

What Determines the Balance of Power in a Household?

I. Introduction

All over the world, men play a larger role in society's decision making than women. This starts at the level of the household: fathers ("patriarchs") generally are seen to have more authority than mothers ("matriarchs"). But the influence of patriarchs even in families is far broader than this in developing countries, where people live in extended families in which the patriarch's and matriarch's sons and their families live with them. The men of the household typically work more in the labor market than do the women. In the public sphere, men are more visible than women; in politics, the proportion of men is generally much larger than that of women. In developing countries, economic necessity may have always forced women to work in the labor market, but it is nevertheless the case that in these countries and in the rich ones, men have generally had a greater say inside and outside the household.

The very thought systems that humans have available to them to make sense of the world around them have largely been formulated by men, as Gerda Lerner (1986) has argued, and women have no means of articulating their experiences because they have been denied the education and leisure needed for this.¹ Feminists refer to this male domination as patriarchy and cite it as one of the most important reasons for the subservience of women. What are the causes of this gender disparity in power, and what can be done to redress the imbalance? This chapter is devoted to providing an understanding of the conceptual framework that economists find most useful in thinking of issues pertaining to power. After we have discussed this, I shall outline theories of patriarchy and review the empirical work that supports them.

¹Lerner, G. (1986), *The Creation of Patriarchy*, Oxford University Press, New York.

Until a couple of decades ago, economists largely thought of the family as a single decision-making unit, as if it comprised only a single person. This construction, which is referred to as the unitary model of the family, has been useful for understanding some aspects of the family. It has enabled us, for example, to understand the emergence of a division of labor in the family and the formation of the traditional household based on the notion of comparative advantage. This view has rationalized why, under some conditions, in a family the husband works in the labor market and the wife concentrates on housework. This division of labor is breaking down in the developed countries but is still in place in developing countries.

Although economic theory based on comparative advantage provides compelling reasons that two people are better off forming a family rather than remaining separate, it is silent on *how* the gains to family formation are split between the two spouses.² Do most of the gains in marriage go to men? Is it the case that men manage to pursue or satisfy their aspirations but women are unable to? Were it possible for them, would women like to rearrange the priorities of the family? Would they prefer to alter the division of labor so that they would be better off?

In any cooperative endeavor like marriage or cohabitation, it is reasonable to presume that the partners exploit all the benefits that are available to cooperation and that no opportunity to improve the well-being of both people is ignored. This idea is captured by the notion of *Pareto efficiency* (also referred to as *Pareto optimality*). An outcome is Pareto efficient if it is impossible for both people to become better off or, equivalently, if a move that makes one person better off would necessarily make the other worse off. But there can be an infinite number of such Pareto-efficient outcomes. A situation in which one spouse receives 99% of the benefits of marriage or cohabitation, leaving the other with only 1%, can be Pareto efficient—it may be impossible to make one person better off without making the other worse off.³ Pareto efficiency tells us nothing about how the benefits are *distributed*. Even if we agree that the outcome in marriage may exhaust all the opportunities whereby both people could be made better off, we need a theory that will tell us how the gains are distributed.

The branch of economics that provides us with useful tools for analyzing economic outcomes within marriage and the distribution of benefits is game theory. In particular, it is bargaining theory that is most relevant. One of the most helpful models in this theory is John Nash's famous bargaining model.⁴

²By the word *spouses* I do not mean only legally married people; those cohabiting are included in this term.

³We can see why the economist Amartya Sen remarked, "A society or an economy may be Pareto optimal and still be perfectly disgusting." Sen, *Collective Choice and Social Welfare*, Holden-Day, San Francisco, 1970, p. 22.

⁴Nash, J. (1950), "The Bargaining Problem," *Econometrica* 18, pp. 155–162.

I describe this model in this chapter. We shall see how the outcome of bargaining depends on the well-being that the bargainers can assure themselves of *in the event that bargaining breaks down*. What they can secure for themselves in this eventuality depends on their alternative (outside) opportunity, which is referred to as their threat utility. After we analyze Nash's model, we shall examine what factors determine these threat utilities. We shall go on to discuss another model of bargaining, in which the two bargainers alternately make offers that can either be accepted or rejected. Here, too, we shall see how and why the threat utilities matter.

The bargaining model was first applied to households by Marilyn Manser and Murray Brown (1980) and by Marjorie B. McElroy and Mary Horney (1981).⁵ We shall end our discussion of bargaining models by looking at the evidence in their favor. The evidence is quite persuasive.

Finally, we shall examine how it is that men have come to dominate the power relations within the household, that is, how patriarchy may have arisen. We shall also study how this asymmetry in power within the household carries within it the seed responsible for circumscribing women's role in the economy and in society in order to serve male interests. We shall begin by examining Friedrich Engels's classic theory that this domination is tied to the emergence of private property and shall discuss the suggestive evidence for it.

We shall then go on to discuss the view from evolutionary biology. We shall see that a part of the domination of women—and *only a part*—can be attributed to what has evolved in nature (for example, only women give birth, only women lactate, and men have more physical strength, on average, than women). But patriarchy arose and has persisted for millennia for other reasons—reasons that have to do with the asymmetry of power that comes from controlling productive assets and also from the power of enforcing socially constructed notions that are handed down through culture. The final topic of this chapter is how culture is recruited to pass on patriarchal values and the empirical evidence that reveals this.

II. The Unitary Model

The unitary model, as we have seen above, assumes that a family can be treated as a single unit without composite parts. There are many ways of rationalizing this obviously ludicrous falsehood. One way is to presume that all members of the family agree upon what the family's objective should be, and then they all decide to pursue this common objective. Another is to

⁵Manser, M., and M. Brown (1980), "Marriage and Household Decision-Making: A Bargaining Analysis," *International Economic Review* 21, pp. 31–44, and McElroy, M. B., and M. J. Horney (1981), "Nash-Bargained Household Decisions: Toward a Generalization of the Theory of Demand," *International Economic Review* 22, pp. 333–349.

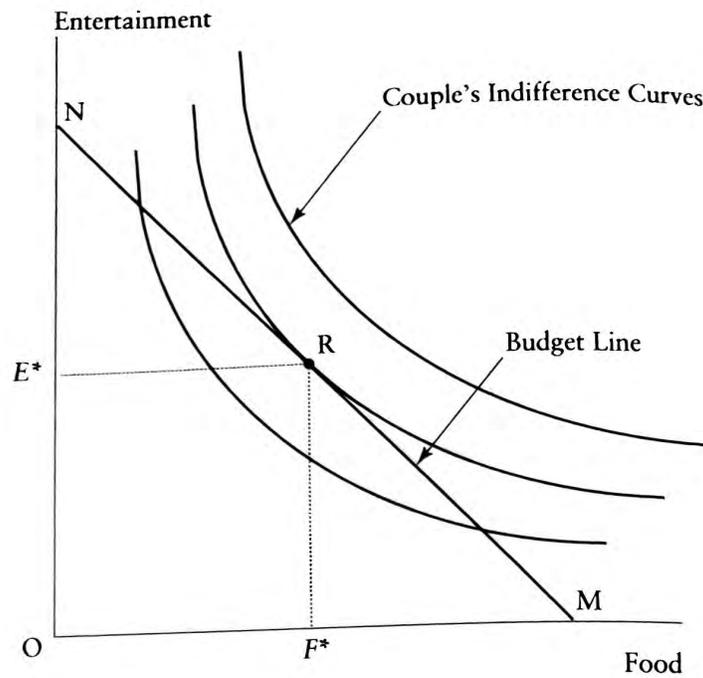


FIGURE 3.1 Resource allocation in the unitary model

assume that there is a benevolent dictator who makes all the decisions of the family. Yet another is to assume that all members of the family have identical preferences for various goods and services so that for all practical purposes the family behaves as a single individual.

To see what such a construction implies, consider a couple deciding how to spend their income between food and entertainment. Suppose that the husband's annual salary is \$40,000 and the wife's \$30,000. Assume that they pool their income instead of maintaining separate accounts. An individual's preferences can be represented by indifference curves—that is, curves along which an individual is indifferent between the various combinations of food and entertainment. If the two individuals discussed here are assumed to have identical preferences, they will have identical indifference curves. Figure 3.1 illustrates the couple's (common) indifference curves and the budget line, MN , as determined by their total income.

Suppose that the husband makes the decisions regarding how the couple's joint income should be allocated. As indicated in the figure, the couple will achieve their highest level of (common) well-being at point R , where they allocate their joint income so as to consume an amount F^* of food and E^* of entertainment. What would happen to this allocation of their income if it was the wife who earned \$40,000 and the husband who earned \$30,000? Nothing would happen. This is because the couple are pooling their income, and only the total income matters. What would happen to the allocation of income if the decision maker was the wife? Once again, nothing would hap-

pen. This is because the two people have identical preferences, so regardless of who makes the decisions, the allocation they will opt for will be the same. This is the essence of the so-called unitary model, in which the family is treated as a unit. In this model the identities of the decision makers do not matter because they have common preferences. Nor do their individual incomes matter; it is only their joint income that matters.

In reality, as most people would suspect, the identity of the decision maker *does* make a great deal of difference in terms of how income is allocated. Two people rarely have identical preferences. Although the assumption that a family operates as a single unit is a useful fiction to posit for many purposes, it is not something that can be maintained when the well-being of women is the subject of investigation. For their well-being certainly depends on who makes the decisions in the household and how these decisions are made. There is considerable evidence to suggest that the unitary model of the household is incorrect. Two examples will suffice to make the point, one from a developed country and another from a developing country.

It has traditionally been assumed that mothers have more to do with children's welfare than fathers. In the United Kingdom, changes made in a child benefit program afforded some insight into how the expenditure pattern of a household changes when income is transferred from fathers to mothers. Prior to April 1977, the British government reduced the taxes that were automatically withheld from fathers' paychecks. The reduced taxes were a benefit intended for the children. Between April 1977 and April 1979, however, the government instituted some changes in the child benefit program. In essence, after April 1979 it eliminated the tax break for fathers and replaced it with a weekly nontaxable payment to mothers. Basically, this switch *redistributed income* from fathers to mothers. If the unitary model of the household were correct, this redistribution "from the wallet to the purse" should have made no difference to the expenditure patterns of households. Shelly Lundberg, Robert Pollak, and Terence Wales (1996) found that, in reality, it did make a difference: expenditures on women's and children's clothing went up, as did expenditures on domestic services; expenditures on men's clothing and tobacco went down.⁶ This demonstrates that the *identity* of the person controlling the income does matter.

In the West African country of Burkina Faso, married men and women cultivate separate plots of land even though they may help each other with their labor. The men and women often cultivate the same crop. Christopher Udry (1996) found that the yield on women's plots is lower (by about 20%) than that on the plots of men cultivating the same crop, even though they

⁶Lundberg, S., R. A. Pollak, and T. J. Wales (1996), "Do Husbands and Wives Pool Their Resources?: Evidence from the United Kingdom Child Benefit," *Journal of Human Resources* 32, pp. 463-480.

both belong to the same household.⁷ Almost all of the fertilizer used by the household is devoted to men's plots. The optimal fertilizer allocation may be defined as that which would maximize the joint incomes of husbands and wives. Because the increase in output made possible by applying fertilizer to a given plot of land is likely to exhibit diminishing returns, it would make economic sense to allocate some fertilizer to women's plots, too. Why don't men allocate some of the fertilizer so as to maximize joint income? It is because men and women control only the income generated from *their own plots*—incomes are not pooled. Furthermore, if their preferences as to how income should be spent are different, it is not only total income but also individual incomes that matter. Naturally men want most of the fertilizer for their own plots, even if diverting some of it to their wives' plots would increase the family income. If they have the power to decide how the fertilizer should be allocated, they will allocate most of it to their own plots.

The two examples above reveal that the identities of the income earners and of the decision makers matter. In any household, it is rarely the case that all decisions are made by one person. For example, in the Burkina Faso case, if the husbands were dictators, they would allocate fertilizer so as to maximize the joint incomes of the families because they would have the assurance that they could spend these incomes in any manner they wanted. They don't allocate fertilizers in this manner because they obviously do not have dictatorial decision-making authority. Typically both spouses in a household have some say in the decision making, though not to the same extent. What determines the extent of an individual's influence in the joint decision-making process, and how does that impinge on the outcome? This is the focus of bargaining models, to which we now turn.

III. The Nash Bargaining Model

The Nash model of bargaining belongs to a class referred to as cooperative bargaining models. The idea is that the two parties involved cooperate in the process of bargaining to arrive at a solution by which they split the gains to come up with an agreement. In other words, the final bargain they arrive at is such that it is impossible to improve the well-being of one party without hurting the other; that is, the bargaining outcome is *Pareto efficient*. In such an outcome, all the gains possible through bargaining are exhausted; that is, no possibility whereby both people could benefit is thrown away.

Suppose that two individuals, Anne and Brett, can participate in an arrangement that can potentially make both of them better off. Can we predict what arrangement they will come up with? How will they split the bene-

⁷Udry, C. (1996), "Gender, Agricultural Production, and the Theory of the Household," *Journal of Political Economy* 104, pp. 1010–1046.

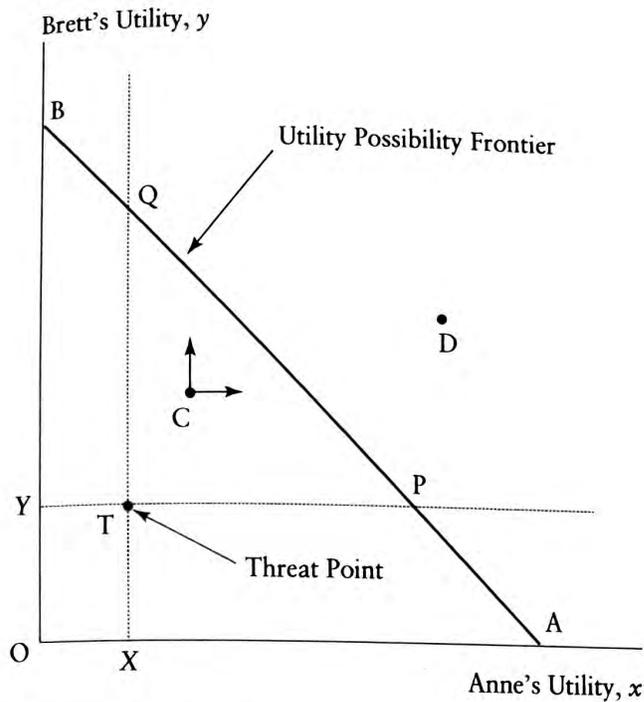


FIGURE 3.2 The basic setup for the Nash bargaining model

fits that the arrangement can generate? Who is going to benefit more from the arrangement, and why? The framework proposed by John Nash is designed to answer these questions. The framework is quite general—it can apply to the bargaining between the two members of a married or an unmarried couple, between the management of a firm and its labor union over wage increases, between two politicians who can strike a mutually advantageous bargain, between a parent and a child over the weekly allowance, and the like. In order to be concrete, in what follows we shall assume that the context is marriage or a common-law relationship.

Let x denote the level of Anne's well-being or utility in the relationship and y denote Brett's. In Figure 3.2, every point represents a combination of Anne's and Brett's utility. Every arrangement they wish to enter into will have as its limit a frontier denoted by AB in the figure, which defines the limit of the possibilities. In other words, it defines the limits of the combinations of well-being that can be achieved by the couple. (If Anne and Brett were bargaining over how to divide a pie, for example, the possibilities would be limited by the size of the pie.) We refer to AB as the utility possibility frontier. Any combination like C , which lies inside the frontier, is achievable within the arrangement. However, a combination at a point like D that lies outside the frontier is not feasible—the arrangement cannot generate sufficiently large benefits.

We shall assume that each person would like to maximize his or her own level of well-being. In Figure 3.2, Anne's most preferred outcome is point A , where she achieves the highest level of utility that the arrangement is capable

of generating. However, at point A Brett's utility is minimized. On the other hand, Brett's most preferred outcome is point B, where he achieves the highest level of utility that the arrangement is capable of generating for him. But at point B, Anne's utility is minimized.

What combination of utilities will Anne and Brett actually achieve? We can be sure that, if we assume that the outcome is Pareto efficient, they will never end up at a point like C in Figure 3.2. Why? Because at C there are benefits from the arrangement that remain unexploited. The outcome C is one in which both people can be better off if they are moved in a northeasterly direction (in between the indicated arrows) toward the frontier AB. It is clear that any point that lies inside the frontier AB is not Pareto efficient because it can be improved on by making both parties better off. Only outcomes on AB can be Pareto efficient, because once they are on AB the only way one person can be made better off is by making the other person worse off (because moving outside the frontier is not an option that is available). So if we believe that the outcome of the bargaining process between Anne and Brett is Pareto efficient, they must end up somewhere on AB. But where exactly will they end up? Notice that every point on AB is Pareto efficient—it is impossible to make one person better off without making the other one worse off.

In order to identify the outcome of the bargaining problem, we need more information. In particular, we need to know how Anne and Brett would fare if negotiations between them broke down. What level of well-being would they achieve if they abandoned the possibility of coming up with a mutually acceptable arrangement? In Figure 3.2 this level of well-being is represented by X for Anne and Y for Brett. These utility levels, X and Y, are referred to as the *threat utilities* of Anne and Brett, respectively. They represent their respective outside options, which indicate the opportunities that are individually available to them outside the present arrangement they are bargaining over. We shall take these threat utilities as given, for they are determined by considerations that lie outside the present arrangement. Later on we shall discuss what factors determine these threat utilities. In Figure 3.2, the point T with coordinates X and Y, respectively, is called the threat point.

In the cooperative arrangement that Anne and Brett are bargaining over, Anne would find a level of well-being below X unacceptable; she would be better off walking away from it and settling for her outside option. Therefore, those outcomes on the segment of AB that lie above Q are ruled out as possible outcomes of the bargaining scenario, because these points are no longer Pareto efficient when Anne's outside option is considered. These points offer Anne a level of well-being that is less than her threat utility. Likewise, Brett would find a level of well-being below Y unacceptable; he would be better off walking away from it and taking up his outside option. So those outcomes on the segment of AB that lie below P are ruled out as possible outcomes of the bargaining scenario because these points offer Brett a level of well-being that

is less than his threat utility. Therefore, the outcome of the bargaining will be somewhere on the segment PQ of the utility possibility frontier. The question is where on PQ, because that will determine the ratio in which the gains to the couple's cooperation will be split between Anne and Brett.

Notice that there are cooperative *and* competitive aspects to the resolution of the bargaining scenario. On the one hand, unless Anne and Brett cooperate, they will not realize the possible gains to their project. Once they have decided to cooperate, however, any surplus that Anne receives above her threat utility will come at the expense of Brett's surplus over his threat utility, and vice versa. Thus a tension between cooperation and conflict is inherent in the bargaining situation.

Suppose that Anne could single-handedly determine the outcome of the bargaining. She would want to maximize her own well-being, x . Equivalently, she would want to do as well as possible for herself compared to what she could do in her threat option. In other words, she would maximize the surplus of her utility over her threat utility, namely, $x - X$. However, in this she would be constrained by the fact she cannot push Brett below point P on the segment AB. If she tried, he would walk away, and the potential benefits of the arrangement would not materialize. So Anne would opt for point P, thereby holding Brett down to the minimal utility (Y) necessary to elicit his cooperation. Similarly, if Brett could single-handedly determine the outcome of the bargaining, he would want to maximize the surplus of his utility over his threat utility, namely, $y - Y$. But he cannot push Anne above point Q on the segment AB because she would then walk away. So he would opt for point Q, thereby holding Anne down to the minimal utility (X) necessary to elicit her cooperation.

In reality, however, we would expect that neither Anne nor Brett would have the power to single-handedly determine the outcome of the bargaining. Both would likely have some say in the matter, though perhaps not an equal say. As a result, we would expect the outcome of the bargaining to lie somewhere between P and Q on AB.

The Bargaining Solution Proposed by John Nash

Under some technical assumptions, John Nash demonstrated which allocation would obtain in the outcome.⁸ He proved that the allocation that would obtain in the bargaining situation is the one for which the *product* of surpluses,

$$(x - X)(y - Y)$$

⁸The three assumptions he made may be translated in this context as follows: (1) The outcome depends only on the threat utilities of Anne and Brett, not on the fact that one person is called Anne and the other Brett. To put it differently, if we switch the threat utilities of Anne and Brett, the utilities they achieve in the bargaining outcome will also switch. (2) If we change the units in which we measure utility, the solution will be the same (except for the change in units). (3) If an outcome that did not obtain as a bargaining solution is removed from the realm of possibilities, the original bargaining scenario will still obtain in the new bargaining scenario.

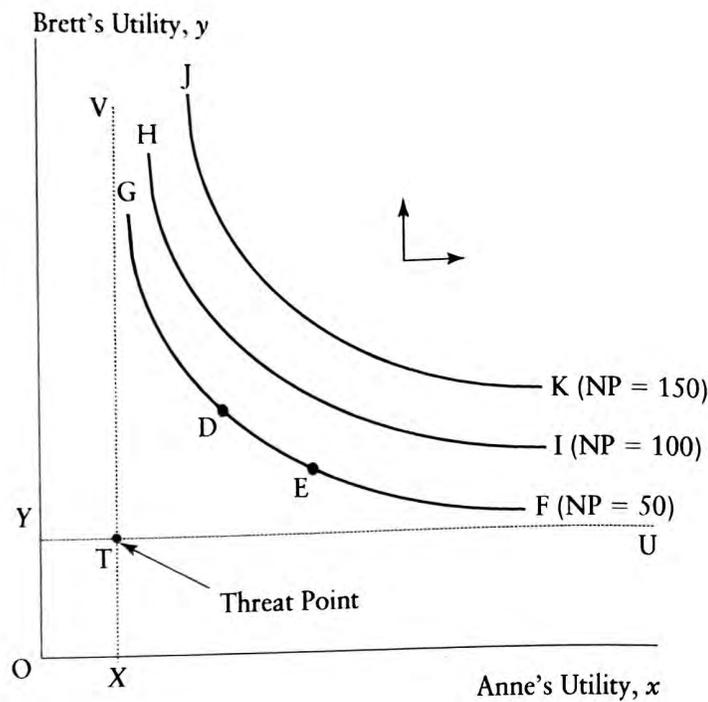


FIGURE 3.3 Illustration of contours along which the Nash product is constant

achieves its *largest possible value*, provided that the following conditions are satisfied: (a) x is at least as large as X , (b) y is at least as large as Y , and (c) the point (x, y) lies on or inside the utility possibility frontier. Conditions a and b merely state that Anne and Brett must receive at least what they can obtain in their threat options. Condition c says that the allocation must be feasible for the given bargaining situation. In other words, what ends up being maximized in the bargaining outcome is neither Anne's surplus $(x - X)$ nor Brett's surplus $(y - Y)$ —so neither Anne nor Brett unilaterally determines the outcome—but rather the product $(x - X)(y - Y)$, which is referred to as the *Nash product*. The proposed solution to the bargaining situation is called the *Nash bargaining solution*.

A Geometrical Exposition of the Nash Bargaining Solution

Let us first represent the Nash bargaining solution geometrically before we attempt to provide intuition for it. Suppose that Anne's threat utility is 10 and Brett's is 15 (that is, $X = 10$ and $Y = 15$). Suppose that in the bargaining situation Anne and Brett both achieve a utility of 20 (that is, $x = y = 20$). This allocation is denoted by point D in Figure 3.3. The Nash product (NP in the figure) for this allocation is $(20 - 10)(20 - 15) = 50$. Now we can conceive of many other allocations (x, y) for which the Nash product will also be exactly 50. Starting from D in the figure, if we increase x we need decrease y by only so much that the Nash product will remain 50. Point E is another allocation with the same Nash product of 50. In a similar manner,

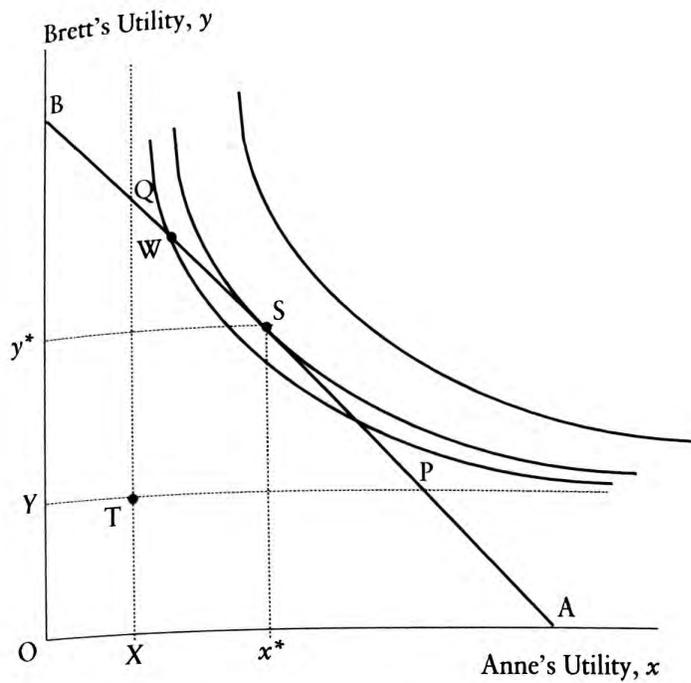


FIGURE 3.4 Illustration of the Nash bargaining solution

we can find an infinite number of allocations with the same Nash product. If we join all these points, we get the downward-sloping curve GF shown in the figure. For convenience, we shall refer to this curve as an *isoproduct contour*. This curve necessarily slopes downward because an increase in x must be accompanied by a decrease in y if the Nash product is to remain 50. Likewise, the isoproduct contour corresponding to a Nash product of 100 will lie on the higher curve HI, the contour for a Nash product of 150 will lie on the even higher curve JK, and so on. In fact, any movement in the northeasterly direction (in a direction between the perpendicular lines with arrowheads) will take us on to contours with higher Nash products.

As in Figure 3.2, in Figure 3.3 we use T to denote the threat point, whose coordinates are the threat utilities of Anne and Brett. No allocation below the horizontal line TU will be acceptable to Brett, and no allocation to the left of the vertical line TV will be acceptable to Anne. The isoproduct contours may approach the lines TU and TV, but they can never quite touch or cut across them.⁹

We are now equipped to geometrically represent the Nash bargaining solution, and this is done in Figure 3.4. In this figure we bring together the threat point, the utility possibility frontier, and the isoproduct contours. We have

⁹To see that this must be true, suppose that the isoproduct curve for $NP = 50$ cuts the horizontal line TU. At the point of intersection, the value of y must be equal to 15 (Brett gains no surplus), implying that the Nash product must be zero. This contradicts the assumption that the Nash product is 50 everywhere on the curve.

seen above that conditions a through c require the Nash solution to be somewhere in the triangular region TPQ. Furthermore, if the outcome is to be Pareto efficient, we have seen that it must lie on the segment PQ of the utility possibility frontier AB. We can identify the Nash bargaining solution if we can figure out where on the segment PQ the Nash product is maximized. According to Nash's theoretical result, this is the point that puts Anne and Brett on the contour corresponding to the *highest* Nash product. From Figure 3.4 we see that this point is S, where an isoproduct contour is *tangential* to the utility possibility frontier. A point like W, where the contour cuts the utility possibility frontier, has a lower Nash product than S. The coordinates of S, indicated by x^* and y^* in the figure, are the utilities achieved by Anne and Brett in the Nash bargaining solution.

The Effect of the Threat Point on the Nash Bargaining Solution

Notice that at point S both Anne and Brett are better off than they would have been at the threat point. Furthermore, the allocation of utilities at S is Pareto efficient: it is impossible to make Anne better off without hurting Brett, and vice versa. These features have been built into the Nash bargaining solution by the requirements that the players do at least as well as in their threat options and that they exhaust all the benefits to cooperation.

A crucial question remains: what determines the split of the benefits that Anne and Brett receive in the Nash bargaining solution? The answer is this: their relative threat utilities. Understanding how this comes about provides some intuition for the Nash bargaining solution and reveals why this is such a useful framework for understanding bargaining outcomes.

If a person's utility in the outside option increases, he or she gets a better deal in the Nash bargaining solution. To see this, suppose that Anne's threat utility increases from its original value X to a new, higher value, X' . We represent the new situation in Figure 3.5. Here T and S denote the original threat point and Nash bargaining solution, respectively, and T' the new threat point. The isoproduct contours are now different than before because the Nash product associated with the allocation (x, y) is now $(x - X')(y - Y)$. So we will now have a *different set* of isoproduct contours.

The Nash bargaining solution will be given by that point on PQ that is on the highest of the new isoproduct contours. These new contours will now approach (but never touch) the horizontal line through T', which is the same as before, and the new vertical line through T'. The vertical line through T' is shifted to the right relative to the vertical line through T. As a result, the new contour passing through any point is steeper than the old contour through the same point because these curves are now being squeezed to the right. This pushes the new point of tangency in the *southeasterly* direction relative to the old point of tangency. The new Nash bargaining solution, denoted in Figure 3.5 by S', lies on PQ to the southeast of the original solution, S. This

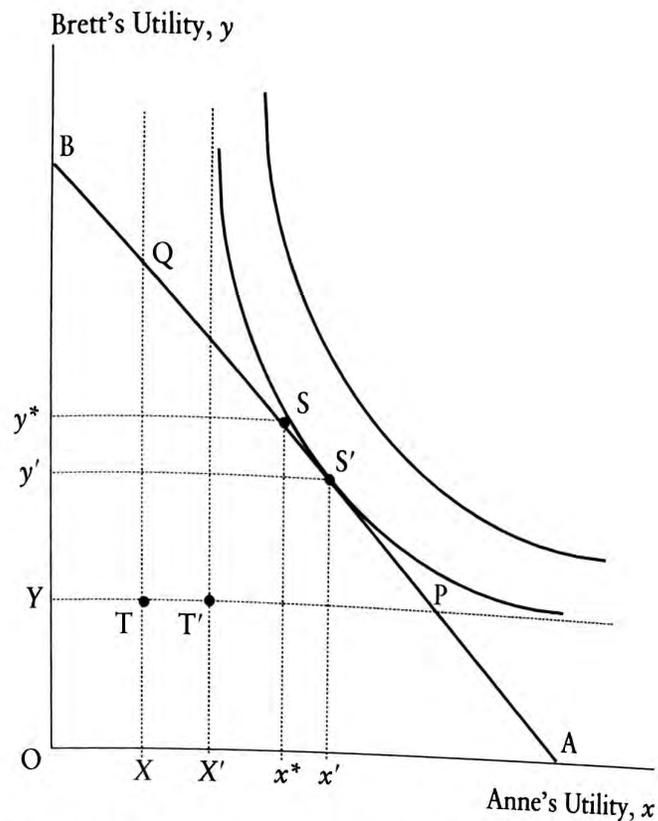


FIGURE 3.5 Illustration of how the Nash bargaining solution changes when Anne's threat utility increases

new solution, which is also Pareto efficient, offers Anne a higher level of utility and Brett a lower level of utility than before. As indicated in the figure, Anne receives a utility x' and Brett y' .

This simple exercise in which the threat utility of Anne is increased illustrates one of the most important properties of the solution to the bargaining situation. When Anne has better outside options, she is assured of a better agreement in the arrangement with Brett. The fact that she now can do better for herself in the event that negotiations between her and Brett break down guarantees Anne better treatment in the bargain. This situation, of course, is symmetrical. If it is Brett whose threat option improves, it is his share that increases in the bargaining solution. *The most important determinants of how the gains to cooperation are split are the relative threat utilities of the bargainers.*

All this is not to say that Anne and Brett necessarily bargain across a table as the management and union of a firm might. Rather, their bargaining is at a psychological level. How assertive a person is likely to be in a bargaining situation depends on his or her fallback options, that is, how well the person can do in the event that bargaining breaks down. It is this that credibly communicates to the other party the person's willingness to walk away if he or she doesn't receive a reasonable share of the benefits to cooperation. What can legitimately be deemed reasonable depends on the person's threat utility.

A Simple Method for Computing the Nash Bargaining Solution

How does one determine the Nash bargaining solution in a handy manner? To draw the set of isoproduct contours and then pick the point of tangency with the utility possibility frontier appears to be an involved and tedious procedure. Fortunately, when this frontier has a simple shape, there is a straightforward procedure that enables us to determine the Nash bargaining outcome. One needs only to draw a simple graph. To illustrate this we shall suppose that the utility possibility frontier is a straight line. Suppose that, along the utility possibility frontier, Anne's and Brett's utilities sum to some known constant, M , that is, $x + y = M$. For example, M may be the amount of the total benefits (say, \$1,000) that would be received from their cooperative endeavor, and the bargaining is over how Anne and Brett might split this amount. It is important to understand that M is something that is given in the bargaining situation and is not to be determined by Anne and Brett. At point A in Figure 3.4, $x = M$ and $y = 0$. As we move up along AB, Anne's utility decreases and Brett's increases until, at B, $x = 0$ and $y = M$. Thus along AB we can express Brett's utility in terms of Anne's: $y = M - x$, which simply says that Brett gets what is left over after Anne gets her share.

We know that the Nash bargaining solution lies on the segment QP in Figure 3.4 because it is Pareto efficient. So we can restrict the search for the solution to this segment. At any point on this segment, by expressing y in terms of x , the Nash product $(x - X)(y - Y)$ can be rewritten as $(x - X)(M - x - Y)$. Expressed in this way, the Nash product depends only on Anne's utility, because X , Y , and M are known quantities that are given. Suppose that we start from point Q in Figure 3.4 and move along AB toward P and compute the Nash product at each point. We can then plot a graph of the Nash product in terms of the value of Anne's utility, x . This is done in Figure 3.6.

At point Q in Figure 3.4, Anne receives a utility that is exactly equal to her threat utility ($x = X$), so the Nash product is zero. Likewise, at point P Brett receives a utility that is exactly equal to his threat utility ($y = Y$ or $x = M - Y$), so the Nash product is again zero. As we move from Q to P, however, the Nash product first increases and then decreases. This is shown as the hill JKL in Figure 3.6. Because the Nash product is highest at point K in this figure, the corresponding value of Anne's utility, x^* , can be read directly from the graph. Brett's utility, y^* , can then be obtained as $y^* = M - x^*$. Thus this simple procedure enables us to compute the Nash bargaining solution with relative ease.

The Relevant Threat Point in Household Bargaining

We have seen that the outcome of bargaining depends on each person's threat point. In household bargaining, what should we take as the threat point? In some cases, it might be divorce that defines the appropriate threat utility. In such cases a breakdown of bargaining is identified as the breakdown of

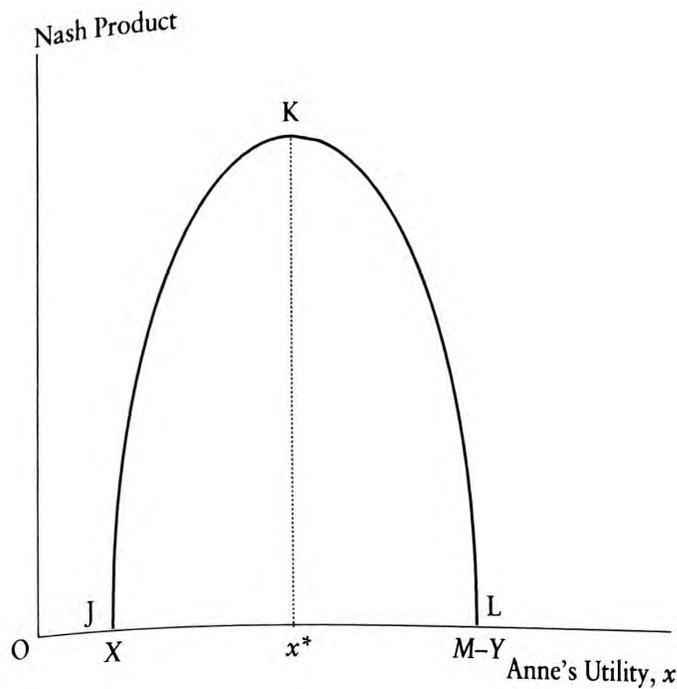


FIGURE 3.6 A simple way to determine the Nash bargaining solution

the relationship. How well Anne and Brett can do for themselves in the event that they break up and go their separate ways may seem the natural choice for their threat utilities. This is the view espoused by some scholars, such as Marilyn Manser and Murray Brown and Marjorie McElroy and Mary Horney.¹⁰ In the developed world, divorce may indeed be a reasonable threat point in many circumstances.

It has also been argued, however, that the utility that each person derives by behaving *noncooperatively within marriage* may define the relevant threat point. This has been the viewpoint of scholars such as Frances Woolley (1988), Shelly Lundberg and Robert Pollak (1993), and Zhiqi Chen and Frances Woolley (2001).¹¹ In other words, if negotiations break down Anne and Brett may ignore the fact that their actions impinge on the well-being of the other person. They may act in their individual best interest, taking the other person's actions as beyond their control. In that scenario, when negotiations break down Anne does the best for herself, taking as given the actions of Brett. Likewise, Brett does the best for himself, taking as given the actions of Anne. The noncooperative outcome whereby neither

¹⁰Manser and Brown (1980) and McElroy and Horney (1981).

¹¹Woolley, F. R. (1988), "A Non-Cooperative Model of Family Decision Making," Trinity International Development Initiative Working Paper 125, London School of Economics, London; Lundberg, S., and R. Pollak (1993), "Separate Spheres Bargaining and the Marriage Market," *Journal of Political Economy* 101 (6), pp. 988-1010; and Chen, Z., and F. R. Woolley (2001), "A Cournot-Nash Model of Family Decision Making," *Economic Journal* 111 (October), 722-748.

can choose actions different from his or her current choice that could make him or her better off, given the other person's action, is referred to as the *Nash equilibrium*, as we saw in the previous chapter.¹² It is important to note that this noncooperative behavior is occurring *within* marriage; the two people have not divorced. This threat alternative may be more appropriate in developing countries in which divorce is relatively rare.

It is quite possible that, in this noncooperative mode, both people may retreat into their *separate spheres* as defined by traditional norms, as argued by Lundberg and Pollak (1993). Let us be more specific. Suppose that Anne is more efficient at housework than Brett and that he is better than Anne at market work. In their cooperative endeavor, they may split their activities according to comparative advantage. Anne may do a larger share of the housework, recognizing that this has to suffice for two people, and take up only a part-time job outside the home. Brett may do much less of the housework and spend most of his nonleisure time earning an income. In a noncooperative situation like that alluded to above, however, Anne might curtail some aspects of her housework (such as cooking and laundry) so that it suffices only for her. In her time that has been thus freed up, she might take up full-time employment outside the home. And Brett, needing some of these household services that Anne has ceased to provide, may need to curtail his market activity and spend more time doing housework. Furthermore, traditional norms may dictate that Anne is responsible for housework and Brett for the income necessary to run the household. So when they retreat into their separate spheres, Anne may contribute only her labor for the upkeep of their household, withholding any financial resources (even though she can afford to contribute these, too). The utility that each person derives from this noncooperative scenario defines the threat point in the "separate spheres" view. The couple is still married—they are not separated or divorced—but in choosing their actions each person is looking only to his or her own well-being (ignoring the beneficial or costly effects of their choices on the partner), and that only in his or her traditional sphere of activity.

Does it matter whether it is divorce or the noncooperative outcome within marriage that is the threat point in the bargaining solution? Yes, it does. To see why this is true, consider two events:¹³ (a) Anne gets a good job that she can take up in the threat scenario, and (b) Anne receives as an inheritance some real estate that earns her rental (nonlabor) income. Both of these events increase her threat utility, but which would yield a better bargaining outcome for her? The answer depends on whether it is divorce or the noncooperative outcome within marriage that is the threat point. To draw a comparison, suppose that the increase in Anne's utility in scenarios a and b

¹²Note that the Nash equilibrium is distinct from the Nash bargaining solution.

¹³The argument that follows is drawn from Anderson, S., and M. Eswaran (2009), "What Determines Female Autonomy?: Evidence from Bangladesh," *Journal of Development Economics* 90, pp. 179-191.

is the same. If divorce is the threat scenario, both events will increase Anne's bargaining power by the same amount and will not affect Brett's threat utility because the individuals are going their separate ways. There is nothing to choose between the two events. In other words, one will obtain the same Nash bargaining solution in both scenarios.

If noncooperative behavior within marriage is the threat scenario, however, the two events might generate very different bargaining outcomes by affecting Brett's threat utility differently. Some household goods and services are public goods in the sense that one cannot prevent one's spouse from enjoying their benefits. When Anne receives rental income, as in event b, she will spend part of it on the household (e.g., buying paintings for the living room), and this public good will benefit Brett even in the noncooperative scenario. So when Anne's nonlabor income increases because of her inheritance, Brett's threat utility also increases. What happens in event a, when Anne gets a good job? In this case Anne will divert some of her time from doing housework to working in the market. As a result, Brett (who consumes these household services) will be worse off. So Brett's threat utility will decrease in event a. In other words, event b increases the threat utilities of both Anne and Brett, whereas a increases Anne's threat utility but decreases Brett's. Consequently, when the couple's noncooperative behavior within marriage is the threat point, scenarios a and b will generate different Nash bargaining solutions. So it matters which scenario defines the threat point.

At this point we should recognize that this approach to bargaining within the household—as useful as it is—has its drawbacks. Amartya Sen (1990) has argued that one drawback of such models is their presumption that individual self-interest is a well-defined concept.¹⁴ This is not necessarily the case, especially in developing countries. Society often downplays some activities, especially those undertaken within the household, as “unproductive.” If they are perceived as such by women, it will undermine their perception of what is their just desserts. As a result, they may not perceive the household allocation as unfair despite the fact that they are deprived in a real sense to an outside view. Put differently, socialization may mold preferences that are detrimental to women in a bargaining situation, and bargaining models take these preferences as given. (Nevertheless, *given* these preferences, the models can accurately predict the outcomes.)

There is evidence on the kinds of socialization that are damaging to women. As mentioned in Chapter 1, Linda Babcock and Sara Laschever (2003) have shown that women may not ask for what is their rightful due in bargaining situations, and consequently they may receive less than men. Both men and women may be playing out socially constructed roles, so the out-

¹⁴Sen, A. (1990), “Gender and Cooperative Conflicts,” in *Persistent Inequalities: Women and World Development*, ed. I. Tinker, Oxford University Press, New York, pp. 123–149.

comes may be very asymmetric even if their outside options are not very different. Although they are very important, outside options are not everything. An alternative way of thinking about this is to recognize that the payoff in outside options must include the negative reactions that women may face from society when they violate gender-normative roles, as shown in the work by Hannah Bowles, Linda Babcock, and Lei Lai (2007) that we discussed in the previous chapter. Because these negative reactions are usually dependent on culture, the perceived payoffs are context dependent.

IV. Determinants of Threat Utility

In a bargaining situation, a woman's threat utility is the utility she can assure herself of in the event that bargaining breaks down. We have seen that her threat utility crucially determines how well she will do in the bargain. The greater her threat utility, the greater will be her utility in the Nash bargaining solution. The better her outside options, the better the deal she can achieve within the bargain. In the bargaining outcome both players typically do better than in their threat options, so it is in their mutual interest to come to a cooperative agreement. However, the threat utility is more fundamental to their well-being than the bargaining outcome, for it is the threat utility that determines the bargaining outcome. It is in each person's interest to possess the highest possible threat utility before entering into a bargain.

But what determines a woman's threat utility? Many factors impinge on this important entity. One of the most important is her human capital. The higher her education level and the more her work experience, the greater will be her productivity and the higher her income should she work. Even if she chooses *not* to work in the cooperative outcome, her utility will be greater in the Nash bargaining solution as a result of her human capital. Ownership of other assets will also increase her threat utility. Ownership of land, financial wealth, and so on, by generating nonlabor income, will increase her threat option in household bargaining.

The laws of the society in which a woman lives are also important. Whether women are seen as equal to men in the eyes of the law matters. In many countries, women received voting rights only a few decades ago. Until then, they had no political voice to improve their lot; they had limited means through which they could increase their resources for things that met their needs. But other laws, such as inheritance laws and divorce laws, also matter. In many countries, inheritance laws are such that parents' bequests are not equally divided between sons and daughters. To the extent that daughters are discriminated against in inheritances, women will have fewer assets and, therefore, lower nonlabor income.

Divorce laws are important, too, because they determine how well a married woman will do in the event her marriage breaks up. If the household's

assets are divided equally, even though she may have specialized in being a housewife, a woman will come out better than when the assets go mostly to her husband. Likewise, custody laws that favor mothers in the event of divorce increase a woman's threat utility. Her greater threat utility will embolden her to demand a more reasonable share of the surplus within marriage.

A woman's social network is also important. Those she can rely on in times of serious trouble (such as a separation or marriage breakup) will certainly impinge on her threat utility. The strength of one's family ties and the physical distance to one's close relatives are important. Someone who has no close relatives or friends and no other support groups will have a low threat utility on that count. She will usually be more timid in her approach to bargaining than if she had strong familial and social ties.

In market economies, however, by far the most important factor impinging on a woman's threat utility is her human capital—her ability to command a good labor income. Human capital is not something that can be taken away from her. A crooked relative may appropriate her land, she may lose her house in a flood or an earthquake, and she may lose her financial wealth in a stock market crash. But her human capital is inalienable; it cannot be separated from her. As long as she maintains her health, she can put her education and work experience to use in the market. Even if the laws of the land are not supportive and even if she does not have close relatives or strong support groups, she can manage to be independent using the income she earns with her human capital.

We must note, however, that even if she earns an independent income, a woman may not always be able to exercise control over how it is spent. In some of the highly patriarchal societies of developing countries, a wage-earning woman has to hand over much of her earnings to the patriarch of her household. Earning ability in such situations is limited in its scope to empower women. It is *control* over the income earned that empowers them. Siwan Anderson and Jean-Marie Baland (2002), for example, found that in the slums of the Kenyan city of Kibera, women often joined forced savings institutions just to get income out of the reach of their husbands, that is, to maintain control over their income.¹⁵ It is nevertheless still true that women with education can exercise greater control over their earnings than those without education.

V. Noncooperative Bargaining

In the Nash bargaining solution we considered above, Anne and Brett cooperated in the bargaining process even if they behaved noncooperatively in

¹⁵Anderson, S., and J. M. Baland (2002), "The Economics of Roscas and Intra-household Resource Allocation," *Quarterly Journal of Economics* 117, pp. 963–995.

the threat outcome. An alternative way of analyzing bargaining situations is to assume that even the *process of bargaining* is noncooperative. In this instance, we cannot explicitly assume that the bargaining outcome is Pareto efficient.

In models of noncooperative bargaining, it is typically assumed that the bargainers can alternately make offers and counteroffers about how the gains from their cooperative endeavor are to be split. The classic paper on noncooperative bargaining is that by Ariel Rubinstein (1982), but the exposition below follows somewhat the treatment in Avinash Dixit and Barry Nalebuff (1991).¹⁶ To get the flavor of how this works, suppose that Anne and Brett can earn a total of \$100 in the event that they agree to cooperate on a one-day project. For the moment, suppose that their threat utilities are zero. We begin by assuming that only Brett can propose how they should split the amount. Anne can either accept the proposal or reject it. If she accepts it, the \$100 will be split in the manner proposed by Brett. If Anne rejects Brett's proposal, they will both gain nothing from the project because it will not be undertaken. This scenario is that of the ultimatum game that we encountered in Chapter 2. How will the money be split?

As before, we assume that Anne and Brett each wants to maximize his or her own well-being. We further assume that this well-being is captured by the amount of money they receive and by nothing else. Even though Brett is the one making the proposal, he has to worry about whether Anne will accept or reject his offer, for if she rejects it, neither of them will receive anything because the project will not be undertaken. So he has to put himself in Anne's shoes and ask himself how she will behave in response to his proposal. In other words, before Brett makes his proposal, he has to solve Anne's decision problem first.

How will Anne decide when confronted with a proposal from Brett? She will recognize that if she rejects his offer, she will gain nothing from the project and, because she has no outside option, will receive nothing elsewhere either. Therefore, she will be better off accepting any offer from Brett that gives her at least one cent. Brett, wanting to maximize his own share, will want to give her just enough that she won't reject his offer but no more. He will give her no more than one cent. So he will propose that he should receive almost everything (\$99.99) and that she should receive almost nothing (\$0.01). Anne will accept the proposal. Of course, we might believe that Anne will be incensed by this extremely unfair distribution and reject his offer. But that would amount to saying that Anne is motivated by something other than the amount of money she will receive, contradicting our

¹⁶Rubinstein, A. (1982), "Perfect Equilibrium in a Bargaining Model," *Econometrica* 50, pp. 97–109, and Dixit, A., and B. Nalebuff (1991), *Thinking Strategically*, W. W. Norton, New York, Chap. 11.

assumption. In fact, if Anne is motivated only by the amount of money she will receive, Brett can even propose that he should receive everything and Anne nothing. If she rejects the offer, again she will receive nothing. If she is indifferent between accepting and rejecting the offer, suppose she chooses to accept. In this case, Brett will receive the entire \$100 and Anne nothing. This is the noncooperative bargaining outcome.

Now let us give Anne a chance to propose a split and see how the bargaining outcome changes. Suppose that she and Brett can undertake the project on each of two days, earning a total of \$100 each day if they can come to an agreement. As before, suppose that they have no outside options. Furthermore, suppose that each person would like to receive the maximum possible total earnings over the two days. On the first day, suppose that Brett gets to make a proposal as to how they should split the money. If Anne accepts the proposal, the proposed split will be implemented for both periods. If Anne rejects the proposal, they both will receive nothing for that day. But the following day, Anne will get to propose how they should split the second day's earnings. If Brett accepts her offer, they will work on the project and split the money as agreed. If Brett rejects it, on the second day, too, neither of them will earn anything.

In making his proposal on the first day, Brett will have to make sure he doesn't offer Anne too little. For if he does, she will reject his offer and do better for herself when she gets to propose the split the next day. How will she choose the split on the next (and last) day? Using the same argument as before, we know that Brett will accept any share on the second day—no matter how small—because by rejecting it he will receive zero and, because he has no outside option, zero elsewhere. So on the second day, Anne will propose that she take everything, leaving Brett nothing. That is, Anne's total earnings over the two days will be \$100 (zero on the first day and \$100 on the second). So when Brett makes his proposal on the first day, he will have to ensure that Anne receives a total of at least \$100 over the two days. Therefore, he will offer a 50-50 split. Because this will be implemented on both days, Anne and Brett each will receive a total of \$100 over the two days. Anne will accept this offer because she can do no better by rejecting it. The noncooperative bargaining outcome now is a 50-50 split.

The first thing to notice about the above outcome is that having the opportunity to reject Brett's offer and making a counteroffer gives Anne bargaining power. Compared to the earlier situation in which Anne had no such option, she now earns \$50 on each of the two days. The very fact that Anne can reject Brett's offer and do better for herself by proposing the split the next day puts a limit on how selfish Brett can be. In any bargaining situation, each person has to seriously take account of the options available to the other person. The freedom to reject an offer and to make a counteroffer is a vehicle of empowerment.

However, a person may also have an *outside option*. If Anne has the option of earning an income outside of this project, how will it affect the bargaining situation with Brett? To see this, suppose that Anne has an outside option (threat utility) of \$20 a day but Brett, as before, has none. So if they do not undertake a project on any day, she can earn \$20 doing some other job but he cannot earn anything. How will this affect Brett's proposal on the first day? He will realize that, if Anne rejects his offer, she will earn \$20 elsewhere on that day, and on the next day she will make him a counteroffer in which she will receive everything from the project. In other words, she can assure herself of a total of \$120 over the two days. So if Brett's offer on the first day is to be accepted, he has to make sure that Anne will receive at least \$120 over the two days. Therefore, he will offer a 40-60 split, \$40 for himself and \$60 for Anne, on each of the two days. And Anne will accept.

We see that when Anne's outside option increases from zero to \$20 a day, her total earnings in the bargain will increase from \$100 to \$120. She does not actually go out and exercise her outside option. Simply having such an option affects the bargaining outcome, because Brett has to respect the fact that she has this option. The situation, of course, is symmetric: if Brett has outside options, this will generally improve his earnings at Anne's expense.

VI. Evidence for Bargaining Models

We have already discussed some evidence suggesting that the unitary model of household allocation is not supported by data. Duncan Thomas (1990) has provided additional compelling evidence of this and of the different preferences of women and men with regard to household expenditures.¹⁷ He examined data from a national sample of Brazil as to how income in the hands of mothers and in those of fathers impinges on spending on the health and nutrition of children. He first found that, judging from the outcomes, it *does* matter whether income accrues to the mother or the father, that is, the data reject the unitary model of the household. This suggests that the individual preferences of husbands and wives are different, and for this difference to be manifested in the outcomes, the wives must have income to spend.

In examining the effect of income on bargaining outcomes such as a household's demand for various goods, it is better to focus on *unearned* income rather than total income. Unearned income refers to income from pension, social security, and financial assets, whereas total income includes labor income. Labor income may itself depend on the bargaining powers of the members of the couple. For example, whether a wife has labor income may depend on whether she has any bargaining power to assert her right to work

¹⁷Thomas, D. (1990), "Intra-Household Resource Allocation: An Inferential Approach," *Journal of Human Resources* 25, pp. 635-664.

in the first place.¹⁸ Unearned income does not have this problem, at least not to the same extent. Thomas found that when a mother's unearned income increased, the household's demand for nutrition rose by more than 4 times the rise in nutrition demand when the father's unearned income increased by the same amount. Furthermore, the effect on child survival of increases in unearned income was almost 20 times larger for the mother than the father. This finding has enormous policy implications for poor countries that are seeking to reduce child mortality: income in the hands of mothers is much more efficacious than income in the hands of fathers.

Esther Duflo (2003) has used data from South Africa to demonstrate that the gender of a grandparent who receives cash is important to determining the health status of girls in a family.¹⁹ In the early 1990s, after the dismantling of apartheid, the South African government expanded its pension program to include blacks. Because extended families are quite common in that country, many pensioners live in the same households as their grandchildren. Duflo found that the health status of female children, as captured by weight-for-height and height-for-age measures, is significantly better if they are living with their pension-earning grandmothers. No such effect is observed for male children. Furthermore, when children are living with their pension-earning grandfathers, there are no discernible health effects on the children. This shows that the identity of the pension recipient (male or female) has an important effect on the grandchildren's health status.

Using data from the African country of Côte d'Ivoire, John Hoddinott and Lawrence Haddad (1995) provide more evidence that the identity of the income earner makes a difference to a family's spending patterns.²⁰ They find that an increase in the share of women's income increases the budget share allocated to food and decreases that devoted to meals eaten outside the home, as well as to alcohol and cigarettes. If the share of the family income accruing to the wife doubles, the share of income spent on food consumed in the home increases by about 2%, whereas the shares of alcohol and cigarettes decline by about 25% and 15%, respectively. Somewhat surprisingly, this study also found that there is a decrease in the shares spent on children's and adults' clothing.

Agnes Quisumbing and John Maluccio (2003) examined the effect of the assets wives bring with them to marriage on the spending patterns of their

¹⁸ A man with bargaining power may recognize that in the future this power may be reduced if his spouse starts working, so he might prevent her from taking a paying job. See Basu, K. (2006), "Gender and Say: A Model of Household Behaviour with Endogenously Determined Balance of Power," *Economic Journal* 116, pp. 558–580.

¹⁹ Duflo, E. (2003), "Grandmothers and Grandfathers: Old-Age Pensions and Intrahousehold Allocation in South Africa," *World Bank Economic Review* 17, pp. 1–25.

²⁰ Hoddinott, J., and L. Haddad (1995), "Does Female Income Share Influence Household Expenditures?: Evidence from Côte d'Ivoire," *Oxford Bulletin of Economics and Statistics* 57, pp. 77–96.

households in four countries (Bangladesh, Ethiopia, Indonesia, and South Africa).²¹ They used these assets as proxies for women's bargaining power within their households. They found that in three out of the four countries the unitary model was rejected. Furthermore, in all four countries the allocations were seen to be consistent with Pareto efficiency (which is what the cooperative bargaining models presume). In two of the countries (Bangladesh and South Africa), an increase in women's bargaining power increased the shares of income allocated to children's education. The authors, however, are cautious to point out that this need not have been because women are more altruistic than men. Because wives are considerably younger than their husbands, on average, the women may have been ensuring better care for themselves in old age via more educated children.

We have seen that, according to bargaining theory, what empowers women is greater threat utility. This was shown to be the case in a stark manner in the Matlab area of Bangladesh by research conducted by Siwan Anderson and Mukesh Eswaran.²² In the data from this area, married women had essentially three options open to them: (i) specializing exclusively in housework, (ii) helping their husbands on their farms, and (iii) earning an independent income by raising chickens and ducks. One might have expected that the autonomy of women in option ii would have been greater than that of women in i and that the autonomy of women in iii would have been even greater. This is because in ii women helped their husbands earn income and in iii they earned independent incomes. A surprising finding of Anderson and Eswaran is that, although women in iii did have greater autonomy than women in i, those in ii did not. Why? Because women who merely helped their husbands earn money did not increase their outside options. Purdah restrictions (whereby women have to veil their faces and sometimes their whole bodies) prevented them from working with men who were not their husbands. So women without the skill to work for themselves had only two options: specializing in housework or helping their husbands in their farm work. Purdah restrictions eliminated outside options for these women. So, by working on their husbands' farms, they garnered no additional bargaining power relative to specializing in housework. It is only by working for themselves and controlling the income they earn that women gain greater say in household matters. Bargaining power depends on outside options, and if these remain unchanged, bargaining power remains unchanged. The empirical finding using Bangladeshi data is a stark confirmation of this prediction of bargaining theory.

²¹ Quisumbing, A. R., and J. A. Maluccio (2003), "Resources at Marriage and Intrahousehold Allocation: Evidence from Bangladesh, Ethiopia, Indonesia, and South Africa," *Oxford Bulletin of Economics and Statistics* 65, pp. 283–327.

²² Anderson and Eswaran (2009).

An interesting verification of the bargaining model has been conducted by Lixing Li and Xiaoyu Wu (2011) using data from China.²³ They argue that because couples have a strong preference for male children in China, women who have sons enjoy more status than women who have daughters. As a result, the bargaining power of the former is greater and they have greater say in household decision making. One might think that, if a son preference is strong, couples will ensure that they have mostly male children (through selective abortion and so on). However, the evidence shows that the proportion of *first-born male children* is no different in China than in countries where there is no gender preference. Sex preference shows up only in second and subsequent births. (We shall discuss preferences as to the sex of children in developing countries and their consequences in Chapter 8.)

To ensure that their measure of bargaining power was not contaminated by the possibility that the genders of children have been manipulated by parents, Li and Wu focused their attention on only first-born children. They investigated whether mothers of male first-born children have more bargaining power than mothers of female first-born children after accounting for all other relevant factors. Using Chinese data for the period 1993–2006, they found that the former enjoyed a greater say of about 4 percentage points in household decision making than the latter. They also found that the former were able to consume more nutrition and, therefore, were less likely to be undernourished. One might suspect that this is due to the fact that when the children start earning, boys earn more than girls, so their family income may be higher. But Li and Wu show that they obtained the same finding even when they restricted themselves to mothers of young children (who wouldn't have started earning). This strongly suggests that it is the bargaining power of the mothers of first-born males that is higher than that of mothers of first-born females.

Evidence for the relevance and importance of bargaining models is certainly not restricted to research done in developing countries. For example, Shelley Phipps and Peter Burton (1998) use Canadian data to show that the unitary model fails.²⁴ Furthermore, they find that although husbands and wives may not pool their incomes for all goods, they may pool them for some goods (such as housing). On goods that they consume privately, they tend to spend their own incomes. However, on goods that are jointly consumed, the spending is dictated by gendered norms about whose sphere of responsibility they are in: wives tend to spend on child care, for example, husbands on transportation.

²³Li, L., and X. Wu (2011), "Gender of Children, Bargaining Power, and Intra-household Resource Allocation in China," *Journal of Human Resources* 46, pp. 295–316.

²⁴Phipps, S. A., and P. S. Burton (1998), "What's Mine Is Yours?: The Influence of Male and Female Incomes on Patterns of Household Expenditure," *Economica* 65, pp. 599–613.

Some interesting, if indirect, confirmation of the predictions of bargaining theory has been provided by Joshua Angrist (2002).²⁵ He examined how sex ratios affected the bargaining power of women in the marriage market in the United States. (Angrist defines the sex ratio as the number of males per female.) If the sex ratio is higher than 1 in the age group of marriageable adults, it means that there are more men than women. This tends to improve the bargaining power of women in the marriage market. As a result, women can choose to marry men with higher incomes, insist on working less when married, and so on.

The difficulty with testing these predictions is usually that the sex ratio is very stable and does not vary enough to be informative about changes in bargaining power. However, Angrist creatively exploited the fact that there have been episodes in U.S. history when the sex ratios of various ethnic communities have changed considerably because U.S. immigration policies have assigned quotas to immigrants of different ethnic groups. In particular, he focused on the period 1910–40 and examined whether there is evidence that changing sex ratios affected the marriage rates of women and men in the next generation. The logic is that, if the sex ratio of Italians, say, changed during the period because of immigration (as it did), the marriage rates among Italians of the *second* generation would have been affected. This is because marriages tend to be endogamous, that is, there is a tendency for Italians to marry Italians, Germans to marry Germans, and so on.

Angrist found that when the sex ratios of ethnic communities increased during the period, more women tended to get married. In addition, these women participated less in the labor market, and their husbands' incomes were higher. Furthermore, the marriages that resulted from higher sex ratios were more stable. These findings are consistent with the implications of bargaining theory. When women are scarce, men will have to try harder to get wives—they will have to invest more in themselves, work harder, earn more, and so on—and will be more careful to avoid marital failure.

All in all, the evidence we have surveyed above in favor of models of bargaining within the household is quite compelling. We now turn to why bargaining theory is relevant to understanding one of the most important institutions responsible for oppressing women, namely, patriarchy.

VII. Origins of Patriarchy

In most contemporary societies, it is men who hold the power to make decisions in society at large and in households. Such societies are referred to as *patriarchal*. Societies in which, by and large, women make the decisions—

²⁵ Angrist, J. (2002), "How Do Sex Ratios Affect Marriage and Labor Markets?: Evidence from America's Second Generation," *Quarterly Journal of Economics* 117, pp. 997–1038.

matriarchal societies—are relatively rare. Why is this? We now address some theories of the origins of patriarchy and the evidence that supports them.

The View from the Social Sciences

Among economic theories that suggest the origins of women's oppression, Marxian theories are among the best, in particular that of Friedrich Engels (1884–1986).²⁶ Engels proposed what is now a classic analysis in his *The Origin of the Family, Private Property, and the State*.²⁷ In his view, the oppression of women has not existed from time immemorial; rather, it began with a specific change in the production technology that humans used for survival. Drawing on the work of an anthropologist, Engels argued that for much of our evolutionary history, humans were organized in clans (called *gentes*, singular *gens*) comprising individuals related by blood. Engels attributed only to men the task of providing subsistence, a view that evidence has subsequently shown to be erroneous. Clans' survival needs were met by meat acquired largely but not exclusively by the hunting of men, and vegetables were gathered largely by women. In fact, the contribution of women to clans' subsistence needs was quite considerable.²⁸ Nevertheless, Engels argued that the work that women did was of a public character: it was done for their entire clans, not for specific individuals. In this organization of society, all property was commonly owned and, although there was a division of labor by gender, women had as much say in community affairs as men. Engels called this egalitarian state *primitive communism*. Marriages were *group* marriages; a man and his brothers were all married to a woman and all her sisters. Paternity of a child was uncertain (it would be impossible to tell who the biological father of a child was), but, as always, it was certain who the mother was. So blood lines were traced through the mother, that is, these societies were matrilineal. However, personal property (to the extent that there was such property) was passed on by a man to his *sister's children*. Why was that? Because, if paternity was uncertain, it was possible that there were no common genes between a man and his wife's children if she had sexual relations with men unrelated to him. However, there would have been at least some common genes between him and his sister's children (because he and his sister had the same mother).

²⁶Readable commentaries on Engels's book can be found in Brewer, P. (2004), Introduction to *The Origin of the Family, Private Property, and the State*, Resistance Books, Chippendale, Australia; Harman, C. (1994), "Engels and the Origins of Human Society," *International Socialism* 2 (65); and Smith, S. (1997), "Engels and the Origin of Women's Oppression," *International Socialist Review* 2, Fall.

²⁷Engels, F. (1986 [1884]), *The Origin of the Family, Private Property, and the State*, Penguin Books, New York.

²⁸This is especially true in regions with latitudes below 40°. See, for example, Hunn, E. S. (1981), "On the Relative Contribution of Men and Women to Subsistence among Hunter-Gatherers of the Columbia Plateau: A Comparison with *Ethnographic Atlas* Summaries," *Journal of Ethnobiology* 1, pp. 124–134.

In this setting arose “pair-bonding,” in which a single male was tied to a single female in a special relationship. This relationship, Engels claimed, became permanent when the technology for survival changed from hunting and gathering and the owning of cattle became productive. He did not exactly explain how animal husbandry and the ownership of animals became privatized and animals came to be owned by men. But his logic presumably was that, because in order to graze cattle women could not stray far from their homes if they had young children, men had the comparative advantage in herding cattle. Thus men acquired the ownership of animals, and this gave them a form of wealth that they could bequeath to future generations. But in the matrilineal system, they gave inheritances to the children of their sisters. Furthermore, unless sexual relations were strictly monogamous, the children of men’s wives were not necessarily their own. Thus, to be more certain of passing on their wealth to *their own children*, men would have insisted on having control of bequests through pair-bonding. Thus lineage came to be traced through fathers rather than mothers, that is, matrilineality gave way to patrilineality. Engels claimed that this was a momentous change in the status of women: “The overthrow of mother right was the world historical defeat of the female sex. The man took command in the home also; the woman was degraded and reduced to servitude; she became the slave of his lust and a mere instrument for the production of children.”²⁹ It was the emergence of the ownership of private property in goods facilitating production that was responsible for the oppression of women, in Engels’s view. He predicted that only when private property was abolished (in a socialist state) would women be freed from their servitude.

Engels did not have the evidence we do today and so got some aspects of prehistoric social organization and specialization wrong. He was incorrect in presuming that matriarchy was universal before the transition described above. Also, he concentrated on the transition from hunting and gathering to pastoralism as the crucial event that undermined women’s status. As we shall see below, it is possible that it was the switch to agriculture that had this effect. Direct evidence for Engels’s theory is hard to come by because it refers to events that occurred thousands of years ago, and hunting and gathering societies are very rare today and so cannot be observed. Nevertheless, his theory does receive some support from indirect evidence. Patricia Draper (1975) studied the !Kung communities at the western edge of the Kalahari Desert in Africa—one of the few hunting and gathering societies that still exist.³⁰ She

²⁹ Engels (1986 [1884], p. 87).

³⁰ Draper, P. (1975), “!Kung Women: Contrasts in Sexual Egalitarianism in Foraging and Sedentary Contexts,” in *An Anthropology of Women*, ed. R. R. Reiter, Monthly Review Press, New York, pp. 77–109.

compared the status of women relative to men of a group that still hunts game and gathers wild vegetables with that of another !Kung group that is more sedentary. Draper found that there is considerable egalitarianism between men and women in the former group; both sexes are quite mobile, and both contribute substantial amounts of food to the community, though that of men is more variable. Women retain control over what they have gathered and exercise considerable autonomy. In contrast, in the more sedentary group, Draper observed a greater stock of durable goods, less mobility among women, greater access of men to domestic animals (mostly goats), and a decline in women's autonomy. All this is consistent with Engels's theory.

More recently, evidence consistent with Engels's theory as to how patrilineality may have emerged has been provided by Clare Holden and Ruth Mace (2003).³¹ They examined 68 Bantu-speaking populations of Sub-Saharan Africa to test whether societies that were matrilineal tended to become patrilineal after they acquired cattle. In other words, when the economic activity shifted from horticultural to pastoral, did patrilineality begin to take over? (Horticulture is the precursor to agriculture and requires much lighter equipment, such as a digging stick or hoe.) Why is it that across the world in contemporary times roughly only a fifth of the societies are matrilineal, two-fifths are patrilineal, and the rest are both? This is not an easy question to answer empirically because it may be the case that patrilineality and pastoral activities have arisen together ("co-evolved") by sheer accident. One has to ensure that this co-evolution is not likely to have been an accident, and to determine this we need to examine the frequency with which patrilineality and matrilineality have occurred together.

Holden and Mace documented 24 of the 68 Bantu cultures as matrilineal and 37 as patrilineal; 30 of the 68 cultures were pastoral. They found, using sophisticated statistical procedures, that the societies that had adopted cattle owning were less likely to be matrilineal. Surprisingly, however, there was little evidence that cattle owning and patrilineality co-evolved. Nevertheless, they found that although cultures may have gone from being matrilineal to patrilineal, the reverse did not happen. In effect, the transition to patrilineality appears to have been irrevocable.

Holden and Mace offer an evolutionary explanation as to why matrilineality may not be as appropriate in pastoral cultures as in horticultural ones. We can explain this as follows. In cultures that are horticultural, women participate in economic activity because the hoe does not require much upper body strength. Parents will naturally invest in their daughters' skill (human capital). Also, families with able daughters will do better in terms of survival. It makes sense

³¹Holden, C. J., and R. Mace (2003), "Spread of Cattle Led to the Loss of Matrilineal Descent in Africa: A Coevolutionary Analysis," *Proceedings of the Royal Society of London B*, 270, pp. 2425-2433.

in this sort of society for women to pass on property through females because they know who their children are and because daughters have inherited their mothers' ability. An able woman who has the genetic makeup to survive better will pass her property on to her own children (who will share these genes). If property were to pass through the husbands, it would reward *their* children—and these are not always their wives' children, too. As we have seen, this is the case if sexual relations are not monogamous or if they are serially monogamous. So the resource abundance made possible by the superior skill of a woman in horticulture may be frittered away by being bequeathed to those who do not carry her genes and, therefore, her ability. The representation of her genes in future generations will be maximized if descent is traced through her, because her (able) children will benefit from her resources. A similar argument applies in reverse in pastoral societies, where men have a comparative advantage in herding activities. In the latter type of cultures, it makes more evolutionary sense for lineage to be traced through men.

Before we leave the discussion of Engels's theory, we should note that Marxian literature on women's oppression subsequently adopted a political and ideological emphasis—it largely saw the subordination of women as arising from the class system, with each class (such as workers, capitalists, and landlords) defined by a common collective interest. An important early exception, however, is the work of Nancy Folbre (1982), who recognized that the oppression of women started within the household and so existed before the class system arose.³² She argued that this oppression sprang from asymmetric bargaining power within the household and saw women's employment outside the home as redressing this imbalance. Accounting for this difference in the bargaining power of women and men in formal economic models would also go a long way toward addressing Heidi Hartmann's (1981) influential critique of the Marxian literature.³³ Hartmann argued that, in an unhappy marriage with feminism, Marxism subsumes patriarchy within the class struggle between labor and capital and thereby undermines feminist objections to patriarchy. Marxian analysis of oppression based on the class system has tended to be gender neutral and therefore is not the most appropriate avenue for addressing oppression based on gender.

The View from Evolutionary Biology

Evolutionary biologists have a different take on how patriarchy arose. Barbara Smuts (1995), who analyzed the evolutionary origins of patriarchy, pro-

³²Folbre, N. (1982), "Exploitation Comes Home: A Critique of Marxian Theory of Family Labour," *Cambridge Journal of Economics* 6, pp. 317–329.

³³H. Hartmann (1981), "The Unhappy Marriage of Marxism and Feminism: Towards a More Progressive Union," in *Women and Revolution*, ed. L. Sargent, Black Rose Books, Montreal.

vides considerable insight into this question.³⁴ In essence, she argues that patriarchy arose out of the need for men to control the sexuality of women. Although evolutionary biologists and feminists generally do not see eye to eye, on this issue they agree. However, they may ascribe different reasons to why men feel the need to exercise this control.

The view of evolutionary biologists is as follows. It is in the reproductive interests of both men and women to have many children. Because children embody their parents' genes, the greater the number of surviving children, the greater will be the prevalence of their parents' genes in future generations. So anything that increases the number of children or improves their chances of survival is to the advantage of parents in that it improves their representation in the future gene pool. This is not to suggest that parents consciously think in this manner. The evolutionary principle of natural selection automatically rewards, in this sense, parents who have large numbers of surviving children relative to other parents.

Beyond that, however, the reproductive interests of men and women diverge. Women must bear their own children, but men do not have to. Given that a child has to be in the mother's womb for nine months, this limits how many children a woman can have. A man, on the other hand, can have many more children—through several women. In fact, if a man is assured that the mother will take care of a child, it is in his reproductive interest to maximize the number of children he has through other women. Men do not think like this, of course, but rather nature accomplishes this outcome through their desire for sex.

The desire for sex gave men the motive for controlling women. Men wanted to ensure that women were readily available to them but outside the reach of other men. This gave rise, in Smuts's view, to the institution of *patri-local residence*, in which a wife leaves behind the natal family with which she grew up and moves to the family of her husband. The move to a completely alien environment reduces a woman's resistance to control.

To the extent that women could find food by themselves, they would have retained considerable autonomy for themselves. This is because being able to survive on their own gave them, in the language of economists, a good threat option. However, Smuts argues that things changed for the worse when, in the evolutionary history of humans, two events occurred.

First, when humans shifted to meat eating women were placed at a disadvantage. Because men are physically stronger on average and because they did not have to carry their children, they were more adept than women at catching and killing game. This made women dependent on men for protein. Anthropologists have proposed that this dependence led to the so-called meat-for-sex exchange, whereby women were forced to trade sexual access

³⁴Smuts, B. (1995), "The Evolutionary Origins of Patriarchy," *Human Nature* 6, pp. 1–32.

for protein.³⁵ This dependence would have undermined women's bargaining power. Whether the meat-for-sex argument is correct with regard to humans is debatable. In hunting and gathering societies, women may have been responsible for providing the bulk of the nutrition on a daily basis because the rewards to hunting were very uncertain.

Second, around 10,000 years ago, humans moved to settled agriculture. Prior to that, humans had the nomadic lifestyle of hunters and gatherers, who moved from place to place when the local resources in an area were exhausted. Women had the freedom to hunt small game and to gather vegetables from commonly owned resources to which they had free access. But with the advent of settled agriculture, this nomadic lifestyle came to an end and women's economic dependence on men increased. The fact that women no longer had the opportunity to move freely decreased their autonomy even further because it gave men the opportunity to monitor their activities.

Why might men have wanted to monitor the actions of women? Because men are never sure of the paternity of their children. Men who unwittingly expended resources to bring up children who were not their own would have promoted the survival of other men's genes, not their own. So the representation in the future gene pool of men who were indifferent to the paternity of their children would soon have dwindled to nothing. Preserved would have been the genes of only those men who jealously guarded the sexual access to their spouses. The move from hunting and gathering to settled agriculture would have greatly reduced the autonomy of women by restricting their mobility.

If this line of argument is correct, the role played by agriculture in undermining the bargaining power of women is ironic. A great deal of the increase in the standard of living of humans in the past 10,000 years can be traced back to settled agriculture and the increase in agricultural productivity. As long as the entire population was required to work to produce the food needed for subsistence, there was neither any demand for other goods and services nor any supply (because no worker could be spared from gathering or hunting). But once agriculture became sufficiently productive that one person could produce a surplus of food (more than was necessary for his or her subsistence), a fraction of the population could feed the whole population. Then there came to be a demand for other goods and services that could be produced by the people released from having to contribute to the population's subsistence. With the appearance of this agricultural surplus arose the possibility of producing handicrafts, textiles, industrial products,

³⁵This meat-for-sex hypothesis is originally due to Symons, D. (1979), *The Evolution of Human Sexuality*, Oxford University Press, Oxford, UK, and Hill, K. (1982), "Hunting and Human Evolution," *Journal of Human Evolution* 11, pp. 521–544. For recent evidence of this sort of exchange among chimpanzees, our closest cousins, see Gomes, C. M., and C. Boesch (2009), "Wild Chimpanzees Exchange Meat for Sex on a Long-Term Basis," *PLoS ONE* 4 (4), p. e5116, doi: 10.1371/journal.pone.0005116.

the arts, cultural activities, and everything else we believe constitutes developed societies. But the appearance of settled agriculture may have decreased the autonomy of women relative to what it was in the hunting and gathering regime of human evolution.

VIII. Culture and the Perpetuation of Patriarchy

We have reviewed the major arguments that have been proposed to explain the origins of patriarchy. But how did it perpetuate itself right down to contemporary times? To understand this, we begin with the work of Ester Boserup (1970, Chap. 1). She offered an important insight into how different farming systems affected women's employment in contemporary agriculture.³⁶ As we shall see, this had consequences for the emergence of patriarchy. Boserup compared societies based on shifting agriculture with those based on settled agriculture. In shifting agriculture, land is set up for cultivation through slash-and-burn techniques, and cultivation is done with a hoe. The hoe is an implement that is relatively light and easily handled by women. Because the soil is dug up only lightly using this technology, however, the nutrients are exhausted within a few years. An agricultural society based on this technology needs to frequently leave the land fallow and move to new land, which is possible only when land is abundant. Settled agriculture came with plow technology. The plow is a relatively heavy implement that digs deep into the ground and is usually pulled by draft animals. The soil does not become depleted as quickly under this technology, and this facilitates settled agriculture; that is, societies do not have to keep moving every few years. Operating the plow and managing draft animals, however, requires a considerable amount of upper body strength, so men have a comparative advantage in operating plow technology.

Examining data over five decades from African countries, Boserup concluded that female (hoe) farming was the predominant form of agriculture there. In contrast, in Asia the technology used was predominantly the plow, and therefore male farming was the norm. Furthermore, because the plow requires less weeding (an activity usually performed by women), there was little need for female labor except perhaps during harvest times. Contributing to the reduced demand for female labor was the fact that, in Asian regions using the plow, there was usually considerable landlessness, so land could be cultivated using hired labor. For these reasons, women in areas of plow agriculture tended to be secluded in their homes and often wore veils when appearing in public.

Specialization by comparative advantage as determined by technology and physical strength is one thing, but why have women been secluded? Seclusion implies that women are prevented from (or refrain from) participating

³⁶Boserup, E. (1970), *Woman's Role in Economic Development*, Earthscan, London.

not merely in agriculture but also in many other activities outside the home. Why couldn't they participate in industrial or entrepreneurial activities? Is it conceivable that, over time, agricultural technology generates a *culture* that may prevent women from engaging in all or most of the activities outside the home? This is precisely the question that has recently been answered in an interesting paper by Alberto Alesina, Paola Giuliano, and Nathan Nunn (2013).³⁷

If one were to use current data, it would be virtually impossible to find many regions in the world that do not use the plow, because most of agriculture around the world has converted to plow farming. Alesina et al. base their analysis on ethnographic data on over 1,200 ethnic groups across the world in preindustrial times. This data set contains information on plow use by these groups from the earliest time that written records were available about them. In other words, the data have information on plow use in the groups in ancient times. The question they ask is how the use of the plow in history impinges on female labor force participation today, accounting for other relevant factors. They find that those regions that historically used the plow tend to have less female labor force participation even today. Not only do women participate less in agriculture in these regions, they also participate less in nonagricultural sectors and also engage less in politics.

A skeptic might argue that the above findings do not necessarily establish that plow technology facilitated the perpetuation of patriarchy. It is conceivable that those societies that were patriarchal did not develop the kinds of institutions (like markets) that would have enabled women to work. If this were the case, female labor force participation today would be low even in the presence of current attitudes that are open to the idea of women working outside the home. To test whether this is so, Alesina et al. examine the labor force participation among immigrant women in the United States. All immigrants face the same institutions (those that are common across the United States). If past use of the plow in their countries of origin is irrelevant, the labor force participation should be the same across all immigrants. What the authors find instead is that those immigrant women who hail from countries that historically used the plow are less likely to participate in the U.S. labor market than are immigrant women from countries that historically did not use the plow. To be even more certain of the effects of plow cultivation, the authors repeated the exercise using only second-generation immigrants, because these would have been truly exposed only to the institutions in the United States, and in this case, too, they find that historical plow cultivation in the country of origin of their parents has a negative effect on the labor force participation of women.

³⁷Alesina, A. F., P. Giuliano, and N. Nunn (2013), "On the Origins of Gender Roles: Women and the Plough," *Quarterly Journal of Economics* 128, pp. 469–530.

These are very interesting and important findings. What do they suggest? That *culture* plays a very important role in undermining the full participation of women in the labor market and in activities outside the home. It may be true that the plow originally offered a good reason for a division of labor by comparative advantage. But that division of labor became fossilized in the minds of people in the form of culture, which appears to have a long life. And cultural beliefs play themselves out in contemporary times and constrain women even when there are no sound economic reasons for them anymore. In other words, women are constrained to act according to socially constructed notions of appropriate behavior that have been culturally handed down. This contributes to the perpetuation of patriarchy.

These findings fit well with some of the arguments made by Gerda Lerner in her thought-provoking book *The Creation of Patriarchy* (1986). In particular, she has argued that patriarchy has been perpetuated because men have monopolized the creation of the symbols that give meaning to our lives. They have foisted on women male-centered conceptual systems that have marginalized women's experiences and left them with no alternative formulations for articulating these experiences. The feminist struggle against subjugation by men, in Lerner's view, is largely a struggle to shake free from the thought systems they have been exposed to for centuries.

Drawing on the ideas from bargaining theory, Torben Iversen and Frances Rosenbluth (2010, Chap. 2) have proposed that the prevalence of patriarchal norms in society is determined by whether the skills that women and men have are specific to the family or are generally applicable outside the household.³⁸ This notion corresponds exactly to that of threat options. If women have skills that are general, they can readily sustain themselves in the event that they break up with their partners. Because their threat utility is high, they will have considerable bargaining power within the household. This was the situation of women in hunting and gathering societies. In this organization of society, as we have seen, men provided the protein by hunting and women provided the bulk of the calorie intake by gathering. In these societies, women and men were deemed to have more or less equal bargaining power.

If women's skills are specific to the family, they cannot easily sustain themselves by walking away from their spouses, and their low threat utility will undermine their bargaining positions within their households. This was the situation of women after the agricultural revolution. Men's greater physical strength allowed them to specialize in farm work, whereas women specialized in raising children. Because the latter is considerably family-specific, women became dependent on men. Social norms gradually responded to this difference in bargaining power, and societies reflected patriarchal values.

³⁸Iversen, T., and F. Rosenbluth (2010), *Women, Work, and Politics: The Political Economy of Gender Inequality*, Yale University Press, New Haven, CT.

When societies industrialized, the bargaining power of women remained low because they could not readily participate in the labor market. This was because working in factories was inconvenient to women with families. Furthermore, industrial work required highly specialized skills as opposed to general skills. (The acquisition of these specialized skills was more difficult for women than men because it is reinforced by continuous labor market participation.) As a result, patriarchal norms persisted during the industrialization of societies. Iversen and Rosenbluth argue that it was only in the postindustrial stage that women started regaining bargaining power. This is because the service sector expanded rapidly and work in this sector required general skills. This expansion coincided with women's greater participation in the labor market in most developed countries. The increase in women's threat utility led to a corresponding increase in their bargaining power. Patriarchal norms started giving way to norms that gave more equal weight to women and men. Thus male obsessions with things like women's chastity started eroding; men who still insisted on marrying women with these old-fashioned virtues had very limited choices. The insistence on such virtues is found nowadays mostly in those developing countries in which women do not yet have full freedom to operate in the labor market.

IX. Summary

The purpose of this chapter has been to help us understand what determines the bargaining power of women and men within the household. We began this chapter with an assessment of the unitary model of the household, which presumes that the household can be treated as a monolithic unit. We saw that this model is not supported by fact. Women and men within the household typically have different preferences. This led us to study Nash's bargaining model. The distinguishing feature of this model is that the payoff to a player in a bargaining situation is dependent on what her payoff would be if negotiations were to break down. When a woman's threat option improves, she achieves a better bargaining outcome.

We then went on to discuss a different approach to bargaining, the so-called noncooperative bargaining model, in which the players make alternate offers. We saw that for a player to have the option of rejecting an offer and then responding to it with her own offer is itself empowering. Furthermore, having an outside option that she can exercise in the event that she rejects an offer is also empowering. Thus we see that, whichever model we invoke, what empowers women is the ability to make choices and having good outside options.

We went on to discuss empirical evidence supporting bargaining models of the household. Data from both developing and developed countries show that women and men have different preferences regarding household expenditures

and children's health and education. The extent to which these preferences are observed in the real world depends on the relative bargaining powers of the spouses. We saw that a study using data from Bangladesh revealed that if a woman's threat option does not change, her bargaining power does not change either—exactly as predicted by bargaining theory. We then discussed evidence from China showing that, in a culture that exhibits a preference for sons as opposed to daughters, women who have sons enjoy a greater say in household decisions than those who have daughters. In sum, the evidence supporting bargaining models is quite strong.

We finally launched into a discussion of the origins of patriarchy. Engels argued that societies that were originally matrilineal became patrilineal after they became pastoral and men acquired private property in the form of cattle. Men's desire to bequeath their inheritance to their children motivated the switch to patrilineality. Engels's point that private property drove a wedge between the bargaining powers of men and women is a deep insight. We saw that there is empirical evidence linking the move toward pastoralism and the switch to patrilineality, giving credence to the theory.

We further discussed empirical evidence showing that women in ethnic groups that historically used the plow are less likely even today to participate in work outside the home and in politics. The reason for this is culture. Cultural beliefs are durable, and they are passed on from generation to generation through the socialization of children. Much of the gender-normative behavior that is expected in contemporary times is merely based on socially constructed notions that have little validity in the present environment.

Exercises and Questions for Discussion

1. Sarah and Josh are contemplating marriage, and in the event that they marry their utility possibility frontier is given by $x + y = 12$, where x and y , respectively, denote the utility levels that Sarah and Josh attain in their married state. Their respective outside options generate a utility of $X = 0$ for Sarah and $Y = 4$ for Josh.
 - (a) Graph the region of feasible utility combinations in marriage, which presumably is a cooperative endeavor.
 - (b) Define the notion of Pareto efficiency. Why might we expect the outcome here to be Pareto efficient?
 - (c) If Sarah could unilaterally decide the allocation of utilities, what allocation would she choose? And what allocation would Josh choose?
 - (d) Describe (with the help of a diagram) the nature of the Nash bargaining solution (NBS), where *both* Sarah and Josh influence the outcome.

- (e) Compute the utilities of Sarah and Josh in the NBS by graphing the Nash product. Based on your solution, can you predict whether Sarah and Josh will opt to marry?
- (f) Redo part e when $X = 4$ and when $X = 8$ (assuming that Y is fixed at 4).
- (g) Using the solutions you have computed, graph Sarah's utility in the NBS as a function of her threat utility. On the same figure, also graph Josh's utility in the NBS. What do these graphs say to you?
2. On each of two days, Alan and Daisy can jointly undertake a project that yields a profit of \$150 per day. They *alternately* make proposals (at most one per day), starting with Daisy, about how to split this amount. If a proposal is rejected, they don't work on the project that day; if it is accepted, the agreement applies to *that day and the remaining day (if any)*. Suppose, first, that both Alan and Daisy have no outside option (they can earn nothing outside). They both want to maximize *their own total income* over the two days.
- (a) Determine the outcome (how they will split the profit) of this bargaining situation, carefully explaining your logic.
- (b) Now suppose that Daisy can earn \$70 a day outside (but Alan still cannot earn anything outside). Determine the bargaining outcome now.
- (c) Explain why the bargaining outcomes are different in parts a and b above.
3. In the study of Udry (1996) in Burkina Faso, spouses cultivated separate plots of land, and these had unequal productivities because different amounts of fertilizer were applied.
- (a) Explain why this outcome is Pareto inefficient.
- (b) Explain why such an outcome is not consistent with the unitary model of the household.
- (c) What is your explanation for the observed outcome?
4. In the Anderson and Eswaran (2009) study on the bargaining power of women in the Matlab area of Bangladesh, they found that (i) women who helped on their husbands' farms had no more autonomy than women who did only housework, whereas (ii) women who earned independent income had greater autonomy.
- (a) Explain whether i is consistent with Nash's bargaining theory. What aspect of the labor market in the Matlab area do you need to invoke to explain this outcome?
- (b) Explain whether ii is consistent with Nash's bargaining theory.

5. Outline the theory of Friedrich Engels about the emergence of patrilineality. What evidence is there for this theory? Relate the emergence and asymmetric ownership of private property to what Engels referred to as “the historic defeat of women.”

6. Summarize the arguments made by Barbara Smuts in her view of the emergence of patriarchy, with special emphasis on its evolutionary origins and the contributions of the transitions from gathering to hunting to settled agriculture. What economic measures would you recommend to counter hangovers of patriarchy in the present day?

7. Both feminists and evolutionary biologists argue that men seek to control the sexuality of women. Explain the main reasons behind this desire for control.

8. Outline Ester Boserup’s theory about the roles of the types of agriculture on women’s employment. Outline as well the empirical evidence in favor of Boserup’s hypothesis. How do you relate women’s employment to their bargaining power within the household?

9. To what extent can patriarchy be explained by evolution? Explain the role of socialization and, more generally, culture in perpetuating patriarchy.

10. Suppose that a couple in a patriarchal developing country find a way to augment their family income by undertaking a joint economic activity. This activity requires one input that cannot be purchased in the market and can be supplied only within the household and another input that is undertaken outside the home (such as marketing). Because the wife is restricted by patriarchal norms to work only within the home, she specializes in the former task while her husband specializes in the latter. With this new activity, the couple earns an extra \$100 a month. Using your understanding of bargaining theory, answer the following questions:

- (a) Will the wife be necessarily better off in utility terms with the couple’s higher income?
- (b) Do you think the proportion of the budget spent on goods preferred by the wife will increase?
- (c) How might your answer change if the husband and wife reversed the activities in which they specialize?