against a parent with no means of precommitment—to grab more than he was supposed to get.⁷⁴ Bergstrom and Carl Bergstrom exploit this possibility to further explore the biological implications of Trivers's approach to parent-child conflict.⁷⁵

Becker opens the door to the study of family conflict still further with his elegant model of “preference formation,” or what could be termed “taking behavior.”⁷⁶ A “taker” is someone too poor to provide compensation for doing his bidding, so he manipulates people instead. He does this with some ambivalence, since he is also altruistic toward his victims, but not enough to justify giving transfers because of his limited means. Instead, he “turns up the heat,” with behavior that could be construed as threats, wheedling, or guilt-tripping, to get his way. Vijayendra Rao, in presenting his work with Frances Bloch, on domestic violence in India, recounts an interesting example.⁷⁷ A husband who could not afford a down payment for a motorcycle threatens his wife with violence in order to get her to ask her parents for the money. A

74. Imagine, for example, that a child away from home pleads for help with February's rent, insisting it's the last time he'll have to ask, and his parent relents, but issues a warning that it will really have to be the last time. But come March, the child asks for help again, and the parent, an altruist, weakens and relents once again. See also Bruce and Waldman (1990).

75. Bergstrom and Bergstrom. 1996. “Rotten Kids, Squawky Birds, and Natural Selection.” Ann Arbor, Mich. Mimeo. Trivers' approach has received some rather intriguing support from recent, and widely cited, findings by evolutionary biologist David Haig (1993). In the first few days in which an embryo's cells begin to divide, it must accomplish several things to thwart imminent doom: send signals to shut down the menstruation process, establish a connection to the mother's blood supply, and duck attacks from the mother's immune system; Elison (2001). Thus begins the cat-and-mouse game that is pregnancy. For example, the placenta secretes a hormone that blocks the sugar-reducing effects of insulin. The mother's system can respond by upping insulin levels, which is why obstetricians sometimes observe pregnant women with sky-high insulin levels and normal blood sugar. Sometimes these effects do not cancel, and the mother contracts gestational diabetes—while her baby gets ever fatter. Haig's evidence reads like an *in utero* version of the grabby kid in the supermarket candy aisle.

76. Becker (1993).

77. Bloch and Vijayendra. 1997. “Terror as a Bargaining Instrument: A Case Study of Dowry Violence in Rural India.” Williamstown, Mass.: Williams College. Mimeo.

necessary condition for this “taking behavior” to work, as Becker shows, is for the wife’s marginal utility of capitulation to increase with her husband’s threats.

It is puzzling that Becker’s approach has not caught on among those who study family behavior. In stark contrast to the avalanche of applied research stimulated by models of altruism, only a trickle of applied work has emanated from models of conflict. Part of the problem might be an obvious question that Becker ignores: “Who in their right mind would tether themselves to some manipulative ogre?” One obvious answer is that financial or psychological burdens from breaking up create fixed costs that deter easy escape. It is possible to add these to the model, however, and doing so can add both realism and additional insight.⁷⁸

Evidence about family conflict based on survey data is mostly limited to studies of domestic violence.⁷⁹ Household surveys provide little information concerning other forms of conflict. A new source of evidence, however, has become available from a special module of the 2000 wave of the HRS. This module asks a number of “point blank” questions, designed to probe for some of the more subtle motivations for intergenerational transfer behavior. The questions are directed to a subsample of survey respondents, and they include two related to family conflict. Respondents are asked if they agree, disagree, or are neutral about the following statements:

—“My immediate family sometimes pressures me to do more than I want to do for them.”

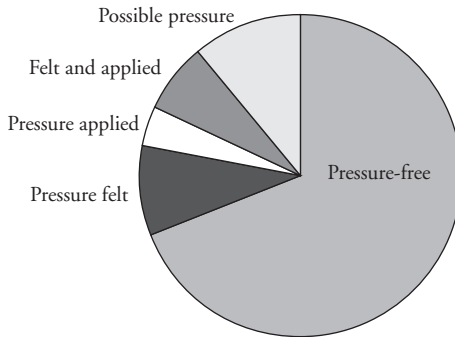
—“I sometimes have to ask over and over again to get my immediate family to help me.”

Call those who agree with the first statement “pressured,” and those who agree with the second “pressurers.” A summary of the responses is shown in figure 6-5.

Only a little over two-thirds of the respondents can be certified “pressure free,” in the sense that they neither applied nor felt pressure; 9 percent of the respondents agree with the first statement, but disagree with the second, so

78. For example, as with most rural Indian wives, those in Bloch and Rao’s data set lived far from their parents and faced virtually infinite fixed costs of terminating the relationship. The more money they had access to, the worse their situation could become, if, for example, parental riches presented a target of opportunity for bullying husbands. This is not necessarily so in the United States, for example, where having a well-paying job and a credible escape plan could help keep a potential bully in check.

79. See, for example, the informative papers by Tauchen, Witte, and Long (1991); and Farmer and Tiefenthaler (1996).

Figure 6-5. *Pressure in HRS Families*

Source: Author's calculations using the Health and Retirement Study (HRS).

they feel pressure, but do not apply any pressure to others.⁸⁰ Of all the respondents, 4 percent disagree with the first statement but agree with the second; surprisingly, 7 percent agree with both statements, suggesting that pressure is not just a “one-way street.” The rest of the sample, 11 percent, is in the “ambiguous” group; they give a “neutral” response to one or both of the statements.

These preliminary findings, along with the theoretical considerations discussed earlier, indicate that the door is open to further inquiry about family conflict. Further research in this area would be of potential policy and intellectual interest. The policy interest stems from the potential for crowding out. If for example, private income transfers are crowded out by public income transfer programs, does this mean that some familial strife would get crowded out too? Such possibilities could change the way we think about the relationship between private and public transfers.

Conclusion

The economic approach to intergenerational transfers often invokes the assumption that men and women have identical interests and capabilities in the reproductive realm. Often this assumption is harmless and convenient,

80. Note that the second question does not ask directly about applying pressure. Querying respondents about whether they asked repeatedly for help seemed a more diplomatic way to broach the issue, since it is unlikely that one would willingly describe oneself as a pest.

but it can sometimes stifle fruitful inquiry into family behavior. Relaxing it illuminates potentially valuable directions for research.

To see how existing work could be reinterpreted or built upon from considerations of reproductive biology, consider two examples referred to at the beginning, in the brief literature review: First is the evidence that putting more income into the hands of mothers increases spending on children. If this behavior is indeed driven, at least in part, by paternity uncertainty, then it should be weaker in cultures in which such uncertainty is low. It would be interesting, for example, to explore the relationship between the severity of regulations and norms about women's sexual behavior and the relative support of children coming from paternal versus maternal grandparents. Consideration of paternal uncertainty forges a link between these two disparate areas of family behavior.

Second is the existing evidence about favoritism of boys. Although little evidence for such bias exists in the United States, Trivers-Willard suggests that such bias can interact with relative socioeconomic status. It is conceivable that leaving out such interactions could obscure such favoritism.

Another standard economic perspective on the family is that it is a place of harmony and agreement, forged either by altruistic ties or the possibility of Pareto-improving trades.⁸¹ But more recent theoretical work, and fragmentary evidence as well, indicates that conflict, and the "taking behavior" that goes along with it, might occupy a significant niche in the familial landscape.

Many of these ideas are amenable to testing with existing household survey microdata. New sources of such information on families are becoming available all the time. Theoretical breakthroughs and advances in data collection make this an especially exciting time for economists interested in family behavior. Further progress will require harnessing insights from biology, and using new ways of looking for evidence. There is much to be done.

COMMENT BY
Theodore Bergstrom

As we all know, economists' models of the family are typically inhabited by asexual Kewpie dolls, with names like A and B or 1 and 2. That is not good enough for Donald Cox. He wants to play with anatomically correct Kens and Barbies.

81. Becker (1974); for example, see also Cox (1987).

Cox argues that biological differences between the sexes are likely to result in predictable differences in the economic relations among family members. Cox looks for testable implications of his theoretical speculations, and has found some intriguing, if not entirely persuasive, results. This puts him well ahead of most economists who speculate about such matters.

Cox's first lesson in the asymmetry of birds-and-bees concerns cuckoldry. Simple biology ensures that women can be much more confident than men about which children are theirs and which are not. Cox finds that there do not seem to be reliable estimates of the percentage of children who are fathered by someone other than their putative father. What evidence there is comes from blood samples taken for other purposes than determining parenthood. Blood tests can be expected to catch a fraction of instances of mistaken paternity. One source is quoted as saying that "between 5 and 30 percent of American and British babies have been adulterously conceived," but Cox reports that even these loose figures are poorly documented. It would be nice to know more about what these numbers are and what they have been through long spells of human history. In the future, perhaps DNA testing will give us sharper results. For the time being, according to Cox, we will have to speculate about magnitudes and look for the qualitative implications of a significant rate of cuckoldry.

Grandma's Bias

Cuckoldry rates are going to have important economic implications if people are more likely to treat their biological children and grandchildren better than stepchildren. Cox proposes an interesting test of the propositions that people are significantly less confident about paternity than about maternity, and that people allocate time and money among their descendants in such a way as to maximize their total contribution to the gene pool. It turns out that Grandma has been discriminating among her grandkids. Grandma appears to care more about the children in her daughters' households than she does about the children in her sons' households. According to the National Survey of Families and Households, maternal grandmothers had 35 percent more sleepovers and 22 percent more visits and calls-plus-letters than paternal grandmothers. On average, they also reported themselves as feeling "extremely close" to their maternal grandkids somewhat more often. All but one of these differences were statistically significant at the 1 percent level.

Cox observes that these effects are consistent with the hypothesis that Grandma is more confident that her daughter's kids are really her descendants than she is about her son's kids. He also notes that other explanations are possible. For example, mothers take a bigger share of the responsibility

for childrearing than do fathers. Mothers are emotionally closer to their mothers than to their mothers-in-law and are more likely to ask the former for help with child care.

What about money transfers? For the population on average, the Grandma story is reversed. Paternal grandparents tend to contribute more money than maternal grandparents. But for the least wealthy 10 percent of the population, maternal grandparents contribute more. Cox offers some anecdotes in support of the proposition that confidence in paternity is lower for poor people than for rich people. This would be consistent with the poor favoring their maternal grandkids, though it would not explain away the observation that the well-off favor their paternal grandkids. This argument would be more convincing if the evidence of differential paternity confidence by income were more convincing. While I do not know a lot about the sex lives of wealthy people, I have heard a lot of stories that suggest that hanky-panky is as likely to be a normal good as an inferior good.

Even if Grandma's bias turns out to be explained by the fact that she gets along better with her daughter than with her daughter-in-law and not by Grandma's suspicions about her daughter-in-law's sex life, her discriminatory practices are likely to interest those who study the economics of the family.

It would be useful to investigate whether some of Grandma's apparent bias toward the matriline is explained by other variables. Does the sample include households that have experienced a divorce and where some of the children are children from an earlier marriage? I can see some reason for Grandma to have more dealings with grandchildren who live with her own child than those who live with her child's former spouse. If mothers are more likely to gain custody than fathers, this would explain some bias toward one's maternal rather than paternal grandchildren.

Although it is likely to be a small effect, it may be worthwhile to consider Grandma's age. Husbands are on average older than wives, so paternal grandmothers will on average be older than maternal grandmothers. If older grandmothers are less attached to their grandchildren than younger ones, this effect would explain some of the apparent bias.

It would also be worthwhile to check the effect of distance between Grandma's home and the grandchild's home. My guess is that there is some tendency towards patrilocality, which would favor attachments with paternal grandchildren, but this is an empirical question that should be checked out.

While we are thinking about the effects of genetic linkage on Grandma's generosity to children, we should not forget about a large class of test cases, namely stepchildren and adopted children. In these cases we know that the genetic links are zero. It would be useful to compare Cox's measurements of

grandmaternal connections for stepchildren and for adopted children with those for putative biological children of sons and daughters.

Sons and Daughters

The Trivers-Willard hypothesis goes something like this: In many species, only the healthiest and most successful males are able to reproduce, and these lucky few hit the reproductive jackpot. Females on the other hand, are biologically constrained from having huge numbers of children; an impoverished female is much more likely to have some children than an impoverished male. Therefore, according to the hypothesis, if mothers find themselves to be well-fed and healthy at the time of conception, they are more likely to have male than female offspring, and if they find themselves in poor condition, they are more likely to have female children. Moreover, the theory predicts that “wealthy” animals are likely to bias their parental investment toward their sons rather than their daughters, while “poor” animals are likely to do the reverse. Ecologists claim to have observed evidence of the Trivers-Willard effect in some species of mammals, such as bison, reindeer, gerbils, red deer, and macaques.⁸²

Cox finds that poor people are more likely to educate their daughters than their sons, while rich people are more likely to educate their sons. He suggests that one interpretation of this result is operation of the Trivers-Willard effect. I am dubious about the Trivers-Willard explanation, but finding a better explanation for this phenomenon is an interesting challenge.

Conflict among Family Members

Biologists are well aware that the biological interests of family members do not coincide. A child has a stronger genetic interest in himself than in his sibling and thus disagrees with his mother about how she should allocate her time between him and his sibling. A person’s own children are twice as closely related to him as his siblings’ children. And so on. Robert Trivers presents a clear discussion of this issue, along with many good examples.⁸³

Cox suggests that economists should pay more attention to interfamilial conflicts of interest and to “inefficiencies” that result from these conflicts. Economists are well aware of Gary Becker’s “Rotten Kid Theorem” that suggests that under certain circumstances, even totally selfish children may be forced to act in the reproductive interests of their parents.⁸⁴ A few years ago,

82. Clutton-Brock (1991).

83. Trivers (1985).

84. Becker (1974).

I wrote a paper called “A Fresh Look at the Rotten Kid Theorem: and Other Household Mysteries,” in which I argue that Becker’s conclusion holds only in very special situations, and that a litter of selfish children would be unlikely to act in such a way as to maximize the parents’ reproductive success.⁸⁵ An interesting parallel discussion exists in the literature of evolutionary biology, with some biologists, such as Richard Alexander, advocating the view that evolutionary forces cause mammalian offspring to act in such a way as to maximize their parents’ net reproductive success, and others, such as Robert Trivers and Richard Dawkins, taking the contrary view.⁸⁶ A paper that my son, Carl, and I wrote, offers a genetically based model of the evolution of behavior in games that involve parent-offspring conflict.⁸⁷

I want to conclude by adding one more plaything to Cox’s dollhouse. This is a case where relatives’ reproductive interests are nearly coincidental, but for which there are interesting divergences. I am thinking of a monogamous husband and wife, each of whom trusts the other’s sexual fidelity. Each of these two people has the same genetic stake in each of their children, and neither of them has any other children to spend resources on. So we can expect a good deal of harmony of interest. But even here, theory predicts a source of discord—a discord that may even be familiar to some of you: in-laws. The prediction of Hamilton’s kin selection theory is that a wife will value her sibling’s children half as much as her own, while her husband has no genetic stake in these children. And conversely for the husband.

In historical societies, even where cuckoldry and divorce may have been rare, marriages were frequently interrupted by the early death of one spouse or the other. Suppose that a woman with some children is considering whether it is in her biological interest to have another child or to stop having children. If she becomes pregnant again, she may die in childbirth. In this case, her other children become orphans, and if her husband marries again, they become stepchildren, with lower survival rates and lower reproductive potential than they would have had if she had stopped having children before this birth. The reproductive loss to her husband is less severe. He has the possibility of remarrying, and producing more children by a new and quite possibly younger wife. Thus the wife’s reproductive interests would be served by having fewer children than would be optimal for her husband to have.

85. Bergstrom (1989).

86. See Alexander (1974, 1979); Dawkins (1976); and Trivers (1974).

87. Bergstrom and Bergstrom (1998).

COMMENT BY

Kathleen McGarry

These certainly are provocative ideas and make for a very interesting paper. Yet, Donald Cox is careful to note that many alternative explanations are possible for the phenomena he describes and that he is simply raising issues that ought to be addressed in future work. The basic idea, that our desire to pass along our genes drives our investments in children, is quite plausible and has a long history in the biological sciences. The crucial question is whether this evolutionary motivation is large enough to affect behavior.

Is the drive toward certain behaviors induced by evolutionary desires strong enough to have an effect in the presence of a myriad of other incentives, obligations, and desires? Making a financial transfer, or providing time help, is a decision reached after some thought, and not a biologically triggered response. Even if parents were genetically predisposed to a certain behavior, it is difficult to imagine that it is carried out impetuously, rather than chosen in a utility maximizing framework where other models come into play. For instance, it is hard to imagine that parents are unconsciously giving greater cash transfers to one child over another. While I have my doubts about whether an evolutionary motive is operable, Cox has succeeded in getting us to think about these issues and perhaps is spurring others to test some of the hypotheses he offers, and on that score, is to be commended.

Consider the motivation for transfers to children. The biological explanation is that parents transfer resources to children to help them succeed so they have successful children of their own, and so on. Through this mechanism, parents enable their genetic line to continue. This theory is in contrast to an altruism model wherein parents transfer to their children because they care about the child's happiness, or an exchange model wherein parents care about their own happiness and the observed transfers are part of a reciprocal agreement, representing payment for services provided by the child.

An important part of developing the model is devising tests that differentiate it from other hypotheses existing in the literature. Fortunately, this novel idea appears to be testable in several ways:

One test that Cox employs is the difference in transfer propensities between mothers and fathers. Because mothers are more certain of the biological link to their child, they should be more likely to make transfers than are fathers. Cox highlights this difference by examining transfers from grandmothers to their grandchildren. Because maternal grandmothers are certain of a genetic link to the grandchild, they are more likely to make transfers than paternal grandmothers, who might harbor some doubt about whether

their son is the child's father. The empirical evidence supports this prediction, but is also consistent with other models of transfer behavior. As Cox notes, if childcare is the responsibility of women, the wife in the couple with young children may turn to her own mother for assistance simply because she feels closer to her than to her mother-in-law. This assistance from the maternal grandmother could be given freely as part of an altruism model or "purchased" in an exchange regime. In an exchange model, the maternal grandmother would be preferred to the paternal grandmother if the wife's mother can provide care at a lower price. For example, the daughter and mother might share similar child-rearing beliefs, or alternatively, if child care is provided in exchange for future home health care, then the daughter may be more efficient in caring for her own mother because she knows the mother's likes and dislikes, her medical history, and so forth.

An extension of this prediction about maternal grandmothers is that the same pattern should be observed for grandfathers. While a maternal grandfather might not be certain that his wife's daughter is truly his, he does know that his daughter's child is hers and therefore, he has only one level of uncertainty (that is, if he is the girl's father, he is most definitely the grandfather). In contrast, a paternal grandfather faces uncertainty in both generations; he does not know for certain that his wife's son is his child, nor does he know whether the grandchild belongs to his son. With these two levels of uncertainty, he is less sure of a genetic relationship with the child than is the maternal grandfather. Following the pattern observed for grandmothers, the data should show greater transfers from maternal grandfathers than from paternal grandfathers. Taking the two relationships together provides a ranking of giving probabilities: maternal grandmother first, then either the maternal grandfather or paternal grandmother (each of whom faces uncertainty in one generation), and finally the paternal grandfather.

This hierarchy is testable and can potentially reveal interesting patterns. For example, part of the reason for grandmothers providing childcare is likely to be the tradition of women caring for children. One can compare the behavior of maternal grandfathers and paternal grandmothers—people who are in some sense "tied" in the probability of genetic attachments—to help sort out some of the difference in sex roles versus genetic uncertainty. My guess is that sex roles would dominate as an explanatory variable.

However, maternal grandfathers and paternal grandmothers might possibly differ in their belief that they have genetic ties to the child. One could expand the model to allow for the uncertainty of genetic links to differ by the age of the child in question. It may be that as the child ages, certain physical and personality traits lead the (potential) father to become more or less cer-

tain that the child is his. Thus despite the fact that they each have one generation of uncertainty, a maternal grandfather might be more (or less) certain of a genetic link than a paternal grandmother and transfers might vary accordingly.

In contrast to the transfer of time, financial transfers are more likely made by the grandparent couple and not by a particular grandparent. In the hierarchy of giving established by the genetic linkages, the maternal grandparents dominate the paternal for both grandmothers and grandfathers. Thus all else constant, the total transferred from the maternal side should unambiguously be greater than that from the paternal grandparents. This relationship, too, can be checked, and in fact, such a comparison is mentioned in the paper. However, in contrast to the predictions of the model, the data show that overall, paternal grandparents give more in cash transfers. This is a straightforward rejection of the model, but consistent with the alternative explanation that the wife is “in charge” of the children and transfers involving child care come from her parents, while the husband is “in charge” of the couple’s financial needs and his parents help out there. Similar work by Robert Schoeni comparing cash transfers from each set of parents does find a slightly greater probability of giving by the wife’s parents, but the difference is not statistically significant.⁸⁸

Cox’s results provide an interesting twist. Couples at the lower point of the income distribution receive more from the wife’s parents, while those higher up in the distribution receive more from the husband’s parents. This difference echoes the work in other disciplines on the Trivers-Willard hypothesis that finds that the wealthy favor sons while the less wealthy favor daughters in the hope that daughters can “marry up.”⁸⁹ Cox suggests that the difference in relative giving by income could also reflect greater uncertainty about paternity among low-income fathers.

Again, a host of other explanations are possible. The difference may simply be capturing the ability of grandparents to make a transfer. Note first that the income used in this tabulation is the income of the recipient generation, not the donor generation. It is not unrealistic to assume that the income of the recipient couple is more highly correlated with the income of the husband’s parents than that of his wife. This relationship would result if the couple’s income is determined largely by the husband’s income and if his income is more highly correlated with his own father’s than with his father-in-law’s.

88. Schoeni (2000).

89. See Cox (this volume) for a detailed discussion of the Trivers-Willard hypothesis.

Thus since high-income husbands likely have high-income parents who can afford to make generous transfers, while low-income husbands likely have low-income parents who do not make generous transfers, it is unsurprising that among those with low incomes, the wife's parents dominate the giving. This relationship, too, could be tested but the data requirements are extensive. To do a good job one would need information not just on transfers from each set of parents, but also income for each set of parents and for the recipient couple.

It would be interesting to see the statistics for the upper end of the distribution as well as the lower end. The paper shows that overall, paternal grandparents are more likely to make cash transfers, while in the lowest decile, maternal grandparents are more likely. Is the pattern reversed in the top decile? How do the amounts vary with the income decile? Is there a clean switch from the wife's parents to the husband's as income increases? Note also that if the income of the recipient couple is highly correlated with that of the donor, then the relationship between income and amount should be positive rather than the negative relationship usually reported when incomes of both the donor and the recipient can be controlled for.

In addition to the income of each generation, other variables need to be controlled for to make the comparisons more credible. Because the data do not indicate which child (or grandchild) is receiving the assistance with childcare, the only way to separate care given to help daughters from care given to help sons is to restrict the comparison to grandmothers with daughters only and grandmothers with sons only. As noted earlier, maternal grandmothers give significantly more care. One alternative explanation is that childcare is the responsibility of the mother, who turns to her own mother for help. However, there are some other possible differences. For example, do daughter-only and son-only parents differ in the number of children they have (and therefore in the total amount given), in the propensity for parents and children to live near each other, or in other factors that could be correlated with transfers?

While favoritism toward daughters can be justified by the certainty of genetic linkage, the Trivers-Willard model provides an explanation for the difference in favoritism across the income distribution. The model argues that parents "control" the sex of their offspring to take advantage of environmental circumstances that favor one sex over the other. Furthermore, poor conditions are predicted to favor girls while good conditions favor boys. Cox argues that investments in education are one (less extreme) variation on this. According to the evolutionary biology hypothesis, parents vary how much they invest in children of each sex based on how successful the child will be

Table 6-1. *Educational Attainment, by Race*

Percent

Decile	1968–78		1979–89		1990–98	
	Whites	Blacks	Whites	Blacks	Whites	Blacks
Bottom 20	0.38	0.48	0.37	0.44	0.48	0.44
Middle 60	0.61	0.57	0.63	0.61	0.75	0.68
Top 20	0.87	0.82	0.90	0.89	0.93	0.91

in “going forth and multiplying.” As with the cash transfers, he finds evidence that girls are favored among low-income families; boys among high-income. This is explained by the idea that girls from low-income families have a better chance of “marrying up” than boys. This result could also be consistent with differences between males and females in the returns to schooling.

One result to note is that a similar pattern exists by race (see table 6-1). Blacks, like women, have higher educational attainment than whites at low socioeconomic status levels, while whites, like men, have more education at high socioeconomic status categories.⁹⁰ Interestingly, over time, this difference has gradually disappeared, suggesting that changes in the labor market may eventually bring about similar changes for the differences in investment between boys and girls.

Because schooling level likely reflects market opportunities as well as parental desires to assist a child, a more straightforward comparison might be to examine *inter-vivos* giving, controlling for schooling. However, while we would expect matriarchal preference to lead to more transfers to daughters, most studies do not find a difference in the probability or amount of transfers to sons and daughters.⁹¹ Even the most recent work that can examine transfers within families fails to find a difference in reciprocity by sex.⁹²

Bequests also present a puzzle with respect to biologically based giving. In the evolutionary approach, transfers to children should be made while children are young enough that the assistance influences their fertility. However,

90. Sandra Black, Stephen Cameron, and Amir Sufi. 2001. “Why Some Do Better: Understanding Black-White Differences in College Enrollment.” Federal Reserve Bank of New York. Mimeo.

91. Altonji, Hayashi, and Kotlikoff (1997); Cox and Jappelli (1990); Cox and Rank (1992).

92. McGarry and Schoeni (1995, 1997).

bequests typically come too late in life to do so, yet are still a large part of lifetime transfers. Furthermore, bequests are overwhelmingly divided equally across children, not favoring those with more offspring of their own, or a particular sex. Estimates of the probability of equal division range from 70 to 90 percent, numbers difficult to reconcile in an evolutionary context. If parents are consciously helping daughters more with care, they should also do so with cash transfers and bequests.

Not only might evolutionary-minded parents differentiate between sons and daughters; they might also want to give more to those children who can provide more grandchildren. Such an approach would predict that stepchildren or adopted children should not only receive fewer transfers than biological children, but should be unlikely to receive anything at all. I have not seen any evidence that this is true. Perhaps more important, the evolutionary model is not consistent with the adoption of children in the first place. If individuals cannot or do not have biological children of their own, rather than adopting, their energies should be invested in caring for or supporting the children of their siblings since these children carry some of their genes, while an adopted child will carry none. Thus the evolutionary biology model would predict that people with siblings who themselves have children would be less likely to adopt than only children, and that adopted children and stepchildren should be significantly less likely to receive transfers than biological children, all else constant.

I am not aware of anyone who has specifically examined *inter-vivos* transfers to step or adopted children, although data from the HRS would allow such a study. Some evidence on the division with respect to bequests does exist and suggests that adopted and natural children are treated equally.⁹³

The allocation of bequests from the National Longitudinal Survey of Mature Women does address the issue of division of bequests with respect to stepchildren. The survey asks respondents whether their estate would be divided equally, and if not, why not. While this is anecdotal only, and certainly not a formal test of the model, it does provide probably the first glimpse at such data for a nationally representative sample. Out of all those who give explanations for not dividing their estate equally across children, some list reasons related to altruism: "X needs it more," and some related to exchange: "X helps me more." In only a very few cases does the explanation in any way mention whether the children are biological, step, or adopted. Here are the relevant responses:

—"It will be divided between *biological* children."

93. Judge and Hrdy (1992).

—“X only has one daughter. Not leaving to stepchildren.”

These two explanations sound like stepchildren or adopted children are written out of the will. However, the intention might not be to treat these children unfairly. Other responses state that:

—“I figured that my stepdaughter can get it from her mother, but my adopted daughter will just have me to get it from.”

—“Because once we are gone, they will disown adopted son, so we want to be sure adopted son will be provided for.”

—“Because adopted son would squander money, so his portion is going to his children.”

These indicate some preference for biological children over stepchildren but not necessarily because of genetics; more likely because the stepchildren have another parent from whom to get transfers and the donor is trying “to be fair.” What is interesting is the only comments on adopted children seem to indicate that they will not be treated differently from biological children.

With respect to the issue of infidelity, Cox argues that women cheat on their mates so that more than one man thinks he could be the father, and will potentially contribute to the welfare of the child. Having two potential fathers can work in either of two ways: The mother can decide which man would provide greater support and rely on him exclusively, or the two potential fathers could both provide care, each at a lower level than they would were they certain the child was theirs. The question then to ask is under what conditions would the expected value of assistance from multiple potential fathers be greater than the amount from one who is (nearly) certain? This is similar to the provision of public goods examined in public finance. Cox acknowledges this “paternity uncertainty creates a public goods problem. . . . Such prospects create externalities that, at least in principle, further dilute incentives for male investment.” As in the classic case, investment is too low in a public good. So a woman might expect that if she gives her mate reason to doubt he is the father, she will likely end up with less total support for the child.

It would be interesting to see a model in which the two sides interact, wherein both men and women are trying to attract mates. Women certainly have a biological reason to focus on the quality of children instead of quantity since their capacity to increase quantity is limited. They can improve the quality by increasing the contribution from the father. This in turn can be done by maximizing the probability that he believes he is indeed the father.

However, it is not just the woman who needs to be concerned about strategic behavior. Men need to attract mates and depending on the model, they may well prefer to attract high-quality mates. To do so, the male needs

to convince a woman (who is selective because of the quality issue) that he would be a good father. Philandering men would not be good fathers from the mother's point of view: First, because by spending time pursuing the opportunity to father more children, they spend less time with any one child. Second, because with more children, each child gets less time and money. Thus evidence of philandering would a priori make a man a less desirable partner. Therefore, both sides want to signal that they are monogamous to get the best mate despite countervailing incentives to act otherwise. This strategic behavior could make for interesting modeling.

This paper raises a number of interesting thoughts, supplies us with numerous testable predictions, and perhaps more than anything, spurs us to think of behaviors consistent with or in conflict with the model. I hope Cox pursues some of the issues presented here, but at the very least he has already provided us with enormous intellectual stimulation.

References

- Alexander, Richard. 1974. "The Evolution of Social Behavior." *Annual Review of Ecology and Systemics* 5: 325–83.
- Alexander, Richard. 1979. *Darwinism and Human Affairs*. University of Washington Press.
- Altonji, Joseph G., Hayashi, Fumio, and Kotlikoff, Laurence J. 1997. "Parental Altruism and Inter Vivos Transfers: Theory and Evidence." *Journal of Political Economy* 105 (December): 1121-1166.
- Anderson, Elijah. 1993. "Sex Codes and Family Life." In *The Ghetto Underclass*, edited by William Julius Wilson. Sage Publications.
- Argys, Laura and Elizabeth Peters. 2001. "Interactions Between Unmarried Fathers and Their Children: The Role of Paternity Establishment and Child-Support Policies." *American Economic Review* 91(May): 125-129.
- Baker, Robin R. and Bellis, Mark A. 1995. *Human Sperm Competition*. Chapman and Hall.
- Becker, Gary S. 1974. "A Theory of Social Interactions." *Journal of Political Economy* 82 (November/December): 1063-93.
- Becker, Gary S. 1976. "Altruism, Egosim, and Genetic Fitness: Economics and Sociobiology." *Journal of Economic Literature* 14 (September): 817-826.
- Becker, Gary S. 1991. *A Treatise on the Family*. Harvard University Press.
- Becker, Gary S. 1993. "Nobel Lecture: The Economic Way of Looking at Behavior." *Journal of Political Economy* 101 (June): 385-409.
- Behrman, Jere R. 1997. "Intrahousehold Distribution and the Family," In *Handbook of Population and Family Economics*, edited by Mark Rosenzweig and Oded Stark. Elsevier Science.

- Behrman Jere R., and Taubman, Paul. 1986. "Birth Order, Schooling and Earnings." *Journal of Labor Economics* 4 (July): S121-S145.
- Behrman, Jere R., Pollak, Robert A., and Taubman, Paul. 1995. "The Wealth Model: Efficiency in Education and Equity in the Family," In *From Parent to Child: Intrahousehold Allocations and Intergenerational Relations in the United States*, edited by Jere R. Behrman, Robert A. Pollak and Paul Taubman. University of Chicago Press.
- Behrman, Jere R., Pollak, Robert A., and Taubman, Paul. 1986. "Do Parents Favor Boys?" *International Economic Review* 27 (February): 31-52.
- Ben-Porath, Yoram and Welch, Finis. 1976. "Do Sex Preferences Really Matter?" *Quarterly Journal of Economics* 90 (May): 285-307.
- Bergstrom, Theodore C. 1989. "A Fresh Look at the Rotten-Kid Theorem – and Other Household Mysteries." *Journal of Political Economy* 97 (October): 1138-59.
- Bergstrom, Theodore C. 1996. "Economics in a Family Way." *Journal of Economic Literature* 34 (December): 1903-1934.
- Bergstrom, Theodore C., and Carl Bergstrom. 1998. "Does Nature Punish Rotten Kids?" *Journal of Bioeconomics* 1 (1): 47-72.
- Bernheim, B. Douglas, Shleifer, Andrei and Summers, Lawrence H. 1985. "The Strategic Bequest Motive." *Journal of Political Economy* 93 (December): 1045-76.
- Bernheim, B. Douglas and Severinov, Sergei, "Bequests as Signals: An Explanation for the Equal Division Puzzle." Working Paper 7791 (Cambridge, MA: National Bureau of Economic Research, July 2000).
- Birkhead, Tim. 2000. *Promiscuity* Cambridge, MA: Harvard University Press.

- Black, Sandra, Stephen Cameron, and Amir Sufi. 2001. "Why Some Do Better: Understanding Black-White Differences in College Enrollment." Federal Reserve Bank of New York. Mimeo.
- Buss, David. 1999. *Evolutionary Psychology*. Allyn & Bacon.
- Cain, Mead. 1977. "The Economic Activities of Children in a Village in Bangladesh." *Population and Development Review* 13 (September): 201-227.
- Case, Anne and Deaton, Angus. 1998. "Large Transfers to the Elderly in South Africa." *Economic Journal* 108 (September): 1330-1361.
- Clutton-Brock, T. H. 1991. *The Evolution of Parental Care*. Princeton University Press.
- Condon, Gerald M. and Condon, Jeffrey L. 2001. *Beyond the Grave: The Right Way and the Wrong Way of Leaving Money to Your Children (and Others)*. Harper Collins Publishers.
- Cox, Donald. 1987. "Motives for Private Income Transfers." *Journal of Political Economy* 95 (June): 508-46.
- Cox, Donald. 1990. "Intergenerational Transfers and Liquidity Constraints." *Quarterly Journal of Economics* 105 (February): 187-217.
- Cox, Donald, and Tullio Japelli. 1990. "Credit Rationing and Private Transfers: Evidence from Survey Data." *Review of Economics and Statistics* 72 (3): 445-53.
- Cox, Donald and Rank, Mark. 1992. "Inter-Vivos Transfers and Intergenerational Exchange." *Review of Economics and Statistics* 74 (May): 305-314.
- Dawkins, Richard. 1976. *The Selfish Gene*. Oxford University Press.
- Diamond, Jared. 1992. *The Third Chimpanzee*. Harper Collins Publishers.

- Duflo, Esther. "Grandmothers and Granddaughters: Old Age Pension and Intra-Household Allocation in South Africa," Working Paper 8061 (Cambridge, MA: National Bureau of Economic Research, December 2000).
- Edlund, Lena. 1999. "Son Preference, Sex Ratios, and Marriage Patterns." *Journal of Political Economy* 107 (December): 1275-1304.
- Edlund, Lena and Korn, Evelyn, 2002. "A Theory of Prostitution." *Journal of Political Economy* 110 (February): 181-214.
- Elison, Peter T. 2001. *On Fertile Ground*. Harvard University Press.
- Euler, H. A. and Weitzel, B. 1996. "Discriminative Grandparental Solicitude as a Reproductive Strategy." *Human Nature* 7 (1): 39-59.
- Farmer, Amy and Tiefenthaler, Jill. 1996. "Domestic Violence: The Value of Services as Signals." *American Economic Review Papers and Proceedings* 86 (May): 274-279.
- Fisher, R. A. 1958. *The Genetical Theory of Natural Selection*, Second Edition. Dover Publishing.
- Haig, David. 1993. "Genetic Conflicts in Human Pregnancy." *The Quarterly Review of Biology* 68 (December): 495-532.
- Hamilton, William D. 1964. "The Genetical Theory of Social Behavior (I and II)." *Journal of Theoretical Biology* 7 (July): 1-32.
- Hewlitt, B. S. 1991. *Intimate Fathers: The Nature and Context of Aka Pygmy Paternal Infant Care*. University of Michigan Press.
- Hirshleifer, Jack. 1977. "Economics from a Biological Viewpoint." *The Journal of Law and Economics* 20 (April): 1-52.
- Hrdy, Sarah Blaffer. 1999. *Mother Nature*. Ballantine Books.

- Hrdy, Sarah Blaffer. 1981. *The Woman That Never Evolved*. Harvard University Press.
- Judge, Debra, and Sarah Blaffer Hrdy. 1992. "Allocation of Accumulated Resources among Close Kin: Inheritance in Sacramento, California, 1890–1984." *Ethology and Sociobiology* (13): 495–522.
- Kennan, J. 1986. "The Economics of Strikes," Chapter 19. In *Handbook of Labor Economics*, edited by O. Ashenfelter and R. Layard. Elsevier Science Publishers.
- Kotlikoff, Laurence J. and Morris, John N. 1989. "How Much Care Do the Aged Receive from Their Children?" In *The Economics of Aging*, edited by David A. Wise. University of Chicago Press.
- Lundberg, Shelly and Pollak, Robert. 1996. "Bargaining and Distribution in Marriage." *Journal of Economic Perspectives* 10 (Fall): 139-158.
- Lundberg, Shelly; Pollak, Robert, and Wales, Terrance. 1997. "Do Husbands and Wives Pool Their Resources? Evidence from the United Kingdom Child Benefit." *Journal of Human Resources* 32 (Summer): 463-80.
- McGarry, Kathleen. 1999. "Inter Vivos Transfers and Intended Bequests." *Journal of Public Economics* 73 (September): 321-51.
- McGarry, Kathleen, and Robert F. Schoeni. 1995. "Transfers Behavior, Measurement and the Redistribution of Resources within the Family." *Journal of Human Resources* 30 (5): S184–226.

- McGarry, Kathleen, and Robert F. Schoeni. 1997. "Transfer Behavior within the Family: Results from the Asset and Health Dynamics Study." *Journal of Gerontology* 52B (2): 82-92.
- Menchik, Paul. 1980. "Primogeniture, Equal Sharing, and the U. S. Distribution of Wealth." *Quarterly Journal of Economics* 94 (March): 299-316.
- Mulligan, Casey. 1997. *Parental Priorities and Economic Inequality*. University of Chicago Press.
- Nugent, Jeffrey. 1985. "The Old-Age Security Motive for Fertility." *Population and Development Review* 11 (March): 75-97.
- Rosenzweig, Mark R., and Stark, Oded. 1989. "Consumption Smoothing, Migration, and Marriage: Evidence from Rural India." *Journal of Political Economy* 97 (August): 905-926.
- Schoeni, Robert F. 2000. "Support Networks within the Family as a Public Good Problem." Working Paper DRU-2294-NIA. Santa Monica, Calif.: RAND.
- Sen, Amartya. 2001. "The Many Faces of Misogyny." *The New Republic* 225 (September): 35-40.
- Sing, C. F., Shreffler, D. C., Neel, J. V., and Napier, J. A. 1971. "Studies on Genetic Selection in a Completely Ascertained Caucasian Population. II. Family Analyses of 11 Blood Group Systems." *American Journal of Human Genetics* 23 (2): 164-198.
- Siow, Aloysius. 1998. "Differential Fecundity, Markets, and Gender Roles." *Journal of Political Economy* 106 (April): 334-354.

- Sloan, Frank A., Picone, Gabriel, and Hoerger, Thomas J. 1997. "The Supply of Children's Time to Disabled Elderly Parents." *Economic Inquiry* 35 (April): 295-308.
- Soldo, Beth and Hill, Martha. 1995. "Family Structure and Transfer Measures." *Journal of Human Resources* 30 (Supplement): S108-S137.
- Stoller, Eleanor P. 1983. "Parental Caregiving by Adult Children." *Journal of Marriage and the Family* 45 (November): 851-58.
- Strauss, John and Thomas, Duncan. 1995. "Human resources: Empirical Modeling of Household and Family Decisions." In *Handbook of Development Economics*, edited by Jere Behrman and T. R. Srinivasan. Elsevier Science.
- Symons, Donald. 1979. *The Evolution of Human Sexuality*. Oxford University Press.
- Tauchen, Helen V., Witte, Ann Dryden, and Long, Sharon K. 1991. "Domestic Violence: A Nonrandom Affair." *International Economic Review* 32 (May): 491-511.
- Trivers, Robert L. 1974. "Parent-Offspring Conflict." *American Zoologist* 14: 249- 64.
- Trivers, Robert. 1985. *Social Evolution*. The Benjamin/Cummins Publishing Co.
- Willis, Robert. 1999. "A Theory of Out-of-Wedlock Childbearing." *Journal of Political Economy* 107 (December): S33-S64.
- Wilson, Margo and Daly, Martin. 1992. "The Man Who Mistook His Wife for a Chattel." In *The Adapted Mind*, edited by Jerome H. Barkow, Leda Cosmides and John Tooby. Oxford University Press.